

STOCK CERTIFICATES *issued by the Calumet and Arizona Mining Company and its subsidiary, the New Cornelia Copper Company.*

underground mines was so rich in copper that it could be shipped directly to the Douglas smelter; but as its quality dwindled, Phelps Dodge depended more than ever before on modern mining and milling wizardry to extract profitable ore from the huge porphyry deposits in the area. But after a few years those sources too appeared exhausted, and despite a $2 million search the company was unable to locate any new deposits of substantial size on its Bisbee properties. It closed the Sacramento Pit in 1929, partly for lack of ore but also for lack of space needed to expand its landscape of production. That happened even as shafts of some of its underground mines drove through the bottom of their ore bodies. All that was grim news. Cates needed to develop or buy some new mines—and soon.

A Perfect Fit

CATES SAW A simple solution close at hand in the company's old rival, the Calumet and Arizona Mining Company. Buoyed by profits from its twenty-acre Irish Mag claim, which contributed to a rich and steady dividend, it had expanded its Bisbee holdings in the early twentieth century to include hundreds more claims there, and then it reached south to acquire lead mines in northern Sonora, east to gain the Eighty-five Mining Company near Lordsburg, New Mexico, north to the Verde Central near Jerome, and west for John Greenway's New Cornelia Copper Company and the beautiful town of Ajo. Mainly it was the mine and mill holdings at Ajo—a desert oasis located in an isolated, mountain-ringed valley 120 miles west of Tucson—that made Calumet and Arizona so attractive to Cates. The New Cornelia Mine held plenty of copper ore to supply Phelps Dodge's smelting and refining facilities for years to come and to provide copper for its fabricating plants. Cates regarded the Ajo property as just what his vertical integration of Phelps Dodge required.

Auspiciously, as Cates reminded his stockholders, their company had cash and securities it accumulated in periods of favorable earnings "available for possible future expansion." Other copper companies were not so fortunate. Calumet and Arizona paid such liberal cash dividends during the 1920s that the disastrous downturn after 1929 left it short of money and on the verge of bankruptcy. Here, as in the case of the struggling Arizona Copper Company in 1921, was a buying opportunity for Phelps

Dodge. Cates fully realized that gaining Calumet and Arizona would greatly strengthen his corporation where it was most vulnerable—in long-range production. Between them the two companies produced almost 360 million pounds of copper in 1930. That year Phelps Dodge's assets were $285 million, and the Calumet and Arizona's were approximately $85 million. Cates dreamed of the powerhouse the combined companies could become.[1]

Calumet and Arizona's president, Gordon R. Campbell, had joined the company shortly after it was organized in 1901 in Michigan's Copper Range and served as its chief executive since 1921. The relationship between Calumet and Arizona and Phelps Dodge had always been friendly enough, but after spending thirty years successfully mining copper in Arizona, Campbell had no desire to end his career by taking orders from Cates. The Calumet and Arizona president fought the merger openly, but sensing that the battle was lost, he resigned in April 1931. All during the spring and summer months when members of the Calumet and Arizona board hammered out merger terms, their office of president went unfilled. In the end they drove a hard bargain: their stockholders exchanged thirteen Calumet and Arizona shares for four of Phelps Dodge (receiving 2.6 million shares in all), and they profited from a special premerger dividend of $2.50 a share. All this meant that the wealth and power of Phelps Dodge were distributed into a far greater number of hands.

To carry out the consolidation in September 1931, Phelps Dodge doubled its capitalization to almost six million shares and added nine new members to its board of directors, for a total of twenty-one. From the former Calumet and Arizona board it gained Louis D. Ricketts and James C. Rea, an eminent Pittsburgh businessman who effectively headed Calumet and Arizona after Campbell quit. Rea was also a member of the Phelps Dodge family because he had married Cleveland Hoadley Dodge's daughter Julia in 1911.

The Calumet and Arizona merger gained Phelps Dodge extensive holdings in Bisbee, which included the Cole, Junction, and Campbell mines, the once great Irish Mag Mine, and several smaller properties. From 1931 on, with the exception of the Shattuck companies, the Warren mining district was wholly a Phelps Dodge operation. Now there was plenty of room to reactivate and expand its open-pit operation. A further payoff was the New Cornelia Copper Company at Ajo.

When Phelps Dodge acquired Calumet and Arizona, besides the well-constructed mining and milling complex at Ajo and a virtually untouched sulfide ore body to meet future needs, it gained another railroad (the Tucson, Cornelia, & Gila Bend) and one more model company town. Ajo was truly an attractive oasis. Back in 1916, having finally solved the riddle of how to remove New Cornelia's overburden profitably, Calumet and Arizona tackled the water problem. Because the Gila River ran fifty miles north of town, residents of old Ajo had to rely instead on whatever drinkable water they could accumulate in tanks and barrels during the summer cloudbursts. For the company the obvious solution was to drill, and after several failed attempts, a crew using an oil-drilling rig at a site some six miles north of town broke into an ancient lava flow and

New Cornelia

From Rogues to Riches

Ajo and the New Cornelia Branch became the latest addition to the Phelps Dodge landscape of production in 1931, although mining in that corner of the Sonoran Desert actually dated back many decades to Spanish and Mexican prospectors. The first Americans arrived there in late 1854, shortly after the United States acquired that portion of Arizona south of the Gila River known as the Gadsden Purchase, but lack of water and good transportation facilities discouraged all but the most persistent prospectors.

Perhaps the single most frustrating thing about Ajo was that its sulfide ore lay buried deep beneath a surface deposit of granite and some twelve million tons of low-grade oxide copper not readily amenable to concentration. Just to remove the rocky overburden that capped the valuable copper would cost millions. Over the years the challenge of solving this mineralogical puzzle had attracted a veritable "Who's Who" of mining to Ajo, along with mine promoters, harmless cranks, and a few clever swindlers. Moreover, the challenge at Ajo showcased some of the most imaginative technology in mining history, though much of it was just as bogus as the fabled philosophers' stone supposedly able to transmute base metals into gold.

Among the several hucksters who blackened Ajo's reputation, none was more flamboyant than Professor Fred L. McGahan. Promising that his vacuum smelting method would unlock the area's copper riches, he fashioned a large furnace consisting of a brick-lined steel cylinder twenty-five feet high and six feet in diameter, and to this he attached several smaller horizontal cylinders containing the oxygen and hydrogen gases that entered into the reaction. A bewildering array of pipes, gauges, and spigots stuck out in all directions. McGahan glibly claimed that, after he pumped regular air out of the furnace cylinder and carefully fed in copper ore mixed with a little fuel oil and just enough oxygen to burn it, he could regulate the temperature so precisely that he could melt every element and separate each out one by one.

Molten gold would sink to the bottom first, where it could be drawn off through the lowest spigot, then came pure silver, copper, and other metals from spigots located progressively higher, until finally the ones at the top yielded oxygen and hydrogen gases. Once it was fired up, or so McGahan claimed, his remarkable furnace could recycle oxygen and hydrogen to maintain heat without needing any outside fuel. Nothing was lost and every element came out chemically pure. Even more impressive, he promised to achieve all this without first having to crush the ore.

It was all pseudoscientific nonsense, the technological equivalent of a perpetual motion machine, but before the professor put his wondrous vacuum smelter to the test, he hastily departed Ajo, leaving behind a note that demanded another $50,000 before he would reveal the secret of its operation. Whether the professor was crazy, or whether he was a rogue who deliberately took advantage of the childlike ignorance and greed of mine investors is no clearer today than in 1907. For years the rusted hulk of McGahan's "vacuumizer" served to stimulate local conversation, and if nothing else, it provided an inventive work of industrial art.

Other would-be entrepreneurs used the more conventional technologies of stamp mills and concentrate tables, but the ores of Ajo



WORKMEN DRILLING BLAST *holes thirty-five feet deep at the New Cornelia Copper Company in Ajo.*

thwarted each one. Out of this harsh land came the New Cornelia Copper Company, named for one speculator's wife. At first it was no more successful than any other outfit. But in 1911 along came John Campbell Greenway, who had headed west a year earlier to run the underground mines at Bisbee for Calumet and Arizona, and with him was Louis D. Ricketts, the genius who had earlier helped Phelps Dodge launch its operations at Nacozari. Both radiated the influence of Daniel C. Jackling and his open-pit mining technology, although Jackling himself was never actively involved at Ajo.

On the advice of Greenway and Ricketts, Calumet and Arizona immediately acquired a controlling interest in the New Cornelia Copper Company. The two men began five years of patient experiment and research. During most of the time their quest seemed hopeless. They would ruin their company and their reputation, renowned engineers warned if they kept on. What drove Ricketts and Greenway, a Rough Rider in 1898 with Teddy Roosevelt in the Spanish-American War and a man of heroic qualities, who allowed nothing to stand in his way, was that further test drilling revealed an immense sulfide deposit estimated to contain at least fifty million tons of copper ore beneath the unforgiving Ajo landscape.

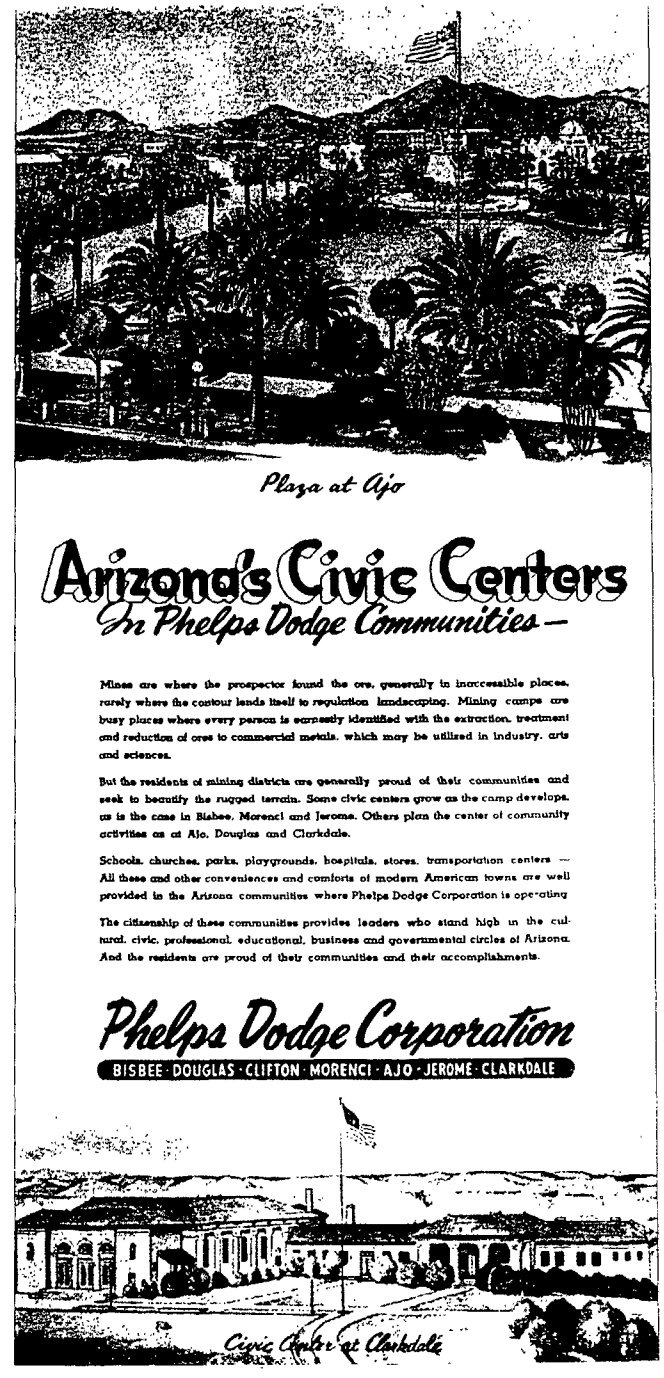
Their persistence won the day. In early 1916, Greenway and Ricketts appeared before the Calumet and Arizona directors to secure their approval to build a leaching plant at Ajo capable of processing five thousand tons of ore per day. When workmen completed the facility in May 1917, it was a monument to engineering efficiency and a rebuke to the naysayers. Once the big leaching plant reached full operation, open-pit mining of the valuable ore body started at Ajo. Yielding a steady stream of copper that sold at the high wartime price of twenty-five cents a pound, the Ajo mine and mill complex more than covered its operating expenses and the cost of removing the oxide overburden, developing the sulfide ore below, and paying regular dividends to shareholders.

(Adapted from Ira B. Joralemon, *Copper* [Berkeley: Howell-North Books, 1973])

at a depth of 1,250 feet tapped into an almost inexhaustible underground river.

With an abundance of life-giving water close at hand, Calumet and Arizona proceeded to construct a remarkable company town. Inspired perhaps by Bertram Goodhue's Tyrone, planners employed the Spanish colonial style and determined to make Ajo as beautiful as it was functional. Residential areas were carefully located away from the mine and mill complex, yet near enough so that employees could walk to work. Many young shade trees soon lined wide, paved avenues that fanned out from a spacious plaza where the well-watered common and the oleander bushes contrasted dramatically with the desert that surrounded Ajo. The company constructed good-quality homes for its workers along the newly landscaped roadways.

The new Cornelia's boss and Ajo's primary creator, John Greenway, built a bungalow of his own on a ledge overlooking the village, though he did not live there long enough to see both the town and the company become Phelps Dodge property. While in New York late in 1925, the Colonel, as Greenway became affectionately known, suffered severe stomach pains. The problem was gallstones, and although the



— Phelps Dodge saluted *Clarkdale and Ajo, two of its most attractive towns in the mid-1940s. Ajo's predominately mission-style architecture was intended to honor the tradition of Spanish padres, who were some of the first European residents of the Sonoran Desert. In a community where every drop of water was precious, the company intended the lush plaza to serve as everybody's front yard. Ajo's visually arresting layout remains largely unchanged today.*

operation to remove them was a success, the patient died four days later on January 19, 1926, from a blood clot. Fifty-three at the time of his death, Greenway was buried in an imposing private graveyard overlooking the open-pit mine he did so much to develop.

On another hilltop was the New Cornelia Hospital, a well-staffed, thirty-five-bed facility with the most modern equipment. Employees in the 1920s paid two dollars or less per month for medical and hospital services for themselves and their families. Greenway spent another $85,000 to establish the New Cornelia Cooperative Mercantile in early 1917, a store overseen by a committee of workers recruited from various departments of the New Cornelia Copper Company. It regularly returned any profits to its customers. When the store first opened its doors in 1917, many employees were skeptical. But before Christmas that first year, 472 workers received a 15 percent rebate, an amount that totaled some $12,000. Year-end rebates became a regular feature of the rhythm of life in Ajo and were one reason that employee turnover was very low.

Dark Days

The merger in the fall of 1931 joined Phelps Dodge's well-filled treasury and management skills with Calumet and Arizona's huge copper reserves. But it did little to brighten the troubled business climate. The early 1930s were not kind to the American copper industry, or to any other large industry for that matter. With the United States mired deep in the Great Depression, diminished demand for copper, falling prices, and foreign competition combined to force Phelps Dodge to cut production by almost 75 percent. "Conditions in the copper industry in 1931," wrote a dispirited Louis Cates, "grew steadily worse."[2]

Cost cutting was the order of the day. Following the Calumet and Arizona merger, Phelps Dodge sold several boxcars of surplus machinery from shops in Bisbee and Douglas to the companies constructing Hoover Dam on the Colorado River. To effect even larger savings, Phelps Dodge abandoned the old Copper Queen smelter at Douglas and enlarged the nearby Calumet and Arizona works to process ore from the consolidated companies. Prior to this both smelters operated at only 50 percent capacity.

For producers generally, hard times required down-the-line belt tightening and overall cuts in production. Even so, with copper selling for less than five cents a pound at a time when Phelps Dodge could scarcely deliver metal to the refinery for less than eight cents, the corporation lost money on mining. Its trifling profits in refining and fabricating, where production slowed to about one-third the normal rate, could not stem the flow of red ink. After trimming its payout at the start of the decade, Phelps Dodge dropped dividends altogether in 1932 and 1933 until it finally granted a "special distribution" in February 1934. The corporation, which had paid out $130,574,000 in dividends from 1909 through 1931, had an open market value of only $21,512,704 in 1932. Cates's push for vertical integration seemingly counted for little in the face of hard times.

Day wages, which customarily fluctuated

according to a sliding scale that corresponded to copper's selling price, reflected the downturn almost immediately. First, production workers received thinner pay envelopes, and then none at all as layoffs spread. Phelps Dodge slashed office and managerial pay but tried in every way to lessen the hardship, such as by favoring employees who had families, spreading hours of work, and making generous gifts to local charities. It contributed, for example, $20,000 to unemployment relief funds at Bisbee and Douglas before Christmas 1931.

At Ajo, Phelps Dodge quickly organized the New Cornelia Branch and spent a considerable sum of money to upgrade the mine, processing plant, and town. But because copper prices continued their sickening slide and the hard times lasted far longer than Cates anticipated, in 1932 Phelps Dodge had to suspend production at all its mines except for the richly endowed Campbell Shaft of the former Calumet and Arizona operation in Bisbee. For a time, nearly all the labyrinthine passageways beneath the Warren district fell silent. There and elsewhere, idle machinery rusted in the desert sun. Of the ten thousand miners that Phelps Dodge employed during good times, fewer than a thousand retained their jobs. In Bisbee the one miner in ten who still reported for work was likely a longtime company employee.

The ongoing adversity Phelps Dodge faced during the Great Depression can be summarized by a series of bleak news items that reported "Moctezuma Copper Closed," "Morenci Branch Shut," and "Operations at Bisbee [Reduced from] 15-Day Schedule to 12 Days a Month." Everything "depends on the copper situation," reflected a pensive Beckett. "How long we can continue even on the present greatly curtailed basis is impossible to say."[1]

As the mines closed, nearby towns suffered both widespread unemployment and an exodus of residents in search of jobs elsewhere. After the Morenci Branch ceased operations on June 23, 1932, so many people left the mining district that the population of Clifton dropped from almost five thousand residents to only fifteen hundred in a matter of months. Phelps Dodge furnished a special passenger train to take hundreds of stranded Mexicans back to Juárez. Many found it difficult to adjust to life in Mexico after living in the United States several years, and so they drifted back, some walking the entire four hundred miles. A few who returned to Clifton earned a precarious living panning for gold in the San Francisco River.

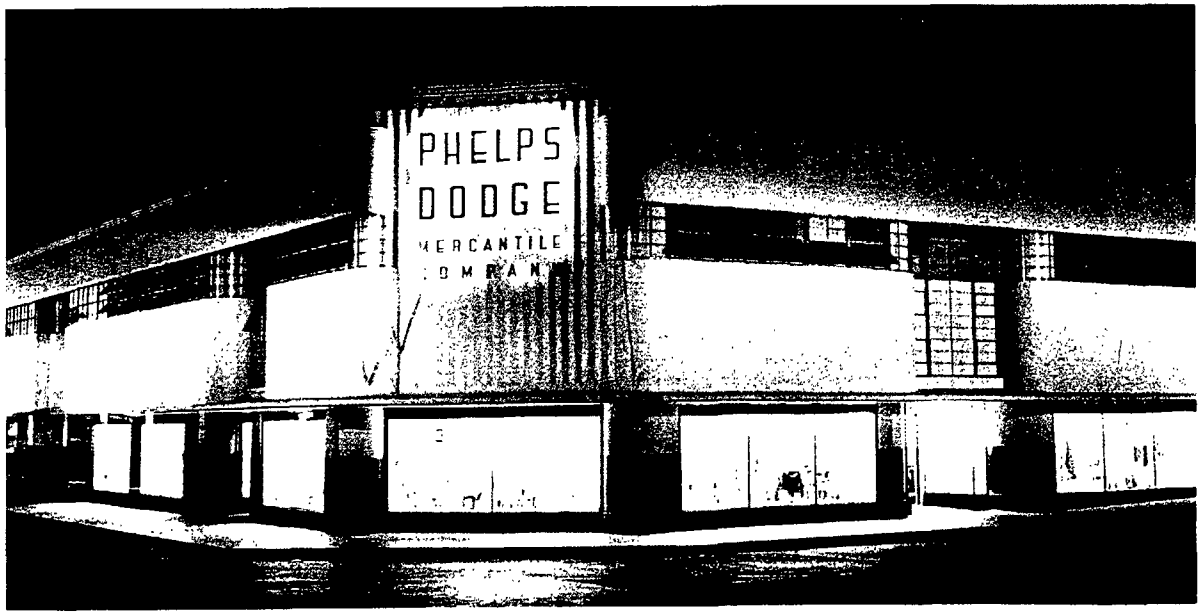
As hard times grew worse, once busy streets in Bisbee, Douglas, Morenci, Ajo, and other depressed mining centers became almost deserted. As for Nacozari, you could leave out the qualifier *almost*. Effective September 21, 1931, the Moctezuma Copper Company was forced to lay off indefinitely virtually all its employees. The Mexican copper center virtually ceased to exist as a town after Phelps Dodge bought a railroad ticket for each of its sixty-eight hundred residents.

People wondered when, and if, the mines of Nacozari would ever reopen. Obviously, it would not be any time soon. Stacks of unsold wirebars crowded the storage yards at Nichols Copper refineries in El Paso and New York, and still more surplus copper existed at other Phelps Dodge properties. Domestic producers, usually content with a six-week supply (approximately

The Mercantile Has a Heart

On December 19, 1933, Andrew W. Liddell, general manager of Phelps Dodge Mercantile, wrote to his boss, P. G. Beckett, vice-president and general manager, to explain that the "credit problem in Bisbee is a very difficult one and the tendency is for it to become more acute." Liddell went on to note that "rightly or wrongly, the employee losing his job or suffering a curtailment in income and having his credit stopped, feels he is hit from both sides—by the Mining Branch when he loses his job and by the Mercantile Company when his credit is stopped." He continued, making a case for leniency: "Accounts which were paid promptly prior to the curtailment, these customers, due to the reasons indicated, find it difficult to pay their bills now." The "credit problem" in the Bisbee area, a subject of several letters exchanged by Liddell and Beckett in late 1933, offers a reminder that, in Phelps Dodge communities, the Mercantile provided a needed social service as well as groceries and other merchandise.

—Based on a letter from A. W. Liddell to P. G. Beckett, December 19, 1933, Phelps Dodge Mercantile records, Phoenix



A NIGHTTIME PHOTOGRAPH *of Phelps Dodge Mercantile in Bisbee. After a fire destroyed the original store and all its additions except for the warehouse, the Mercantile constructed this new facility on the site in 1939. It was the first major building project undertaken by a young contractor named Del Webb, who later became famous for his "Sun City" retirement communities and ownership of the New York Yankees. This store closed in July 1976, not long after Phelps Dodge shut down its last Bisbee mines.*

120 million pounds of blister or refined copper or both), by the spring of 1932 confronted a mind-boggling one billion pounds of above-ground stocks.

Seeking New Markets: The Dymaxion Bathroom

With the world once again awash in an ocean of low-priced copper and with the collapse of markets in the electric, railroad, building, and automotive industries, the best thing for Louis Cates and Phelps Dodge to do, apart from further cutting costs, was to create new markets for red metal. One unusual result of that effort was the Dymaxion Bathroom. In what was one of the corporation's stranger business ventures, Phelps Dodge hired a controversial young industrial designer named Richard Buckminster Fuller, Jr., to fashion a one-piece bathroom entirely from copper. The man known to history as Bucky Fuller joined the technical staff at the Laurel Hill Refinery in 1935 to develop a unit called the Integrated Bath or Five by Five (for the number of square feet it occupied).

Using Fuller's basic design, Phelps Dodge produced twelve prototypes of the Dymaxion Bathroom. Technicians handcrafted each one from a single large sheet of copper that they hammered into shape over dies, hardened, and then sprayed with an alloy of tin and antimony intended to resist soap stains and keep the copper shiny and bright. A complete bathroom, which included an integral lavatory, toilet, and tub, weighed 404 pounds, about as much as the usual porcelain bathtub alone. Two men were supposed to be able to handle a home installation in three hours because of the minimum number of plumbing and wiring connections. Best of all, or so Phelps Dodge scientists claimed, renters could purchase and easily install a Dymaxion Bathroom themselves. When they moved on, they could just as easily remove the unit and haul it to their next home. The latter feature was considered important to the many mobile Americans during the uncertain times of the 1930s.

Fuller, incidentally, coined the term *Dymaxion* from the words *dynamic* and *maximum*. In 1933 he invented a Dymaxion car, a three-wheel rear-engine model that apparently inspired the researchers at Phelps Dodge to pursue making bathrooms that could be easily stamped out like so many automobile bodies. By late 1937, Phelps Dodge had invested some $20,000 in the quixotic project, no small amount during hard times when a new Arrow dress shirt cost less than $1. Cates took such personal interest in the project that he even had a Dymaxion Bathroom displayed outside the corporation's new headquarters on the twenty-ninth floor at 40 Wall Street. Up in midtown Manhattan in 1937, the Museum of Modern Art offered the curious public another look at the Dymaxion Bathroom. In truth, no one knew what to make of the strange object. Was it art or science or sheer lunacy? Press observers were no less certain of Fuller himself, whom they variously described as a genius, a crank, or a madman.

Both the quirky bathroom and its no-less-quirky inventor were studies in contradiction. Fuller, the son of an aristocratic New England family, was expelled from Harvard for skipping too many tests and later arrested at the Waldorf-

Astoria Hotel for failing to pay his bills. There was talk of sending him to a reformatory, but a friend saved Fuller by finding him a job as a meat handler with Armour and Company in New York. One popular profile described him as a stubborn but good-natured man who seemed to stare out at the world with disconcerting intensity.

For Phelps Dodge the Dymaxion Bathroom was purely a business proposition. It offered an innovative way to respond to the copper market during times of abnormally low demand, energize the company's struggling mines, and put employees back to work. Hoping to sell each unit for less than $400, Phelps Dodge anticipated a tremendous market for the Dymaxion Bathroom in government housing projects. But because its first units sold for more than $700 apiece, not one ended up in low-cost housing. Quite the contrary. Two were installed in the Jasper Morgan residence in New York City and two more in the John Nicholas Brown residence on exclusive Fishers Island in Long Island Sound.

Fuller received patent no. 2,220,482 for his Dymaxion Bathroom in 1940, which he promptly assigned to Phelps Dodge. He may have intended his invention to become part of a complete Dymaxion Dwelling Machine, a futuristic house he had evidently conceived back in the 1920s. He had two prototype dwellings built by Beech Aircraft in Wichita, Kansas, during the months immediately following World War II. Both of the homes were circular structures fabricated from a combination of lightweight plastics, aluminum, and stainless steel and hung from a central mast instead of resting on a conventional foundation. In truth, they were visually arresting— looking much like flying saucers, which, incidentally, people first spotted in western skies in 1947. But neither the modular bathroom nor the full-blown dwelling machine entered production. Well before 1947, Cates had grown disillusioned and halted Phelps Dodge participation in Fuller's projects.

During World War II the company sold one Dymaxion Bathroom to a secretary at its Laurel Hill plant for the junk value of the unit, about $50. That was pocket change compared to approximately $25,000 Phelps Dodge invested in its odd venture in industrial design. Apparently most of the rest ended up as copper scrap. Only two units survive today: one is at the Montreal Museum of Decorative Arts and another is at the Henry Ford Museum and Greenfield Village in Dearborn, Michigan.[4]

One cannot fault Cates and Phelps Dodge's research personnel for their initial interest in the Dymaxion Bathroom. Those were desperate days. Shares of Phelps Dodge common stock that sold for three hundred dollars apiece in 1929 had dropped to seven by 1932, the year that copper prices bottomed out at slightly less than five cents a pound. Earlier, after a two-week trip to the East in mid-1931, P. G. Beckett had reported back to his colleagues in Douglas, Arizona, that "in the copper business everything is just about as sad and unhappy as it could be." And, he added, the situation "is getting worse rather than better."[5]

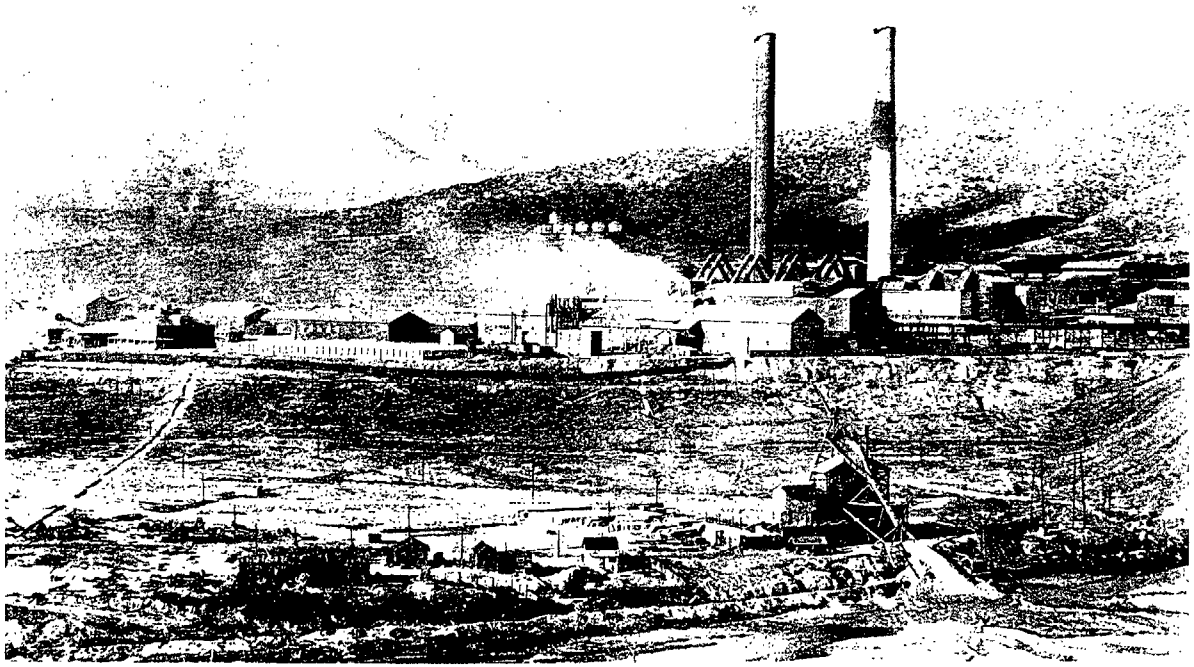
A New Day at Old Jerome

The years of the Great Depression presented Phelps Dodge with yet another great opportunity at Jerome, Arizona, where in

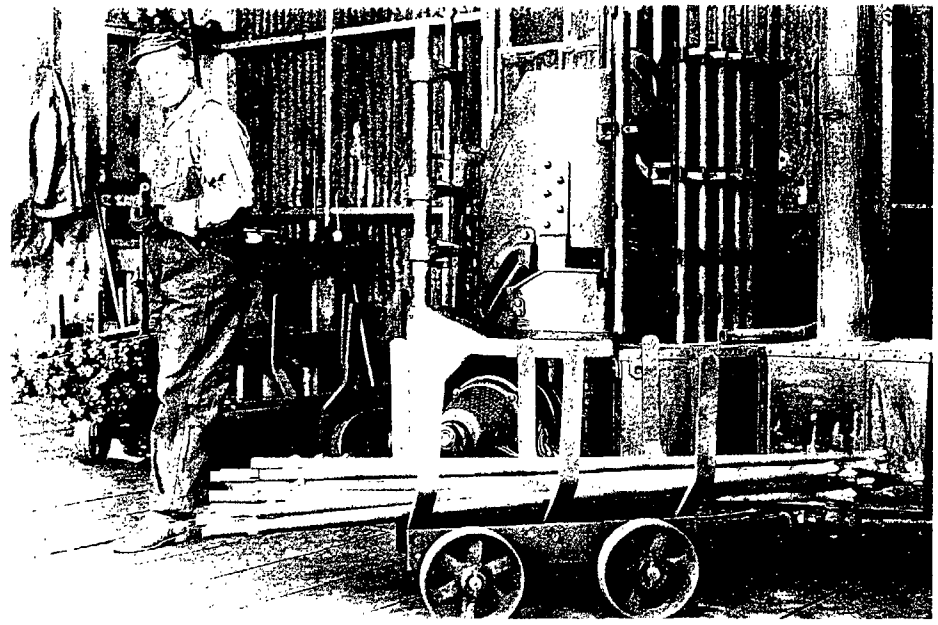
1935 it bought the old United Verde Copper Company, a purchase that positioned it ahead of Anaconda and second only to Kennecott among America's leading producers. In Jerome, as in Ajo and elsewhere, Phelps Dodge picked up the strands of several decades of history along with its newly acquired property. Among Jerome's claims to fame was that it was home to the world's richest individually owned copper mine, the United Verde. Another was that Jerome's mines yielded enough wealth to make three separate fortunes—one each for William Andrews Clark and Phelps Dodge at the United Verde Copper Company and another for "Rawhide Jimmy" Douglas and his associates from the United Verde Extension Mine, which they discovered almost literally under Senator Clark's nose.

United Verde first began to produce a significant amount of copper matte and precious metal bullion back in 1883, though not necessarily at a profit. In 1885, as Montana commissioner to the New Orleans Cotton Centennial Exposition, William Andrews Clark examined an exhibit of United Verde ore. Legendary for his attention to detail, Clark noticed gold and silver in addition to copper. Three years later, in 1888, shortly after his first visit to the isolated site, he purchased the United Verde property and developed it into an impressive mine, smelter, and railroad complex.

By 1900, when the United Verde Copper Company ranked ahead of the Copper Queen as Arizona's most productive copper mine (and the sixth most productive in the world), it yielded



Ground was broken in 1912, and the first furnace of the United Verde Copper Company's Clarkdale smelter was "blown in" on May 16, 1915. The following year it processed three-quarters of a million tons of copper ore. Phelps Dodge acquired the property in 1935. Jerome and the United Verde's original smelter site are on the slopes of the distant mountains at the far left.



INSIDE THE UNITED VERDE'S *drill-sharpening shop built in 1919–20. This was a small but vital cog in a major mining enterprise, which itself formed only one portion of the vast and complex industrial machine assembled by William Andrews Clark. Among his holdings were metal mines, wire-fabricating plants, electric utilities, sugar, rubber, and coffee plantations, and America's largest bronze factory. Phelps Dodge gained valuable pieces of the Clark empire in the form of the Bayway plant in New Jersey and the United Verde Copper Company in Arizona.*

about forty million pounds of red metal a year. The torrid pace of production held steady for at least twenty years. By the second decade of the century, however, Clark's smelter was unable to keep up with the flood of ore. And because the smelter, a network of railroad tracks, and various shop buildings sat atop the underground mine workings, maintaining the complex had become both difficult and expensive.

In fact, the whole works started to slip downhill because of the miles of tunnels that honeycombed the property, giving rise to the quip that Jerome "is a town on the move." That was one reason Clark bought a number of ranches along with their valuable water rights in the Verde Valley in 1910. There, about six miles downhill from Jerome, he built a new reduction works and the model town of Clarkdale to attract and hold stable, family-oriented employees. His utility company provided water, light, and power for Jerome and administered Clarkdale. Its services ranged from police protection to garbage collection.

United Verde production temporarily peaked at the end of World War I in 1918, when the company mined about 870,000 tons of ore, most of it coming from an open-pit that commenced operation on the old mine site a year earlier. The postwar slump in copper prices temporarily slowed production, but in 1923 after the copper market recovered somewhat from its doldrums, the company's output broke all records at more than a million tons. The United Verde was a very profitable property, and from the late 1880s until the mid-1920s, most dividends flowed straight into Clark's own deep pockets. Unlike the usual business tycoon of his day, he avoided mergers and partnerships, and he preferred to take on only family members as associates. At the time of his death in March 1925, Clark and his family owned 99.7 percent of all shares issued by United Verde, and a few trusted colleagues owned the remaining handful.

Clark's heirs were not as interested in mining as he was, and when copper prices plummeted during the Great Depression, they halted all production at United Verde in May 1931 and a short time later opted to sell the property. Mining experts had only recently advised them that its ore reserves were nearly exhausted. Further, a massive slide of six million cubic yards of rocky overburden occurred along a steep wall of the open-pit mine on March 23, 1931, enveloping Jerome in dust and creating a thunderous roar heard several miles away. The slide required five years and considerable expense

a grandson died.

Meanwhile, Phelps Dodge's own geologists and engineers, upon investigation, came to believe that the United Verde Copper Company still possessed enough potential to make it a worthwhile investment, which during the next quarter century it proved to be. After waging a brief contest with the American Smelting and Refining Company, which probably had its eye on the smelter at Clarkdale, Phelps Dodge acquired the property on February 18, 1935, for slightly less than $21 million.

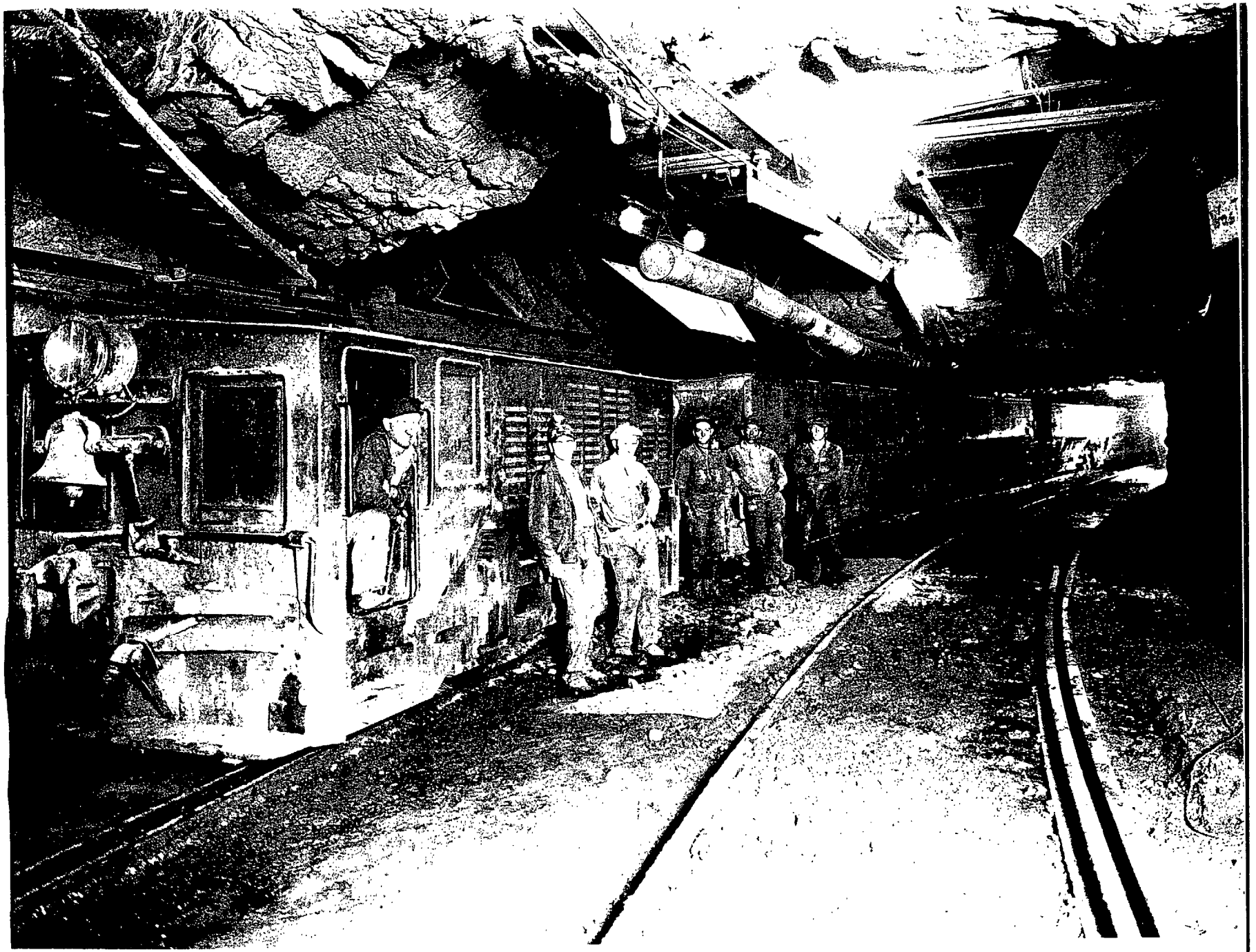
For that sum it gained the large Clarkdale smelter as well as the nearby company town, connecting railroads, and local utility company, in addition to the mines and mining claims in the Jerome area and the wholly owned Compañía Minera de San Carlos, S.A., a lead-silver property located ten miles south of the Rio Grande River in Chihuahua, Mexico. From its United Verde holdings Phelps Dodge earned more than $40 million in profits from copper, zinc, silver, and gold ores before it ceased large-scale mining at Jerome in 1953. It subsequently sold off the utility company, railroad, smelter, and Clarkdale itself. Today the town is an active community where wide streets and several Spanish-style municipal buildings grouped around a plaza recall its origin in 1914 as Senator Clark's ideal company town.

Slow Return to Prosperity

By the middle years of the 1930s, Phelps Dodge's finances seemed secure. The price of copper still hovered around eight to nine cents a pound, a figure that did nothing to lift the prevailing gloom but, because of shrinking inventories and a four-cent protective tariff levied by Congress in 1932, would not likely drop down to rock-bottom levels seen during the worst of the depression. Cates reported to stockholders in early 1935 that the mines of Moctezuma and Morenci remained closed, Bisbee was producing copper only on a limited basis, but the New Cornelia at Ajo had reopened the previous July 1 and "operated steadily" for the last half of 1934. Moreover, to strengthen its balance sheet Phelps Dodge sold the Tombstone mine properties that it had leased out for years and the steel-oriented National Electric Products Corporation, which it had never successfully integrated with other components of Phelps Dodge Copper Products Corporation. In general, the business climate was improving.

The Copper Products subsidiary traveled down the same road to moderate recovery as did its mining counterpart in the late 1930s. By that time, plant additions and a corresponding enlargement of its workforce were accelerating; and some new orders, such as for hundreds of miles of heavy cable for the new Bonneville Power Administration in the Pacific Northwest, were sizable enough for the business press to take notice. Additional encouragement came from Arizona, where deposits in Bisbee continued to yield copper ore as workmen deepened old shafts and sank new ones. In anticipation of a bright future for copper, Phelps Dodge expanded the power plant and enlarged the Douglas smelter by adding three modern furnaces to increase its capacity beyond current needs.

Electric haulage in United Verde's Hopewell Tunnel. *Although steam shovels generally loaded ore into railroad cars for the trip up and out of an open-pit mine, in the 1920s at Jerome's United Verde Mine they loaded it into some of the first haulage trucks used in the industry. These took the ore to an old vertical shaft hundreds of feet deep and dumped it. At the bottom, railcars carried it through a long horizontal drift called the Hopewell Tunnel to the outside, where more men loaded it aboard the cars of the Verde Tunnel & Smelter Railroad for a seven-mile trip down the mountainside to the Clarkdale smelter.*



By the spring of 1937 something approximating prosperity once again energized America's copper producers. The improving business climate meant revival of activity at almost all Phelps Dodge branches and opportunity to launch a number of new building projects. At Ajo's New Cornelia operation alone, the company spent more than $2 million on a host of improvement programs that ranged from increasing the capacity of the open-pit mine to building fifty more workers homes. Among P. G. Beckett's important contributions to mine operations was a switch from old-fashioned steam shovels that operated along railroad tracks to more flexible and productive electrical shovels that traveled on their own moving treads.

Back in the dark days of 1932 who could have predicted that only four years later the Ajo open-pit mine would emerge as Arizona's leading copper producer, yielding an impressive ninety-six million pounds of red metal in 1936? The mine remained at the head of the pack until 1942. It earned a profit at a time when the price of copper averaged less than ten cents a pound, and Ajo ore contained only ten pounds of red metal per ton.

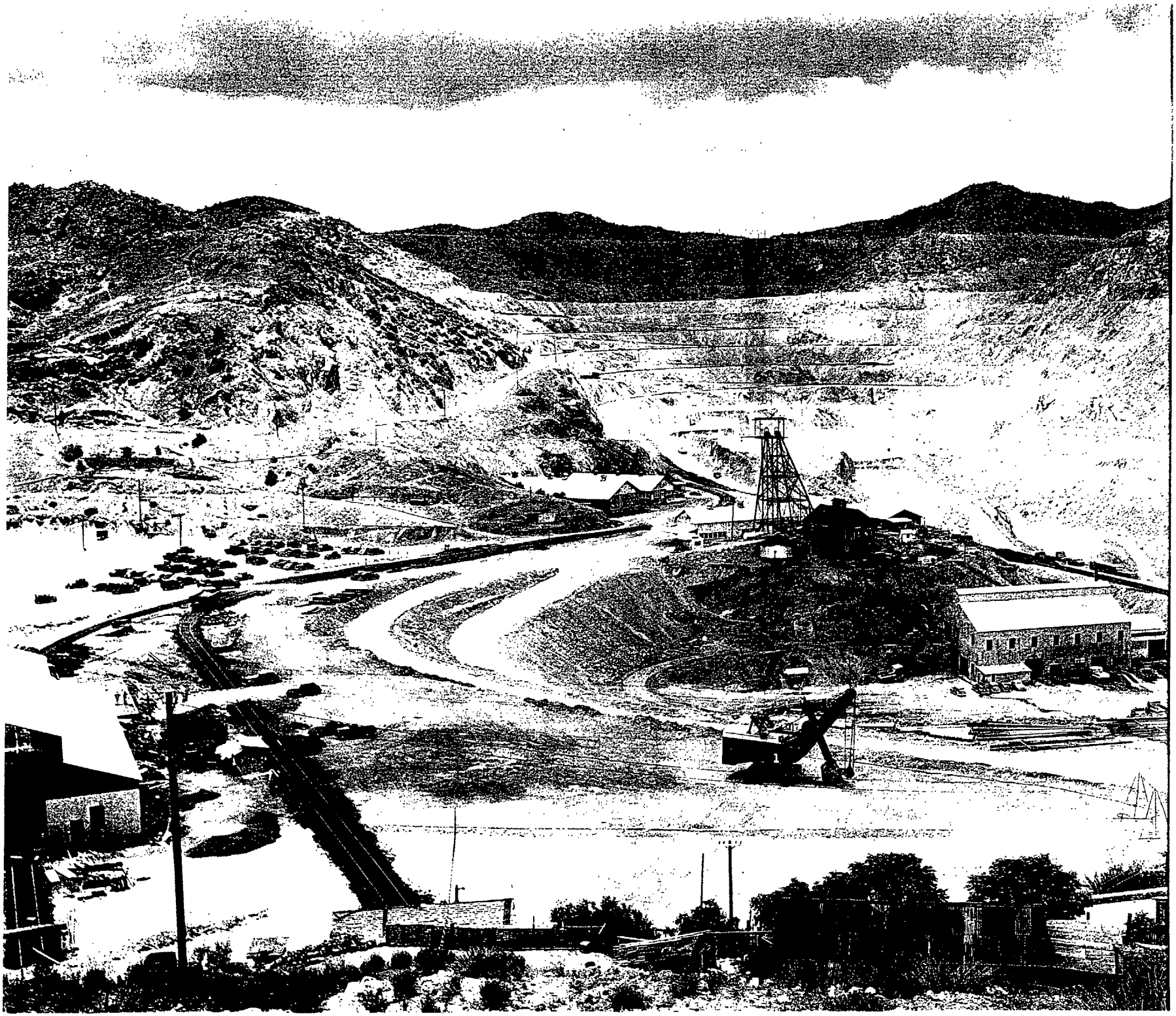
On the whole, Phelps Dodge emerged from the Great Depression in much better shape than it had entered it. By permanently closing its underground mines at Morenci, temporarily halting production at its open-pit mine at Ajo, and focusing its activity at Bisbee, Phelps Dodge minimized production costs during the worst of the hard times. And occasionally a ray of sunshine pierced the gloom, as it did in 1934 when underground crews at Bisbee discovered a massive sulfide ore body averaging 9.5 percent copper. By the late 1930s, corporate earnings had climbed to the highest level since the boom times of World War I, and the number of miners Phelps Dodge employed rebounded from a thousand or so during the worst months of the depression to ten times that number.

By 1937 the future looked brighter than at any time since Cates became president seven years earlier. For Phelps Dodge management it was time to start to develop the colossal low-grade copper deposit at Morenci, where its plans for an open-pit mine had been put on hold. It was fortunate that the man who stood at the corporate helm during that challenging undertaking was someone who had made his reputation developing large porphyry ore bodies. Assuredly the technological challenges did not worry him. In fact, after steering Phelps Dodge safely through the murky waters of hard times, probably very little worried him, not even rising international tensions in Europe.

In 1938, as men and machines battled to prepare the Clay ore body for mining, the Nazi legions goose-stepped their way into Austria and then Czechoslovakia. They launched an invasion of Poland in September 1939. Phelps Dodge had nearly completed its Morenci project when wave after wave of enemy warplanes launched a surprise attack on Pearl Harbor on December 7, 1941. After that "day of infamy," what a few years earlier had seemed like an enormous and risky undertaking was too modest to satisfy the insatiable wartime demands for copper.

WORKMEN INSTALL *Habirshaw's special "Park Cable" in a bucolic area of Saint Louis, Missouri, in this undated image (apparently from the 1920s). The product was used "where it is preferable to bury the cables directly in the ground rather than put them in ducts."*


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Chapter Nine



EVOLVING ENTERPRISE *in* WAR *and* PEACE

ONE THING THAT greatly irritated Louis S. Cates in 1941 was the ghost of the old Bisbee deportation as invoked in a landmark United States Supreme Court case called *Phelps Dodge Corporation v. National Labor Relations Board*. Therein lies an episode that illustrates how much more Uncle Sam intervened in business dealings after 1937 and why the New Deal and World War II years brought dramatic and enduring alterations to Phelps Dodge—and not just in the area of government relations.

A Ghost of Old Bisbee

THE STRENGTH OF organized workers in the United States declined after World War I when the nation entered an era of applied scientific management and labor cooperation that prevailed until the early 1930s. Locals of the International Union of Mine, Mill and Smelter Workers often identified their interests with those of management, such as when a Miami local publicly urged Congress in 1926

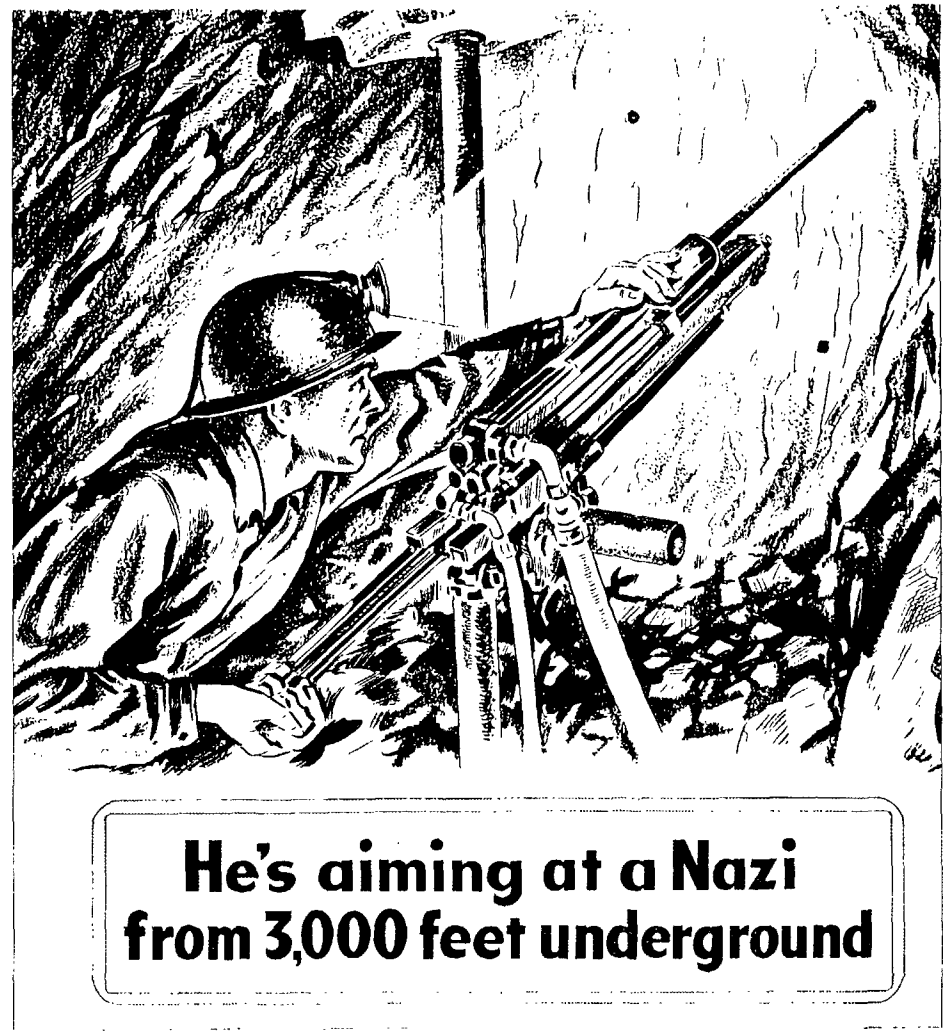
THE OPEN-PIT MINE AT Morenci, seen here in 1940 before workers spiked railroad haulage lines into place along the benches. At one time the mine contained more than seventy-five miles of standard gauge track.

to impose a heavy tax on copper imports. The union firmly believed that a protective tariff would lift domestic copper prices enough to permit American companies to increase wages.

The era of labor-management harmony ended abruptly when mines throughout Arizona and New Mexico either closed or greatly scaled back production in response to the Great Depression. Encouraged by the National Industrial Recovery Act of 1933, which seemed to commit the federal government to support labor, organizers stepped up the pace of union activity among copper workers. At Phelps Dodge, after more than a decade of relative calm, labor disputes increasingly beset its mine and mill operations—even after the economic picture brightened somewhat in the later 1930s.

Exemplifying the unprecedented support labor received during the Franklin D. Roosevelt administration was congressional passage of the National Labor Relations Act, or Wagner Act, which according to one historian of the New Deal era, "threw the weight of government behind the right of labor to bargain collectively, and compelled employers to accede peacefully to the unionization of their plants," yet "imposed no reciprocal obligations of any kind on unions." No one, concludes William E. Leuchtenburg, "fully understood why Congress passed so radical a law with so little opposition and by such overwhelming margins." Not even Roosevelt embraced the measure until he saw that Congress would likely approve it.[1]

The third branch of government, the Supreme Court, likewise stepped up its involvement in labor relations during the late 1930s. Among its milestone decisions was one that resulted from a strike that began at the Copper Queen Branch on June 10, 1935, or some three weeks *before* the National Labor Relations Act went into effect. The timing was important. When the strike ended a few weeks later, on August 24, the Mine-Mill union charged Phelps Dodge with engaging in unfair labor practices



This Phelps Dodge *advertisement from World War II emphasized that production for all-out war began in mines deep beneath Arizona. Phelps Dodge was ready when war came because of the new landscape of production it built at Morenci after 1937.*

as defined by the Wagner Act. Specifically, it accused the company of firing several strikers simply because they belonged to the union.

After the recently established National Labor Relations Board found those charges valid, it mandated that Phelps Dodge reinstate and pay any former employees who had not found jobs elsewhere the wages they would have earned had the company not discharged them. One snag was that each worker's case was different, and especially so for two men the company discharged before either the Wagner act took effect or the strike began. Phelps Dodge appealed the ruling, and the Second Circuit Court upheld its right to fire the employees. It then remanded the case to the National Labor Relations Board, which ruled yet once more in favor of the discharged men. Phelps Dodge appealed to the United States Supreme Court in early 1941, six years now having elapsed since the dispute began.

The company selected a young Arizona attorney, Denison Kitchel, to argue its case. As a student at Harvard Kitchel had studied law under Felix Frankfurter, one of the nine "old men" who now had to decide the complex matter. A day or two before oral arguments, Kitchel enjoyed a pleasant visit with his former mentor, but just as he prepared to leave, Frankfurter asked him, "Did you ever see this document?" In his hand he held a printed copy of the government's report critical of the Bisbee deportation of 1917, a document Frankfurter himself had written as counsel for the President's Mediation Commission established by Woodrow Wilson to investigate labor unrest in Arizona.[7]

For Kitchel the report resurrected a frightening specter from old Bisbee. "I immediately went to the telephone and called Louis Cates in New York and said, 'We've had it. Felix is sitting up there and he's going to bury the hatchet right between my shoulders.'" And he was right. When Kitchel presented his oral arguments for Phelps Dodge (with his mother, father, and fiancée watching), Frankfurter showed his former student no mercy. After every statement he would respond, "and also Mr. Kitchel," as if to undercut all his arguments. Chief Justice Charles Evans Hughes appeared willing to support Kitchel, who recalled feeling like a ball being swatted back and forth between the two eminent justices.

When the high court later announced its decision in *Phelps Dodge Corporation v. National Labor Relations Board*, the outcome surprised few observers. Kitchel was on his honeymoon in Mexico with his wife, Naomi (daughter of Walter and Margaret Douglas), when he learned of the vote from an angry Cates. His phone message was exactly two words long: "We lost!" No wonder Kitchel always recalled Cates as a very tough and brusque man.

In a split decision, a majority of the justices—all five of Roosevelt's New Deal appointees—voted to uphold the National Labor Relations Board. Frankfurter, their spokesman, stirred memories of the Bisbee deportation of 1917, as Kitchel had feared, when he wrote a rather slanted "history" of union organization that formed a major part of his opinion in the case. Frankfurter probably should have excused himself because he was hardly impartial. That would not be the last time that the

ghost of actions taken in wartime Bisbee in 1917 returned to haunt Phelps Dodge.

Mountains of Copper for Democracy's Arsenal

In the late 1930s, at a time when the American economy slowly improved and the nation's businesses entered a new era of labor and government relations, Phelps Dodge formally launched development of its open-pit mine at Morenci. Underground production from its consolidated properties at the branch had remained relatively high during most of the 1920s, but sagging copper prices after the Wall Street crash forced the company to suspend production there in mid-1932. Even had prices not plunged, Phelps Dodge was running out of ore that it could mine profitably at Morenci using existing underground technology, but because of hard times the company wisely postponed the Herculean task of converting to an open-pit mine.

In fact, three things combined to delay the Morenci project: questions about the best mining methods, concerns about how to finance so large an enterprise, and fears that low copper prices at that time made low-grade ore not worth mining. Phelps Dodge, however, dared not hesitate too long. Louis Ricketts warned his fellow directors in 1935 that the declining output from the mines of Ajo, Jerome, and Bisbee made developing major new sources of ore a priority. Fortunately, the price of copper climbed to ten cents per pound in 1936, and that was encouraging news for Phelps Dodge.

The mine proposed for Morenci was not to be operated by tiny ore cars, hand-operated windlasses, and shovels and picks. It demanded an immense, complicated, thoroughly mechanized, and very costly industrial operation. That meant standard-gauge railway tracks spiraling down long horizontal benches to where steam shovels loaded trains with ore for the long climb back to the rim and across to a concentrator of unprecedented size. Early-day mining companies had recovered copper metal from ores by smelting alone, but smelting any ore composed of 98 percent rock and merely 2 percent copper would require so many furnaces and consume such staggering amounts of fuel that no company could earn a profit from it. To make smelting of low-grade ore feasible, a producer needed a large and efficient mill to eliminate as much waste rock as possible *before* it sent the resulting concentrate to the smelter, the succeeding step in a reduction process that yielded copper of ever-increasing purity. The mine itself was thus only one part of a complex and costly enterprise.

The question for Phelps Dodge was whether it should merely refurbish and add to its existing processing facilities—crushers, concentrator, smelter, and the like—or spend considerably more money to fashion a new and thoroughly modern landscape of production. The existing Morenci concentrator and its many ancillary structures were not large enough to handle huge tonnages of ore that the new mine was expected to produce, nor were they advantageously located. Corporate executives correctly reasoned that any attempt to enlarge and modernize them would in the end prove costly and disappointing.

A Bold Undertaking at Morenci

Nothing comparable in size to the proposed open-pit mine and processing complex at Morenci had been attempted before in Arizona, and consequently its cost would be staggering—totaling perhaps as much as $42 million, an unprecedented figure. In addition, unlike all mines previously developed or acquired by Phelps Dodge, where rich surface deposits essentially underwrote the cost of digging deep to reach large and profitable ore bodies, Morenci had an enormous unproductive overburden that would have to be removed before the low-grade ore body could be worked. In other words, even before the nation's first major new copper mine in at least twenty years yielded a single pound of copper, Phelps Dodge must strip away fifty million tons of overburden (most of which the mining experts then considered waste) and transform a ridge and mountain crest into something like a vast Roman amphitheater—all at enormous cost. The company might have to wait as long as five years to recover its initial investment.

Fortunately, the size of the Morenci challenge appealed to Louis Cates and gave him a chance to apply what he had learned earlier working with Daniel Jackling at Bingham Canyon, Utah. As president of Phelps Dodge Cates did not fear spending millions of dollars to develop a mammoth mine that over a thirty-year span was predicted to yield some five billion pounds of copper.

That was why Phelps Dodge directors decided to build everything new and locate each structure to maximize production.

Preparatory work at Morenci required construction of roads, railroads, and buildings for offices, shops, change rooms, and garage and purchases of electric shovels, trucks, bulldozers, tractors, and graders by the score, jackhammers, churn drills, blasting explosives—and so much more. Engineers estimated that the company needed to lay at least forty miles of standard-gauge railroad track to reach down into the pit for ore and haul it back up to the mill and smelter, and this track work alone would cost $1.5 million. To that sum Phelps Dodge must add another $2.5 million for diesel and electric locomotives and dump cars, $800,000 for twelve power shovels, $600,000 for electric power installations, and finally $250,000 for cranes, air compressors, hand drills, and other necessary equipment.

The shopping list grew longer and longer until all the projected expenses totaled approximately $42 million. To finance so enormous an undertaking, Phelps Dodge sold 3.5 percent convertible debentures worth more than

$20 million to the public in June 1937 and paid the rest of the expense from current earnings as construction progressed.

Directing work on the Morenci project was Harrison M. (Harry) Lavender, who succeeded P. G. Beckett in 1937, the year the longtime general manager of western branch operations relocated to New York, where he continued as a vice-president. Lavender, who conformed to the popular stereotype of the rugged, tough, and gruff mining man, was demanding and at times even tyrannical. Because he didn't sleep well, he frequently phoned subordinates any time of the day or night. Often when he returned to his Douglas office following a whirlwind inspection of the various branches, Lavender rapidly dictated twenty pages of notes to his secretary, who frantically wrote everything in shorthand, all the while knowing that he might add, "I want that in the 10:30 mail." Julia Mazanek, who joined Phelps Dodge as a secretary in the General Manager's Office in 1947 and was still working for the corporation more than fifty years later (at its Phoenix headquarters), recalled that Lavender "was a very approachable person despite his aura of authority."[1]

Still, in his drinking days he could be "pretty wild," recalled the former president Warren Fenzi, and he was an incorrigible practical joker, yet on the job Lavender always possessed energy needed to get a prodigious amount of work done. Further, he was very bright man who could hold many facts and figures in his head without difficulty. Lavender came to Phelps Dodge from Calumet and Arizona, where his knowledge of operations had greatly impressed Cates during merger negotiations.

Working closely with Lavender was Walter C. Lawson, a brilliant mining engineer and an authority on open-pit mining (and who was as much a quiet introvert as Lavender was a boisterous extrovert). As chief engineer, Lawson was largely responsible for the success of the original Morenci project, and his careful planning permitted its further expansion, by 80 percent, only a short while later to meet stepped-up production required by World War II. Like Lavender, Lawson came to Phelps Dodge as a result of the Calumet and Arizona merger.

Besides those two men, numerous other people deserve credit for successful development of Morenci's new landscape of production, most notably Wilbur Jurden, head of engineering at the Anaconda Copper Mining Company. Two greatly revered figures in Phelps Dodge history, the elder James Douglas and Louis Ricketts, had long insisted that, although copper companies competed vigorously with one another, their scientists should nonetheless work together and exchange their findings. That kind of liberality paid big dividends when Cornelius F. Kelley, the president of Anaconda, responded to a call from Cates by lending Jurden to Phelps Dodge to help it design a new reduction works. In fact, it was Jurden and his staff of engineers borrowed from Anaconda who wisely located most of the treatment facilities approximately halfway between Morenci and Clifton, where they received ore by a downgrade haul from the mine.

On August 24, 1937, Phelps Dodge Shovel No. 1 dug deep into the Arizona topsoil at the 5,350-foot elevation and brought up a dipper full of overburden, the first step in the process of

stripping away a layer of earth and rock that averaged slightly more than two hundred feet thick above the Clay ore body. The area's old-timers soon accustomed themselves to strange new sights and new mining lingo. Lines of transportation were horizontal rather than vertical, and instead of cages dropping into dark shafts, locomotives crisscrossed a sunlit landscape. Underground miners jokingly referred to the new pit as the "sunshine stope."

Above the Clay ore body, dynamite blasts raised whole banks of earth skyward. Bulldozers then pushed the shattered pieces into large piles along the benches that started to spiral down along the walls of the emerging pit. In this amphitheater setting, power shovels buried their buckets deep into the rocky piles, swung around, and dropped their loads into one of the waiting haul trucks that ranged in capacity from five to twenty-two and a half tons. The chief purpose of the fleet of haul trucks—utilized at Morenci more extensively than in any other open-pit operation in the United States at the time—was to prepare the way for the general use of rails.

During 1939, after workmen spiked down several miles of track in the pit and along a main line between the mine and the reduction works, the first trains went into service. During July of the next year, traffic by rail fully augmented truck haulage. Nine big electric locomotives supplied by Westinghouse, and "said to be the largest trolley-battery units of their kind for use in open-pit mining," started operating in 1941. Phelps Dodge purchased five diesel-powered switch engines to shuttle cars among its surface facilities.

Phelps Dodge in 1939 broke ground for a concentrator five time larger than its existing mill at Morenci, to process twenty-five thousand tons of sulfide-rich ore per day. That same year it added a new smelter to the expanding landscape of production. Located next to the massive concentrator on the highway below old Morenci, it was completed in 1941. The smelter stack from its base to cap stood 612 feet tall, a remarkable height that underscored the immensity of the new facility. Twelve copper points at the top and heavy copper grounding cables served to protect from lightning strikes one of the largest reinforced concrete chimneys ever built.

In some respects the new mine, mill, and smelter complex at Morenci represented the ultimate in open-pit porphyry mining as Daniel Jackling originally envisioned it almost forty years earlier. It was conceived and built as a unit, on the basis of the latest technology, and without attempting to mix old facilities with new ones. By contrast, the layout at Utah's Bingham Canyon, where Cates had worked with Jackling, evolved mainly by adding new processing facilities to the old. Jackling himself described the Phelps Dodge venture at Morenci as "probably the boldest undertaking of its kind in history" given the physical obstacles and the "financial requirements of almost forbidding magnitude prior to the incidence of any production of consequence."[4]

Wartime Morenci and the Replumbing of Arizona

On January 30, 1942, wheels began to turn in the big new concentrator at Morenci, thereby launching production from Phelps Dodge's latest and largest open-pit mine.

The smelter poured its first copper anode on April 26, 1942. Weighing seven hundred pounds, it was the first of a steady stream of heavy anodes that traveled in boxcars to the El Paso refinery.

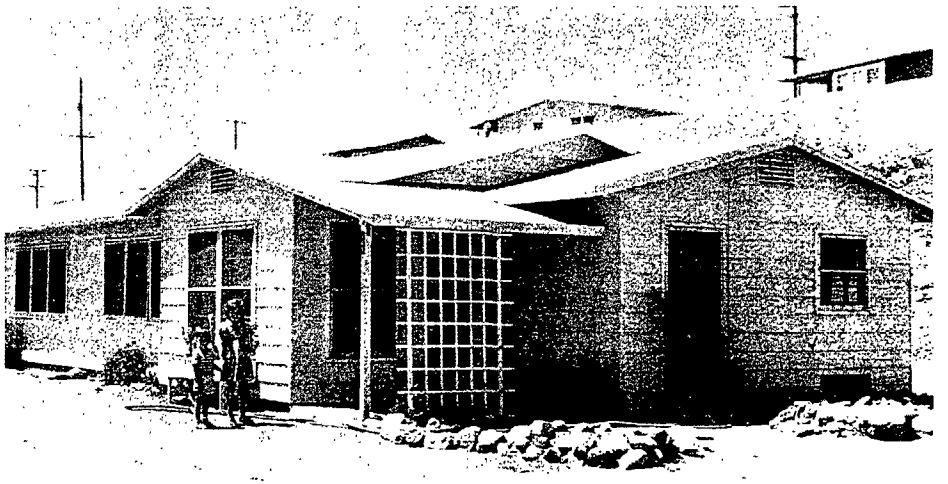
Cates and Phelps Dodge were justifiably pleased by what they had accomplished. A demanding five-year construction schedule was met on time, and by mid-1942 the Morenci complex operated at its intended capacity. Ironically, achieving that goal was no longer good enough because by then World War II had engulfed the United States. The Allies did not have enough copper to meet rising wartime needs, which dwarfed even the insatiable demands of World War I. Spurred by Uncle Sam, Phelps Dodge nearly doubled its productive capacity at Morenci by 1944.

Technically, Uncle Sam in the form of the United States Defense Plant Corporation paid for the additional Morenci expansion. The government built the facilities and rented them back to Phelps Dodge. By February 1, 1944, after an expenditure of about $68 million by the corporation and the federal government, the enlarged project was in full operation. Every bit as challenging as the recently completed complex, it increased the size and capacity of the mine, mill, smelter, and power plants and added new housing for a growing army of employees.

Ever since 1937, both Clifton and Morenci had looked like boom towns. Anticipating a burgeoning of personnel, Phelps Dodge had laid out a large-scale residential district about a mile southwest of old Morenci's town center. By the end of 1941, it built 271 low-rent houses, nearly all of them copper-roofed stucco dwellings. It housed single workers in the fully renovated Longfellow Hotel and in the former hospital remodeled into a comfortable dormitory. Phelps Dodge greatly expanded recreation and school facilities at Morenci and erected a new 34-bed hospital complete with the latest equipment—including an iron lung purchased with funds raised by the women's club to treat polio victims.

By 1942, Clifton had a population of five thousand and Morenci had seven thousand, but because of wartime expansion of production, housing remained in short supply. Empty lots became trailer camps; some people lived in the back seats of cars or took turns sleeping in eight-hour shifts around the clock in "hot beds." The rapid growth of Clifton and Morenci and Phelps Dodge's new landscape of production was not the total story, however.

The sheer size of the mine and processing complex, especially as a result of wartime



Employee housing at Morenci, May 1, 1944. *Not all money Phelps Dodge spent during World War II to increase production was invested in industrial landscapes. At Morenci it constructed 770 additional homes in 1944 and increased the capacity of the company-community hospital from thirty-four to fifty-two beds. At the beginning of World War II the corporation operated a total of seven hospitals: Douglas with thirty-five beds, Bisbee with forty-three, Morenci with thirty-four, Ajo with thirty-three, Nacozari with thirteen, Jerome with fifty-two, and Dawson with thirty—all for employees and their families.*

THE COMMITMENT TO safety is a top priority at Phelps Dodge Corporation, and its annual Chairman's Safety Awards program provides a way to emphasize that fact. Douglas C. Yearley holds one of the award medallions.

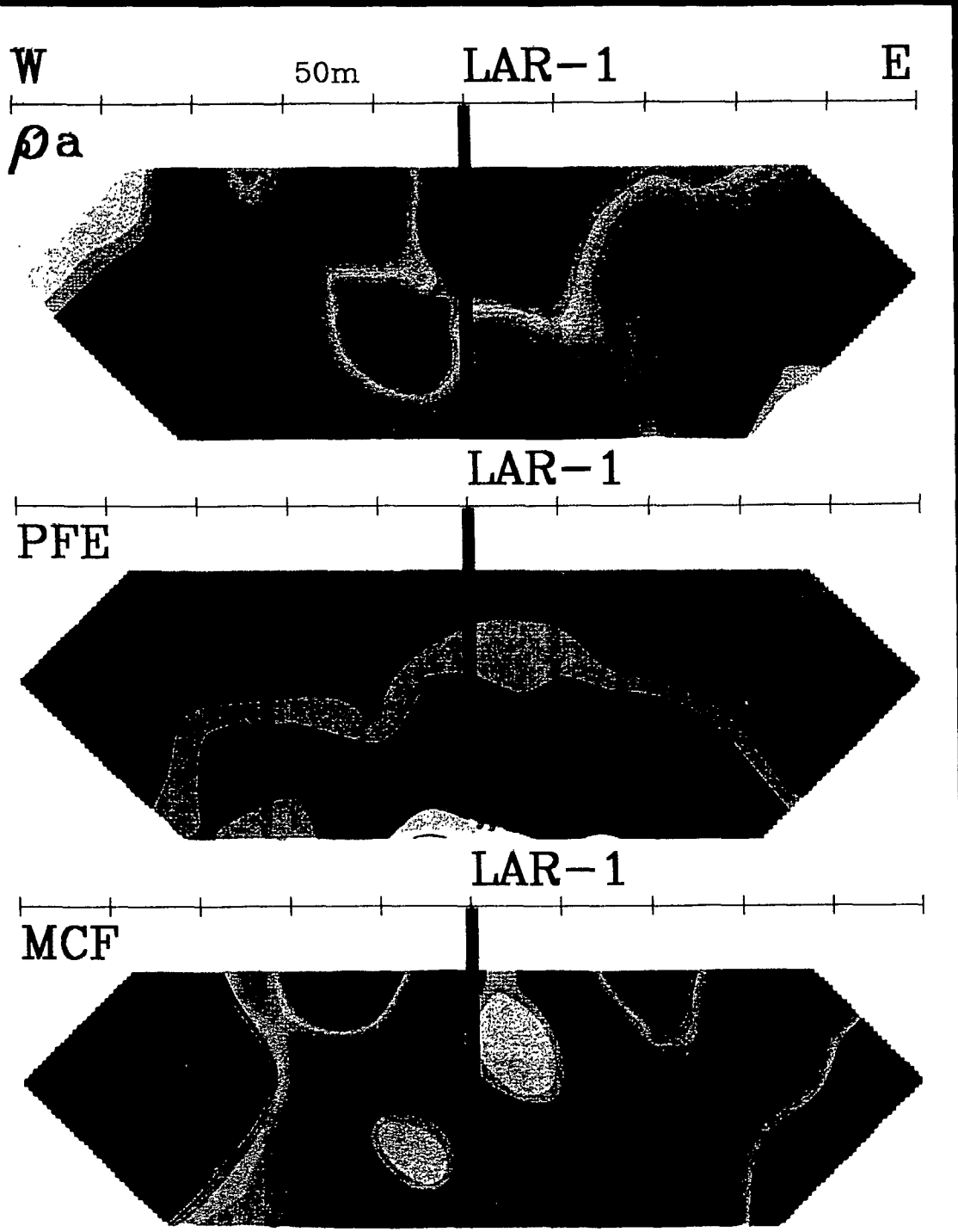




Company photographer Ken Malloque *took this prizewinning photograph of the converter aisle at the now-demolished Morenci smelter. He is a member of a multigenerational Phelps Dodge family. His grandfather Joseph Malloque appears in the black-and-white image on page 138 showing Morenci's New Italian Band. He is the second person to the right of the arrow in the front row.*



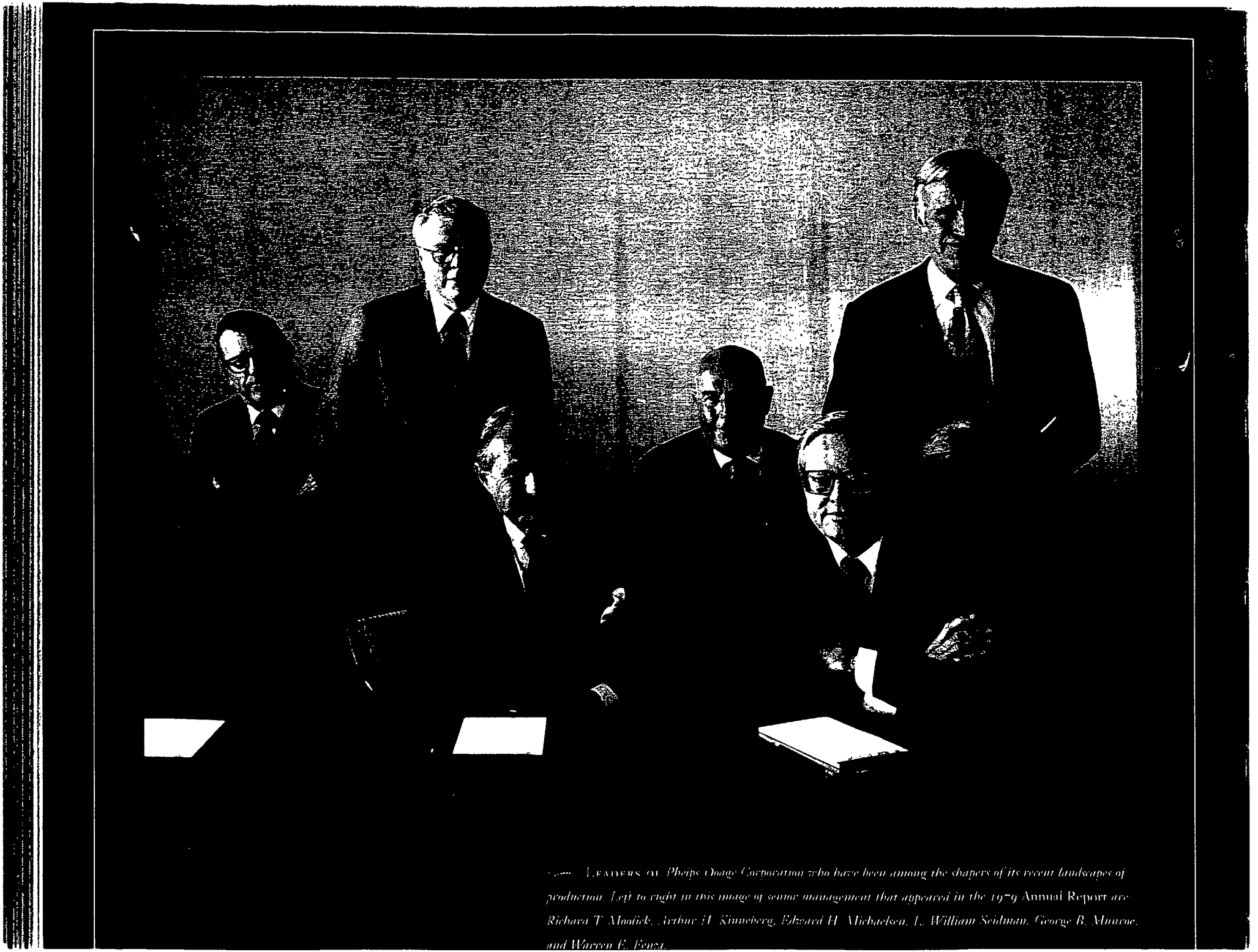
THIS DRAMATIC TWILIGHT PHOTOGRAPH of the Morenci mine in the days of railroad operation appeared on the cover image of Phelps Dodge's 1974 Annual Report. The long exposure captured the shovel in motion. Railroads are no longer used within any of Phelps Dodge's active copper mines.



MINING BEGINS WITH EXPLORATION. *This image shows what Phelps Dodge teams saw as they probed electronically beneath the surface of Chile's stark Atacama Desert to discover the ore body that became Candelaria. These views of the underground landscape, which illustrate differing resistivity detected in a sulfide rich mineral deposit and the surrounding "country rock," provided geophysical specialists a "Eureka!" moment.*



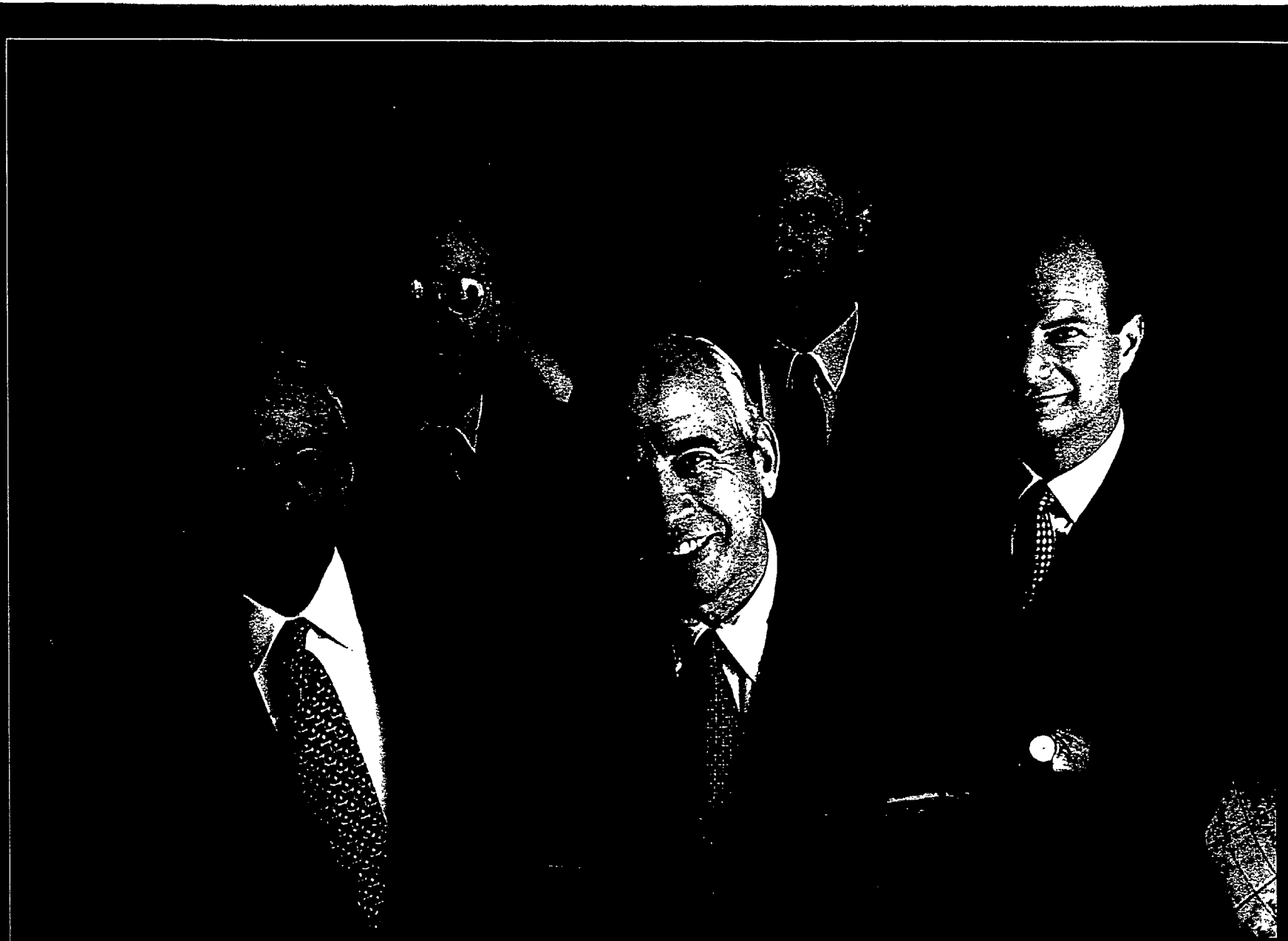
PHELPS DODGE'S *Punta Padrones* mechanized clean port facility, where beginning in the 1990s ship loaded copper concentrate from Candelaria in Chile that was destined for smelters in Japan and other distant locations



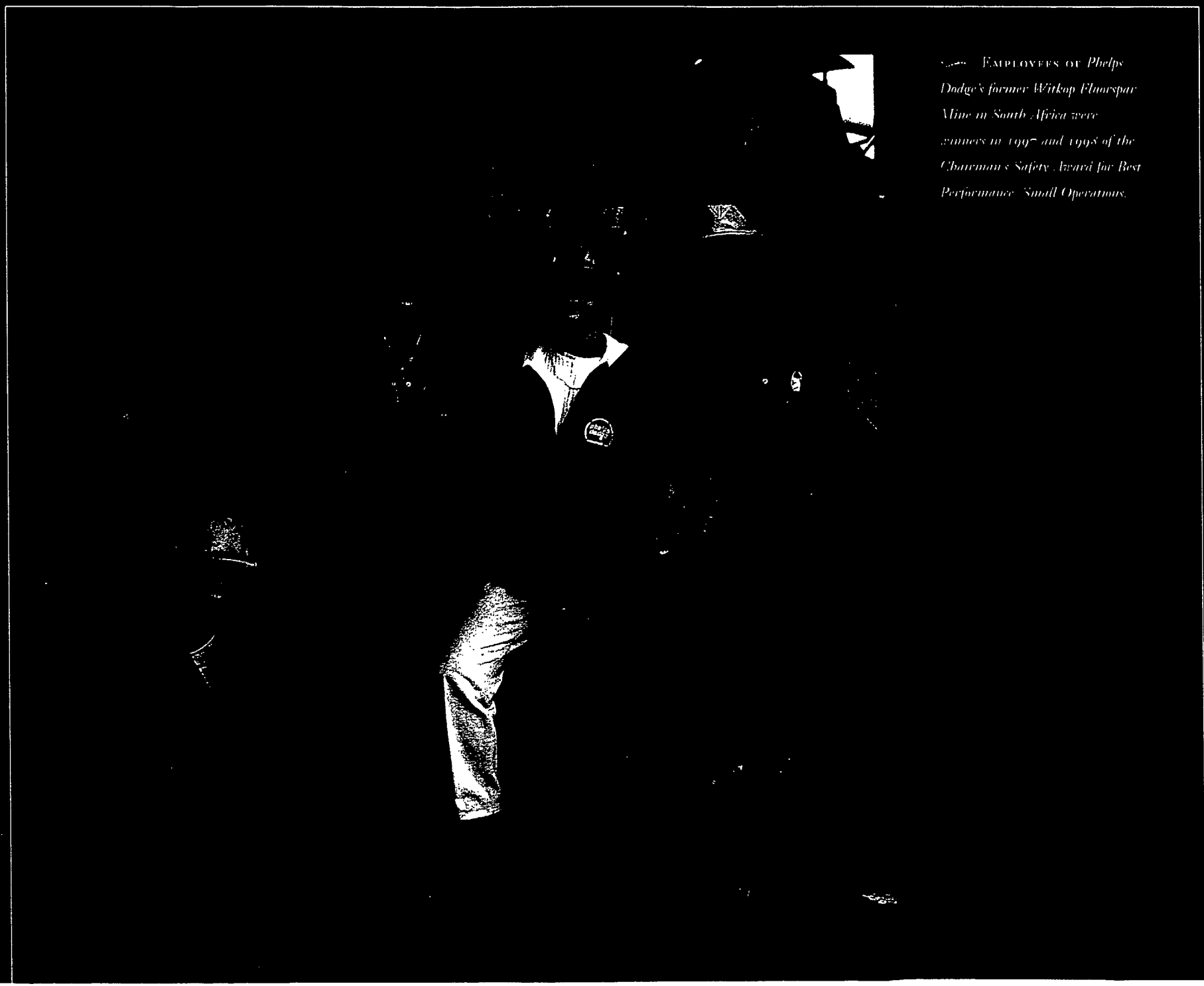
LEADERS OF *Phelps Dodge Corporation who have been among the shapers of its recent landscapes of production. Left to right in this image of senior management that appeared in the 1979* Annual Report *are Richard T. Mostyn, Arthur H. Kinneberg, Edward H. Michaelson, L. William Seidman, George B. Munroe, and Warren E. Fenzl.*

TEN YEARS LATER: *at his retirement party in 1989, C. Robert Durham, Phelps Dodge Corporation chairman, is flanked (left to right) by Patrick J. Ryan, J. Steven Whisler, Douglas C. Yearley, and Leonard R. Judd*

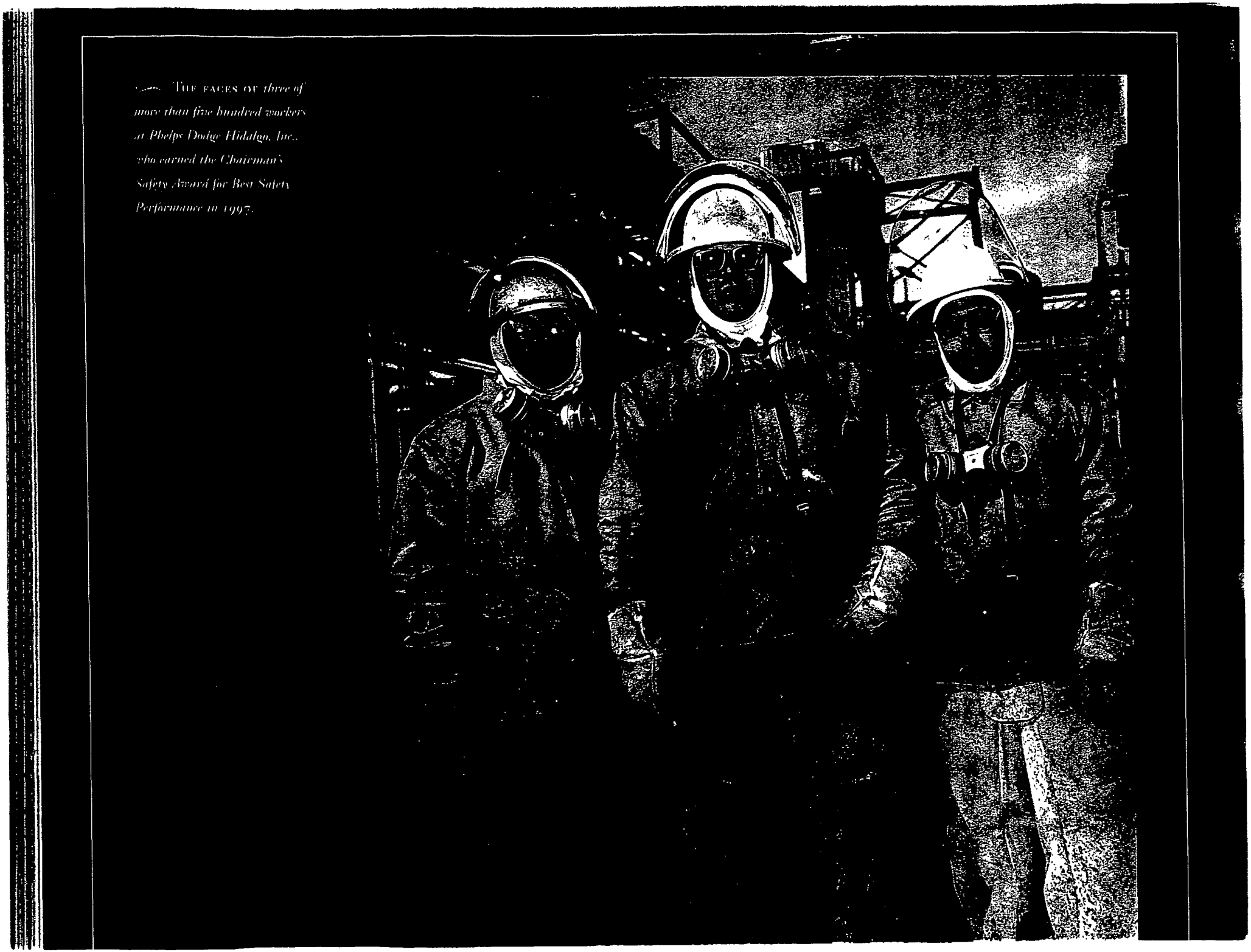




ONE MORE GENERATION: *Phelps Dodge's Senior Management Team in 1997. From left to right are Thomas M. St. Clair, Manuel J. Iraola, Douglas C. Yearley, Ramiro G. Peru, and J. Steven Whisler.*

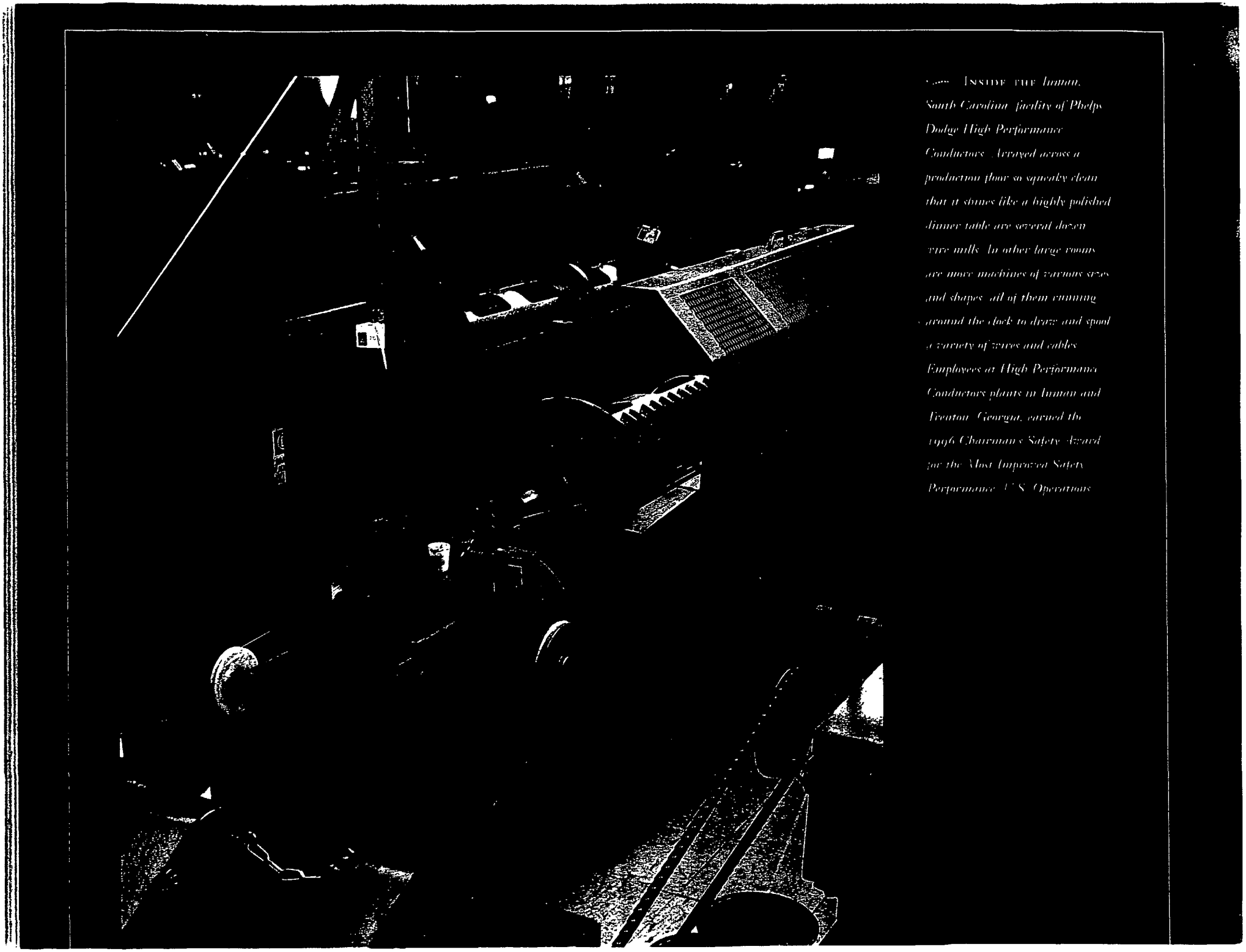


Employees of *Phelps Dodge's former Witkop Fluorspar Mine in South Africa were winners in 1997 and 1998 of the Chairman's Safety Award for Best Performance - Small Operations.*



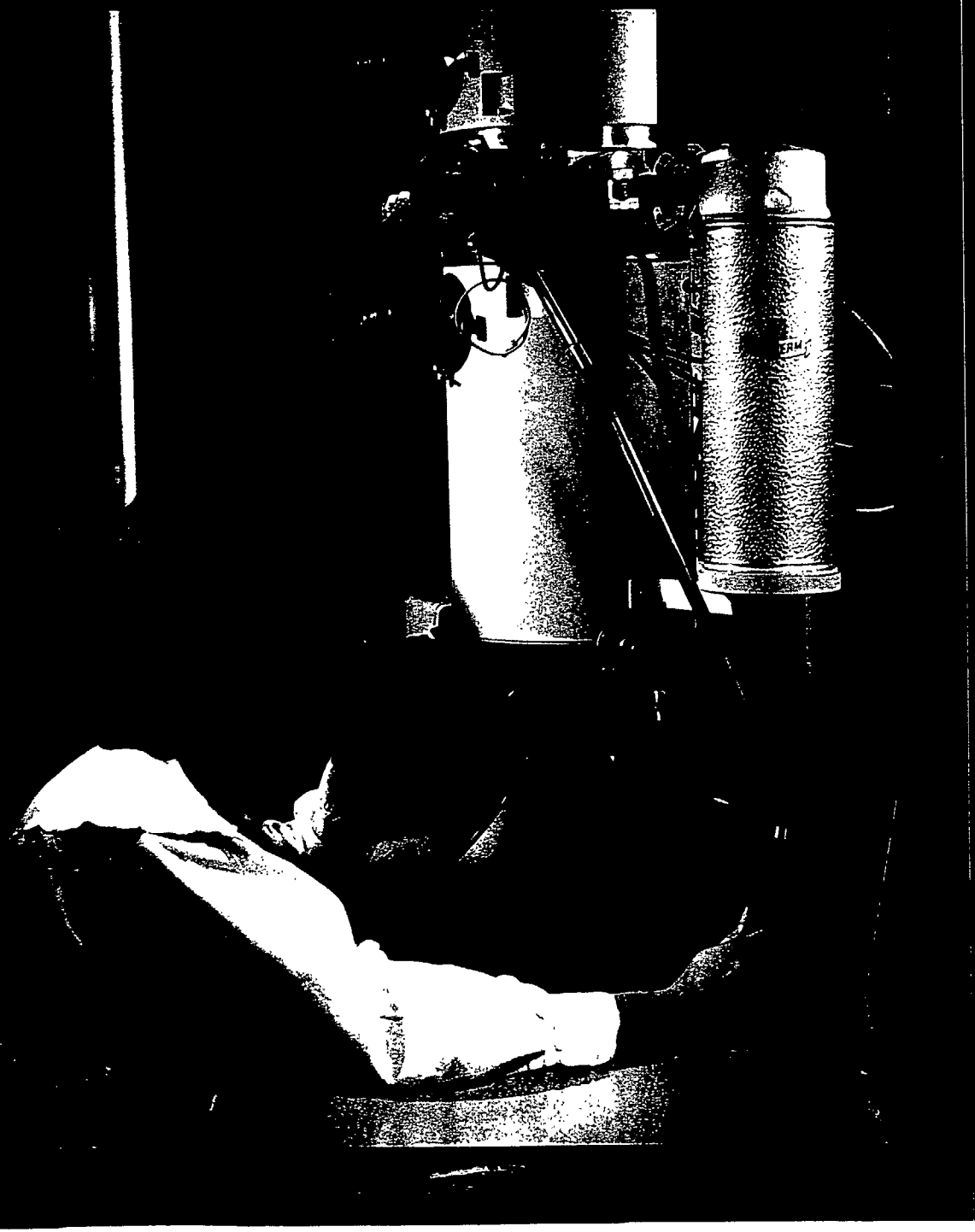
The faces of *three of more than five hundred workers at Phelps Dodge Hidalgo, Inc., who earned the Chairman's Safety Award for Best Safety Performance in 1997.*

EMPLOYEES AT Columbian Chemicals Company's Santander Spain plant earned a 1997 Chairman's Safety Award for Best Performance - Small Operations



Inside the Inman, South Carolina facility of Phelps Dodge High Performance Conductors. Arrayed across a production floor so squeaky clean that it shines like a highly polished dinner table are several dozen wire mills. In other large rooms are more machines of various sizes and shapes, all of them running around the clock to draw and spool a variety of wires and cables. Employees at High Performance Conductors plants in Inman and Fiveton, Georgia, earned the 1996 Chairman's Safety Award for the Most Improved Safety Performance, U.S. Operations.

INSIDE THE *modern research laboratory at Columbian Chemicals Company head quarters in Marietta Georgia*



"PIONEERING THE CREATION OF VALUE"

The many faces of Phelps Dodge, a composite portrait of some of the corporation's modern pioneers in the creation of value. The original images were used to illustrate safety brochures




NIE NABY
WORD NIE



"PD Kin Me" A collective portrait of some of today's contributors in Phoenix who either grew up in a Phelps Dodge community or belong to a Phelps Dodge family spanning several generations or both. Seated left to right are Dean Kief, Julia Muscanek, Tom Gjurgevich, Ramon Pena, Paula Garcia, and Ross Bacino. Standing left to right are Steve Tanner, Kelly Baker, Steve Rauch, Pat Fortunato, Teresa Oberle, Jim Smith, Maurice Sandoval, Barnard Myers, and Jamie Ivey. On the wall of the conversation's boardroom hang portraits of Daniel James, Jason Phelps, and William C. Dodge, the three founders of the enterprise.

expansion, made it imperative that Phelps Dodge locate an adequate amount of water for its new mill facilities. Prior to 1937, when only underground mines operated in the Clifton-Morenci area, water rights the company had earlier acquired on Eagle Creek, Chase Creek, and the San Francisco River seemed adequate to meet all local needs. Those streams, all tributaries of the Gila River, flowed through the district and were located in general proximity to the mining areas.

When development began in 1937, Phelps Dodge anticipated that the usual sources could supply the extra water needed. That is, water would be pumped uphill to the mill from the river and creeks. However, when the federal government called for nearly twice the copper-producing capacity at Morenci to meet wartime demands, the company needed to locate still more water or trade for it. Phelps Dodge did not own any sizable water rights on the Salt or Verde river systems, two of the most obvious sources of new water. Moreover, the broken and uplifted terrain around Morenci meant that transporting additional water from where it was available to where it was needed would involve a major feat of engineering.

Phelps Dodge carefully examined each piece of a puzzle that when fully assembled illustrated the exceedingly complex nature of Arizona's water resources. It noted that the Salt River Valley Water Users Association had constructed Bartlett Dam in the late 1930s to hold Verde River floodwaters that could later be used for irrigation and to protect downstream Phoenix from damaging overflows. Unfortunately, the capacity of Bartlett Reservoir was not always adequate to handle the deluge. As a result, every few years a major flood topped Bartlett Dam, inundated parts of Phoenix, and spilled precious water down the Gila River.

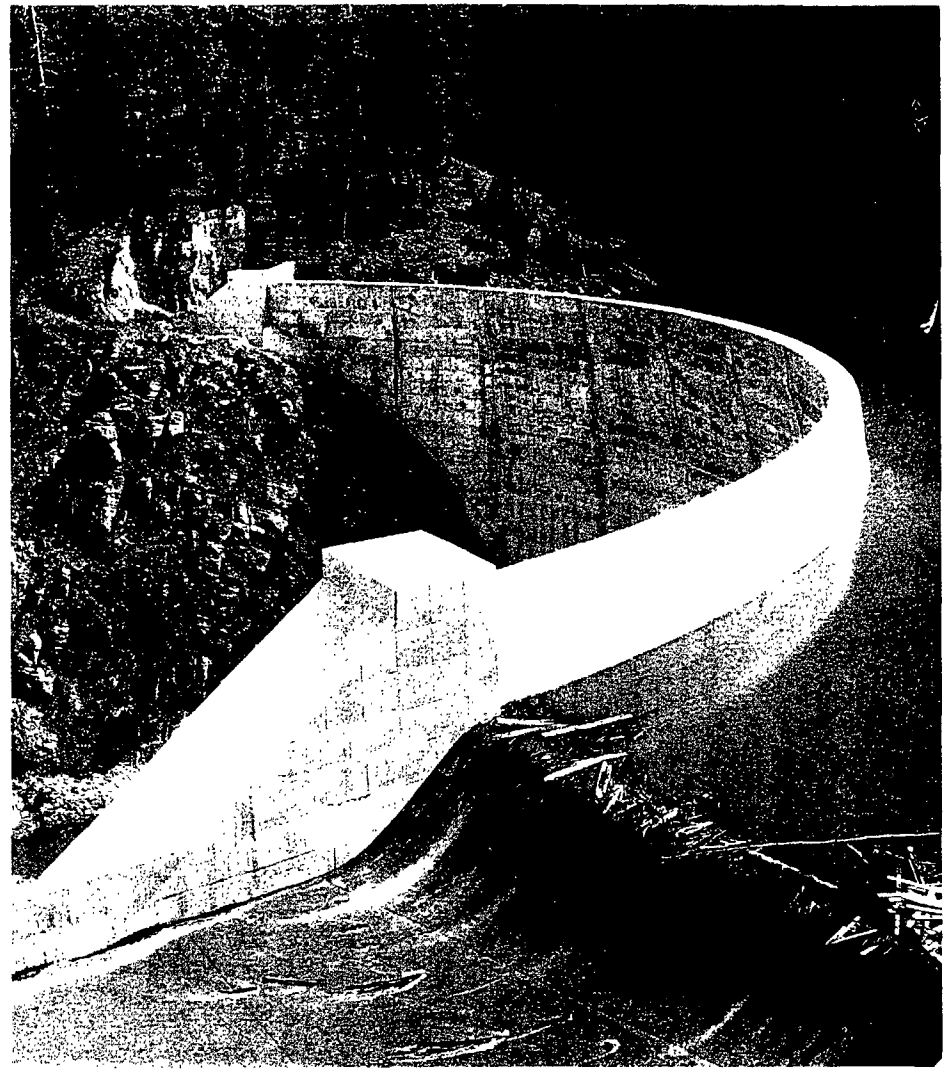
With that problem in mind, Phelps Dodge entered into an innovative agreement with the Salt River Valley Water Users Association, which also controlled other sources of water for the many irrigated fields and orchards around Phoenix. Phelps Dodge proposed to build Horseshoe Dam farther upstream from Bartlett Dam, about forty miles northeast of Phoenix, to reduce flood danger significantly and provide additional water storage for farms and cities of the Salt River valley. In return, Phelps Dodge received credits to 250,000 acre-feet of water that it could take during the coming years from the Black River in eastern Arizona, some forty miles from Morenci. Lifted by pumps seven hundred feet to the rim of Black Canyon, the water then flowed by gravity through nearly six and a half miles of buried pipeline to Willow Creek from where it continued twenty-one miles to Eagle Creek and then another thirty miles to the Eagle Creek Pump Station near Morenci, where Phelps Dodge recovered it along with the creek's normal supply of water, as in the past. It required roughly two days for Black River water to complete its fifty-one-mile journey. Its delivery to Morenci under the Horseshoe Dam agreement became Arizona's first successful experiment in transmontane diversion of water.

Phelps Dodge completed construction of $2.5 million Horseshoe Dam in the mid-1940s, the cornerstone of a complicated system that collected, stored, distributed, and recycled water needed for both domestic and industrial uses at

Morenci. Show Low Dam was next, its storage lake completed in 1953. It pumped surplus unappropriated water from a tributary of the Little Colorado River over uplands located about a hundred miles north of Morenci and into a tributary of the Salt River. That flow in turn enabled the company to pump still more water from the Black River. But Show Low proved an erratic source that some years yielded no water at all.

Phelps Dodge located additional water on East Clear Creek where in late 1965 it completed construction of Blue Ridge Dam, a thin inverted concrete arch 170 feet high, 600 feet wide, but only 6 feet wide at the top. Pumps lifted water from the reservoir formed by the dam to the top of the Mogollon Rim, from where it traveled down to the Verde River through seven miles of penstock and a hydroelectric plant that in turn generated power for the pumps (in effect coming close to creating a perpetual motion machine). By building Horseshoe, Show Low, and Blue Ridge dams, Phelps Dodge also provided Arizona with new lakes for public fishing, boating, camping, and recreation.

In all, the corporation's replumbing of Arizona meant building three large dams, reservoirs, pumping plants, pipelines, and other support facilities located in six different counties and at points as far distant from the Morenci mine as 180 miles. That was possible because of agreements negotiated with some thirteen different federal, state, and local agencies. Few, if any, American industries can claim to have developed a more extensive system for moving water than Phelps Dodge.[5]



PART OF THE *replumbing of Arizona was the graceful Blue Ridge Dam, finished in 1965 but nonetheless part of the complex water delivery system that dated back to World War II. It was Bill Evans, a Phoenix attorney and avid outdoorsman, who drew upon his extensive knowledge of the Mogollon Rim backcountry to conceptualize how Phelps Dodge could best deliver water to Morenci. He headed the firm of Evans, Kitchel, and Jenckes, which for years provided outside legal counsel to Phelps Dodge.*

Soldiers of Production

STARTING IN 1940, the copper companies of the United States produced in four years about as much copper as they had during the entire nineteenth century. From 1931, when Phelps Dodge acquired the Calumet and Arizona Mining Company, until the end of 1946, it alone invested in excess of $83 million in capital improvements, or an average of more than $5 million a year. More than half was spent at Morenci, which by the end of World War II emerged as the company's largest mine and processing complex.

Apart from its open-pit mine at Morenci—many would call it the flagship—Phelps Dodge possessed a valuable and varied fleet of other properties. Not the least of these was the venerable Copper Queen Branch. During the Great Depression, rich ore bodies and careful management had allowed some of Bisbee's underground mines to continue operating, albeit at much reduced levels. World War II, by contrast, found the Copper Queen Branch in full production. Bisbee copper operations had long yielded lead and zinc as by-products, but now those two metals were essential to winning the war and mined along with copper as never before. At Jerome and the United Verde Branch, even certain marginal or low-grade ores became worth mining, although the property overall experienced such a decline in ore production during the war years that the nearby Clarkdale smelter had enough extra capacity to relieve some of the load carried by eastern smelters. For a time it handled ore from Bisbee too.

The mines of Ajo, Arizona, worked around the clock, seven days a week, and the town's population, having declined to around four hundred permanent residents during the shutdown of the Great Depression, swelled to some six thousand people during the war. Company trains of covered steel dump cars pulled out for the big smelter plant in Douglas loaded with dark green half-dried mud, which was a concentrate of copper, silver, and gold. At one time the cars were not covered—until the company discovered that the desert heat dried out the usually moist concentrate and allowed considerable quantities of copper, silver and gold to blow off as dust in the hot winds.

As a result of the federally sponsored expansion of production at Morenci, the El Paso refinery would have formed a production bottleneck for Phelps Dodge had it not been enlarged to boost its annual capacity from 158,000 tons to 220,000 tons of copper. The cost, more than $2.5 million, was financed by the Defense Plant Corporation. When peace returned, employees of the company's two refineries could be proud that they handled all copper reaching the El Paso and Laurel Hill plants without once failing to meet their scheduled delivery dates.

Output from Phelps Dodge's mines for the first time exceeded four hundred million pounds of copper annually in 1942, but wartime production records were meant to be broken. With all properties synchronized like the parts of a fine watch, 1943 was another banner year. The corporation's annual report observed that copper production was the highest in Phelps Dodge history. Within the limits imposed at times by

Shipboard Nervous Systems

Phelps Dodge's Habirshaw Cable and Wire Division made special shipboard cable that functioned like the nerves to transform fighting ships into responsive combat and merchant vessels. Every warship required a vast network of wires and cables to control propulsion and to direct gunfire against the enemy aircraft and ships by means of radar. A single aircraft carrier utilized more than two hundred miles of cable, and Uncle Sam required that every inch of it be tough, fireproof, and waterproof.

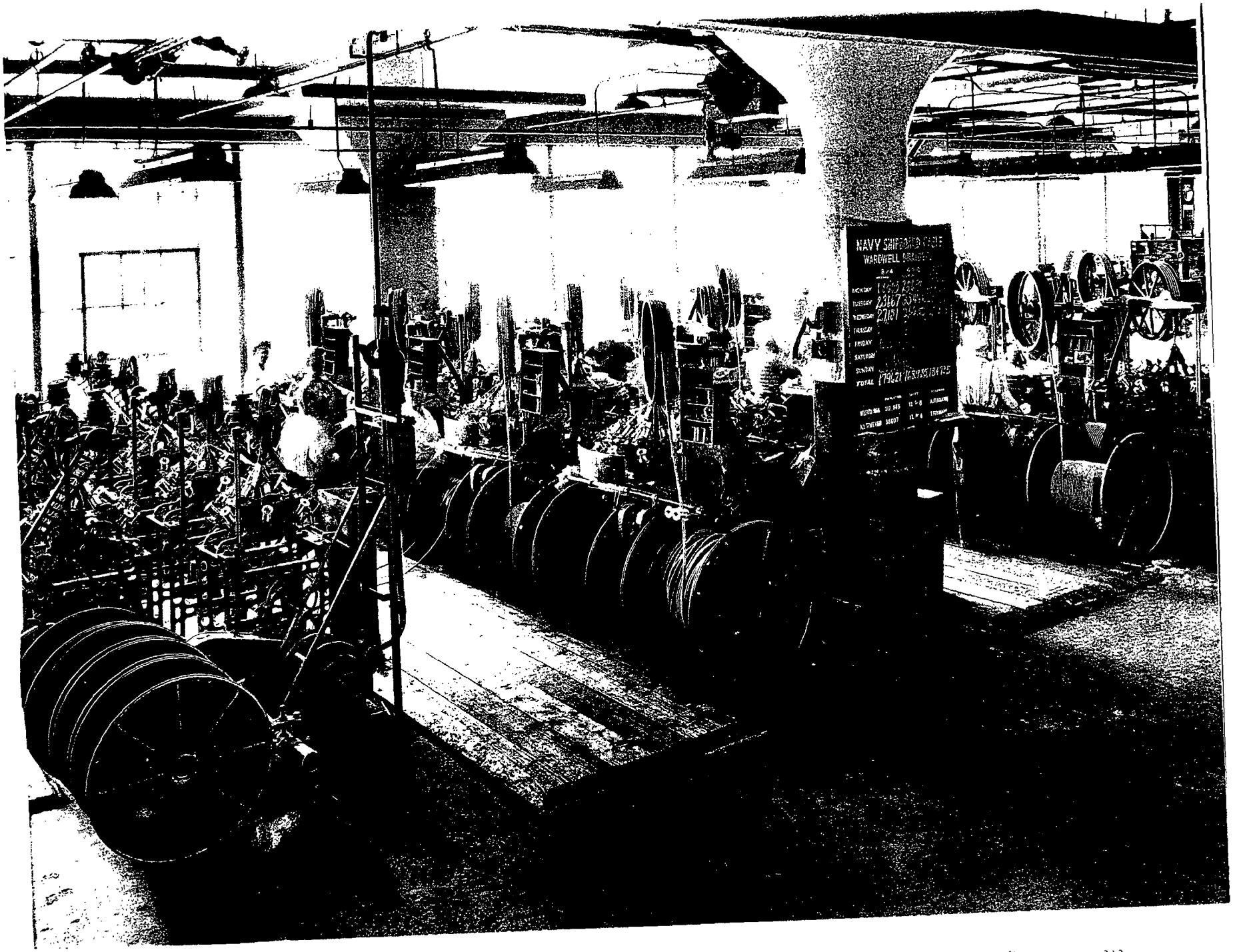
Shipboard cable was surprisingly difficult to fabricate. Although wartime shortages often limited Phelps Dodge Copper Products Corporation to the use of substitute materials, it still had to make cable that was shipboard cable—that is, fireproof, fire-resistant, and fully able to endure high and continuous operating temperatures. As warships grew more complex, and hence more crowded with wires and cables, manufacturers reduced the diameter of shipboard cables yet still kept them functioning flawlessly. To meet all such demands Phelps Dodge Copper Products rushed to completion in 1942 a new plant at Yonkers devoted exclusively to fabricating shipboard cable. By war's end it was the world's largest maker of that largely uncelebrated but vital product.

manpower shortages, "all of the branches operated at capacity." That was true too for 1944 and 1945. Interestingly, Phelps Dodge was required to sell every pound of copper it produced to Uncle Sam. All buyers, including Phelps Dodge's own fabricating operations, had to apply to Washington to obtain copper.

By war's end the various Phelps Dodge metal-producing properties had increased copper production by more than 50 percent—and that was despite occasional shortages of labor. The story was much the same at its fabricating plants, where to meet military and civilian needs Phelps Dodge Copper Products Corporation carried out a major expansion program of its own. It built new plants, enlarged and reorganized those already in operation, increased the number of machines, and added technical experts to its staff. During the war years Phelps Dodge factories manufactured billions of pounds of war materials.

Phelps Dodge Copper Products first felt the impact of war in a flood of orders from the British government for degaussing cable. That ingenious item, the result of months of research by British scientists, helped protect ships from deadly magnetic mines. After company engineers translated laboratory theory into production-line practice, Phelps Dodge Copper Products Corporation emerged as one of the world's largest manufacturers of degaussing cable.

Braiding machines *inside the Habirshaw Cable and Wire plant manufactured navy shipboard cable during World War II.*


NAVY SHIPBUILDING
WARDWELL
MONDAY
TUESDAY
WEDNESDAY
THURSDAY
FRIDAY
SATURDAY
SUNDAY
TOTAL

At plants in the Yonkers area, Phelps Dodge's Habirshaw Cable and Wire Division also fabricated endless miles of field wire for the Army Signal Corps. Soldiers unspooled small reels of field wire to extend lines of communication across the battlefields.

Phelps Dodge Copper Products made special thirty-mile lengths of submarine cable for the Russian government, which used it to supply electric power from central generating plants located in safe areas across swampy land to cities besieged by invading armies. Military police accompanied a special trainload of the cable as it traveled from the Yonkers plant to Seattle, from where it continued by boat to Russia.

Among the multitude of other special wire and cable products that Phelps Dodge made to help win the war were coaxial cables for a recently invented technology called radar. It fabricated countless miles of magnet wire for everything from ship generators and tank controls to aircraft gyrostabilizers and portable X-ray machines. In fact, by the time the war ended in August 1945, Phelps Dodge's manufactured products could be found aboard virtually all types of Allied military vehicles operating in all types of environments.

In addition to wires and cables, Phelps Dodge made rotating bands for projectiles and copper condenser tubes for steam-powered ships in the Allied war machine. Cruisers and battleships were as helpless without condenser or admiralty tubes as without their big guns, and a single aircraft carrier might utilize as much as two hundred tons of copper in piping alone. It needed millions more pounds of copper for sea-resisting castings, huge bronze propellers, and miles of onboard wires and cables.

In the months between September 1939 and December 7, 1941, when the war had not yet come to North America, Wylie Brown of Phelps Dodge Copper Products perceived a parallel between the tense times and those that preceded American entry into World War I. He grew increasingly concerned that likely shortages of condenser tubes imperiled the United States shipbuilding effort. Thus well before Pearl Harbor he launched a new division to avert a production crisis. Working with officials of the Defense Plant Corporation, which provided the needed financing, Phelps Dodge erected a facility in California to fabricate immense tonnages of condenser tubes required by West Coast shipbuilders The $21.2 million Los Angeles Tube Mill began operation in 1942 and by the end of the year was working at capacity to make seamless brass and copper tubes.

Besides mass-producing war materials, Phelps Dodge's various research and development departments cooperated with federal officials during World War II to fabricate new products, such as components necessary to build atomic bombs. For the latter assignment, Phelps Dodge Copper Products Corporation plant at Bayway rolled several million pounds of Uncle Sam's stockpile of precious silver into strips forty feet long, three inches wide, and five-eighths inch thick, which a manufacturer in Milwaukee, Wisconsin, coiled into magnets shipped to Berkeley, California, for installation in an atom-smashing cyclotron. It was all part of the famous Manhattan Project.

Perhaps no assignment for Phelps Dodge was more bizarre yet vital to winning World War II than a secret project called Operation Pluto. "Pipe Lines Under The Ocean," or Pluto for short, entailed an ingenious plan to extend a large hollow conduit beneath the English Channel to supply fuel to Anglo-American troops once they established a continental beachhead at Normandy. Success of the Allied thrust across western Europe depended in large measure upon a steady supply of petroleum products pumped from fuel depots on the west coast of England to frontline troops in France and later Germany. Military officials feared that if they used a large cable-laying ship to extend the pipeline under the English Channel, the Nazis might easily spot and destroy the suspicious vessel with torpedoes or bombs. Instead, the Allies relied on an inconspicuous tuglike vessel to pull 23-mile-long sections of pipeline into place under water and out of sight.

With that plan in mind, early in April 1944 the British government asked the United States Army Corps of Engineers if American industry could produce the unusual pipelines. Because Habirshaw Cable and Wire was a recognized leader in the manufacture of large-diameter, long-length underwater cables, the army sent a deputation to call on Wylie Brown. One executive, William Dunbar, recalled being summoned to Brown's office and finding there a stony-faced group that included a brigadier general, a colonel, and a captain, and Phelps Dodge's own plant manager and chief engineer from Yonkers.[6]

Brown turned to the army men and said, "You state for my people here exactly what you want us to do." The chairman of the military delegation emphasized by way of introduction that the secret project they had in mind would have "every priority that the government can give you; we've got to have it as fast as possible." Here he paused before stating, "We want a hollow submarine cable."

"What d'you want it for?" interrupted the always irascible Brown.

"Top secret," came the reply. "You'll never know until after the war."

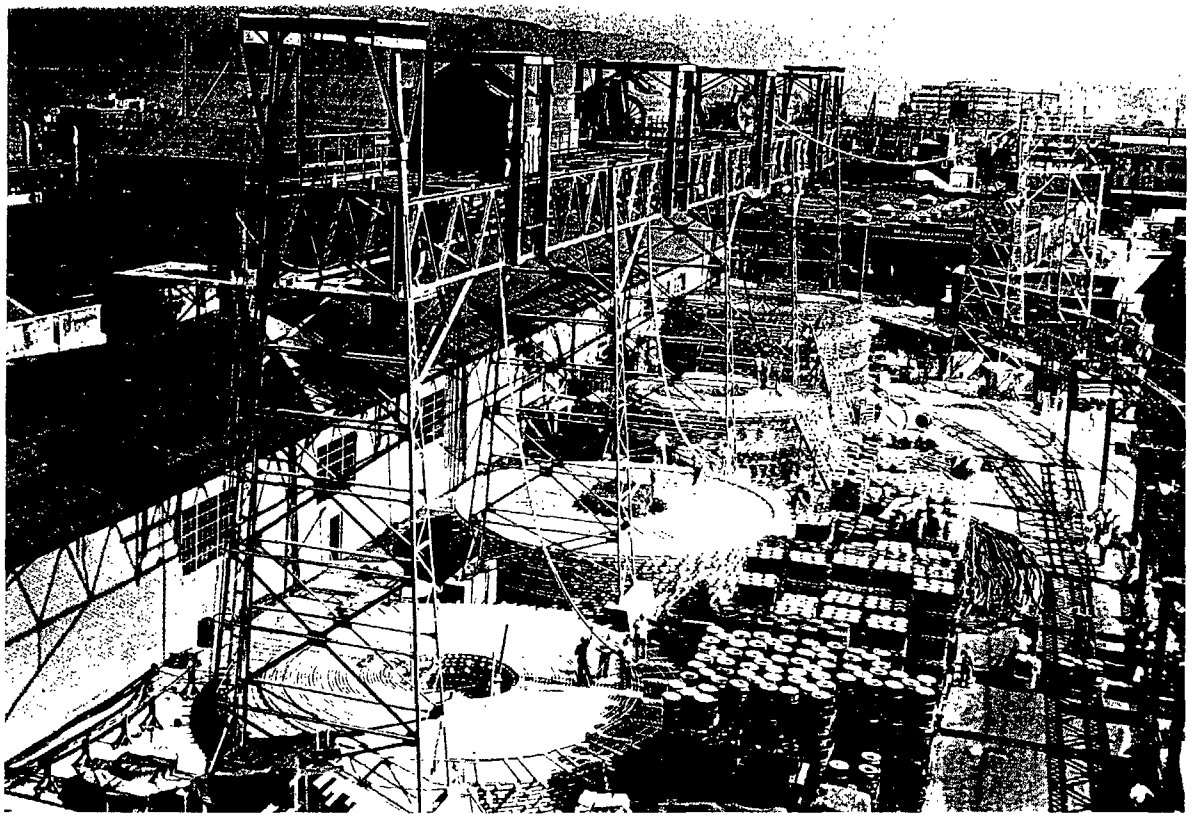
"Well," responded Brown, "we can make a hollow cable. We can make [it] with nothing in it, no guts in it, no wires—nothing. . . . It'll be a tube with nothing inside. It'll be lead." Here he paused and turned to his Habirshaw works manager, Earle A. Mitchell, and barked in his customary tone, "Mitchell! You can do this?"

Having commanded a navy submarine chaser during World War I, Mitchell understood the urgency of Brown's request. "Yes, sir," he responded quickly.

"How're you going to do it?" Brown fired back.

Mitchell responded as if thinking aloud, "I'm going to [hesitates] . . . going to draw [extrude] a tube, and I am going to put some antimony in the lead to harden it, but you'll still be able to bend it. I'm going to put jute [coarse fiber] around the outside of it. . . . I am going to put steel armor wires on that jute—the jute will give the armor wires a bedding—and I'm going to put jute over [everything] as additional protection."

"How're you going to ship it? How're you going to move it?" Brown knew that the usual communication cable contained several hundred telephone wires and that its wire core supported



HOLLOW LENGTHS OF *cable being fabricated in Yonkers for Operation Pluto. One such coil contained forty miles of cable and was fifty feet in diameter and forty feet high. Weighing approximately four thousand tons, it caused much concern about whether ships assigned to the project could safely cross the North Atlantic bearing the enormous weight of their strange cargo.*

the weight of the cable when coiled for shipment. Hollow cables handled that way would collapse under their own weight. Mitchell's proposed solution to that problem was to fill each cable with water during shipment to support the weight of the coil above it.

The military people grew increasingly interested, Dunbar recalled. "The general says, 'Your plant at Yonkers . . . is on the river. It's navigable. Deep water. I'm going to put Liberty Ships along your dock . . . and as this cable is manufactured and goes on these reels, it goes right into the hulls. . . . As one ship fills up with these cables, the next Liberty Ship will pull in.'"

Military engineers brought their specifications to Phelps Dodge, which on April 8, 1944, launched construction of an entirely new plant at Yonkers (since demolished) to handle the mammoth order. Its own engineers rushed to design, build, and install special machinery required to perform all manufacturing operations simultaneously. Those giant machines applied the many separate layers of protective coverings in a single continuous operation to create a sheathed conduit that was then carried outside where it was coiled before being loaded into specially converted cargo ships alongside the plant's deepwater dock.

Three other companies—General Electric, Okonite, and General Cable—shared in closely guarded Operation Pluto, but Phelps Dodge Copper Products Corporation bore the main responsibility. Each section of pipeline was four inches in diameter but designed to withstand high-pressure pumping. None of its competitors could build the required conduits in sections of more than two thousand feet, yet Phelps Dodge not only brazed those lengths together at Yonkers but itself fabricated over two-thirds of the total required distance of 140 miles.

First delivery took place on July 5, 1944, and exactly 162 days after Phelps Dodge Copper Products Corporation first tackled its unique assignment, the new Yonkers plant shipped the last foot of its quota on September 16, 1944. The conduit was soon in place to provide fuel to Allied armored divisions under General George Patton, then driving toward the German border. The Habirshaw Division received a coveted Army-Navy "E" Pennant for excellence in production of war materials. It was one of many commendations that Phelps Dodge people earned, each a token of appreciation from the armed forces to the nation's copper workers who contributed so much to achieve victory.

From War to Peace

The General Alexander Anderson was one of the first big troopships to return from Europe after fighting ended there in the spring of 1945. As it sailed up the Hudson River past Phelps Dodge's Habirshaw plant, it seemed suddenly to list slightly to starboard as many of the 5,519 soldiers aboard rushed to return greetings from a group of women production workers who had gathered on the dock. As the plant whistle sounded long and loud to welcome the troops home, still more women spontaneously left their jobs to cheer as the ship passed by. Phelps Dodge workers had much to celebrate, including their own vital role in winning the war.

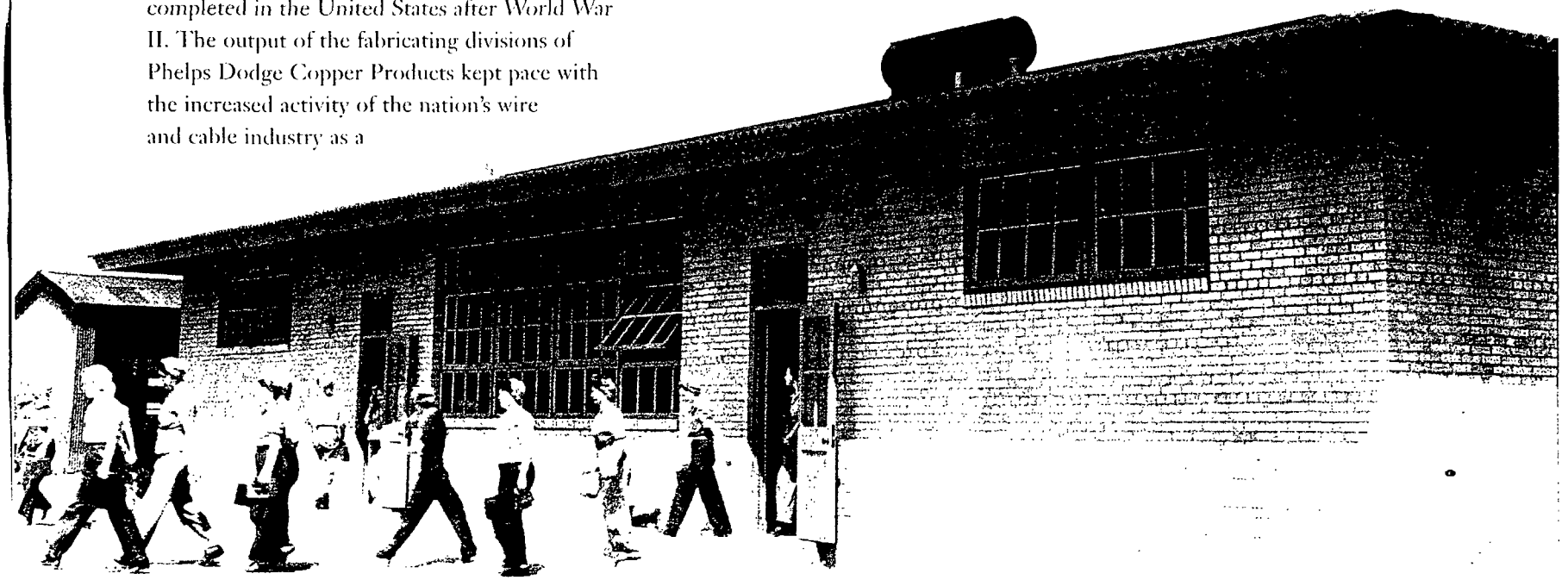
Due in large measure to the massive expansion at Morenci, Phelps Dodge at the end of World War II in August 1945 employed about fifteen thousand people, or about double the number it had just before the war. During the conflict, production of copper continued around the clock despite the loss of employees who volunteered or were drafted for military service, though War Department officials later furloughed a number of service personnel with mining experience to return to their former jobs. A total of 5,950 Phelps Dodge employees entered the United States armed forces during the war, and more than 100 of them died in service.

The pace of production did not slow appreciably even after the return of peace in 1945 because, although military demand for copper dropped abruptly, pent-up demand for civilian goods of all kinds created a vigorous postwar market for copper. Apart from a short pause after 1945 because of dislocations associated with government decontrols, inflation, and labor militancy, there followed a protracted level of affluence that caused America's copper industry to prosper as it had not done in nearly thirty years. Phelps Dodge copper production rose to nearly five hundred million pounds in 1948 to help meet unsatisfied demands that had accumulated during the war years.

That same year Phelps Dodge purchased outright the expanded plant facilities at Morenci and El Paso and the tube mill in Los Angeles, all of which Uncle Sam had financed during the war. Then came the cold war, and only five short years after the end of World War II, the Korean War again increased the military demand for copper. Phelps Dodge was ready, because even before the guns of World War II fell silent, its executives were already looking ahead to anticipate the needs of a postwar world.

As a result, they planned and implemented many improvements and expansions in existing plants, and they established a completely new division of Phelps Dodge Copper Products, the Indiana Rod and Wire Division, with a $4.5 million plant in Fort Wayne. Its construction began in August 1945 at a site directly across New Haven Avenue from the company's Inca Manufacturing plant. When the Indiana rod mill commenced production late in 1946, it was the most modern facility of its kind in the world—as well as one of the first major industrial projects completed in the United States after World War II. The output of the fabricating divisions of Phelps Dodge Copper Products kept pace with the increased activity of the nation's wire and cable industry as a whole. By 1949, in fact, the corporation ranked as the nation's largest rod and wire manufacturer.

On the mining side, the economic health of Phelps Dodge remained synonymous with production of copper from Bisbee, Ajo, Jerome, and Morenci. Day after day the mine at Morenci remained busy, and the landscape there constantly evolved as the great pit grew wider and deeper and as disposal of rock and concentrator tailings filled up old canyons and created impressive new mountains. Somewhat the opposite was true for the United Verde Branch where World War II output represented a last valiant effort by a once great producer. The end was clearly at hand by the late 1940s. Every annual report speculated that because it had made no major discoveries, the mine could operate only two or three additional years. Zinc ore mined deep underground helped to postpone the United Verde Branch's inevitable day of reckoning until 1953.



A MODERN CHANGE HOUSE *for women was opened at the Morenci Branch in 1944. To deal with wartime labor shortages, Phelps Dodge recruited Navajo and Hopi Indians from Arizona reservations, Jamaicans, and women, many of them wives of its Morenci employees. That was the first time women worked in the company's mining and milling operations, not just its offices. By the end of 1943 some 25 percent of its concentrator workforce was female.*

Dealing with Uncle Sam

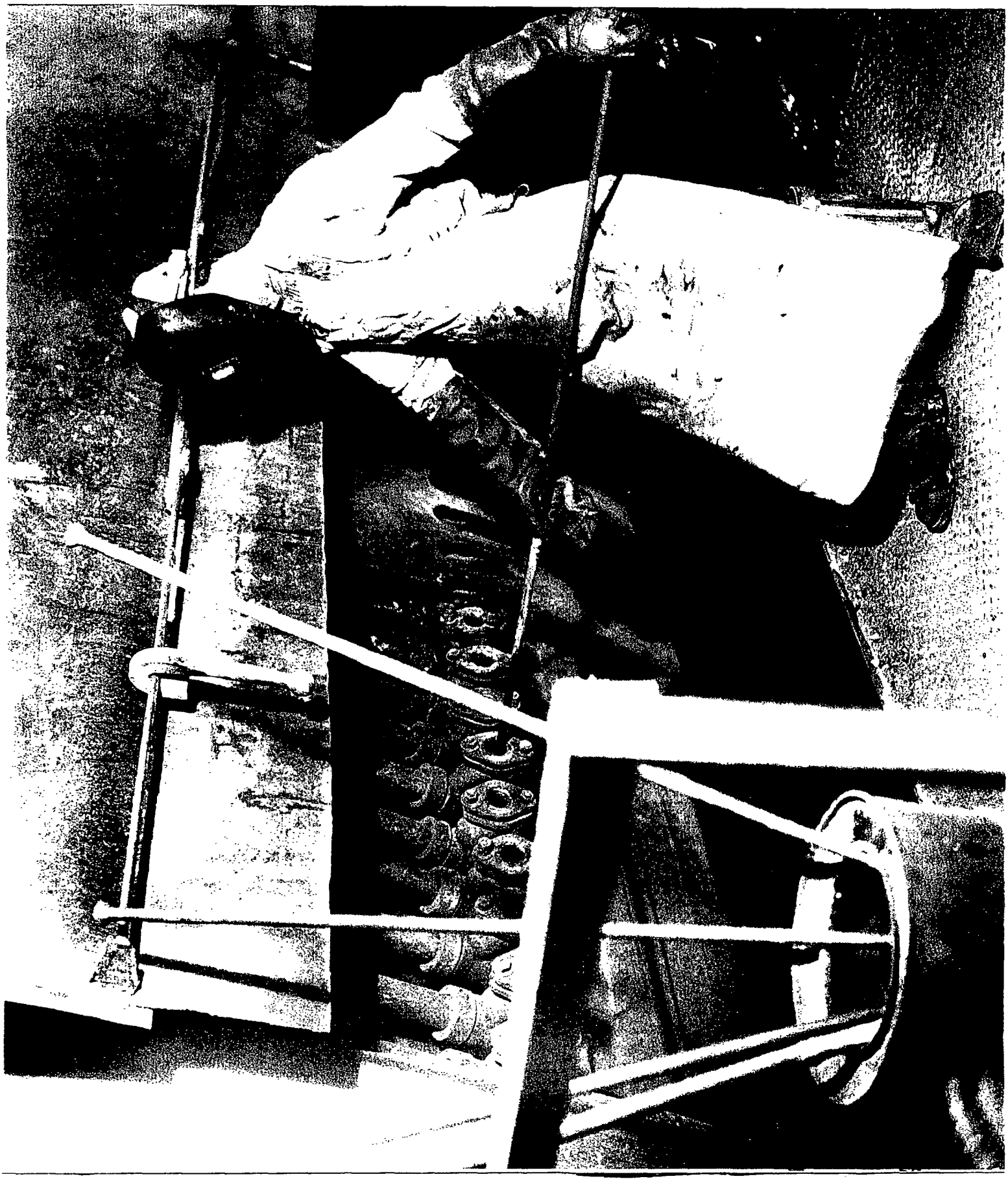
After 1937, Phelps Dodge found itself working ever more closely with federal officials, and that was truly a departure for the venerable corporation. In contrast to the titanic legal battles waged by Montana copper barons at the turn-of-the-century, which made national headlines, Phelps Dodge had long sought to maintain a quiet, inconspicuous political stance. Exceptions were rare, such as in 1864 when William E. Dodge, who thought New York City's mercantile community needed a competent spokesman in the House of Representatives, ran successfully on the Republican ticket. He declined renomination, however, after a single term in Congress dampened his interest in politics.

During the early 1870s, the partnership's traditional distaste for politics increased because of unfounded accusations to the effect that the company had defrauded the federal government of large sums of money through undervaluation of metal imports. A Dodge family biographer concluded that the company perhaps "should have taken the case to court and fought the charges" but that it was "intimidated by the arbitrary methods of the customs officials," whose authority was backed by the Port of New York collector Chester A. Arthur as well as by the Empire State's powerful United States Senator Roscoe Conkling. To members of the city's notorious Tweed Ring it was all "honest graft," but to some members of the press it was blackmail "by a conspiracy of petty official rogues." When old Daniel James, a model of business rectitude, learned from an English newspaper that the federal government was planning to sue Phelps Dodge for $1,750,000, "the shock well-nigh killed him."[7]

Phelps, Dodge & Company, concerned for the firm's good name, settled the case out of court for approximately $250,000. The episode left William E. Dodge furious. He sought to avoid political maneuverings of every type—except to congratulate his former Republican congressional colleagues Rutherford B. Hayes and James A. Garfield upon their respective elections as president in 1876 and 1880 and to applaud Lucy Hayes's refusal to serve any wine or liquor in the White House.

The corporation's links to the federal government remained minimal throughout the 1920s. Only after the Great Depression tightened its grip on American industry did Cates and other Phelps Dodge leaders take an activist stance by pressuring Congress for a tariff on imported copper, and later they prominently associated themselves with New Deal agencies like the National Recovery Administration by helping shape policies intended to assure fair competition within the nation's industrial and manufacturing sectors. Phelps Dodge's need to work closely with Uncle Sam increased dramatically during World War II, and a growing array of interconnections with the federal government ended the laissez-faire political and economic climate that copper producers took for granted during much of their business lives.

During the early 1940s, an expanding bureaucracy in wartime Washington formulated a maze of regulations unprecedented in scope and number. Two federal agencies most directly affected Phelps Dodge. One was the Defense



THIS PHOTOGRAPH *shows a "converter puncher" in the Morenci smelter on August 25, 1943. At pneumatic drills in mining stopes deep underground, at glowing furnaces in smelters and refineries, at brawny presses in rod and tube mills, and at humming machines in wire and cable plants across the nation, Phelps Dodge people labored long and hard to win the war.*

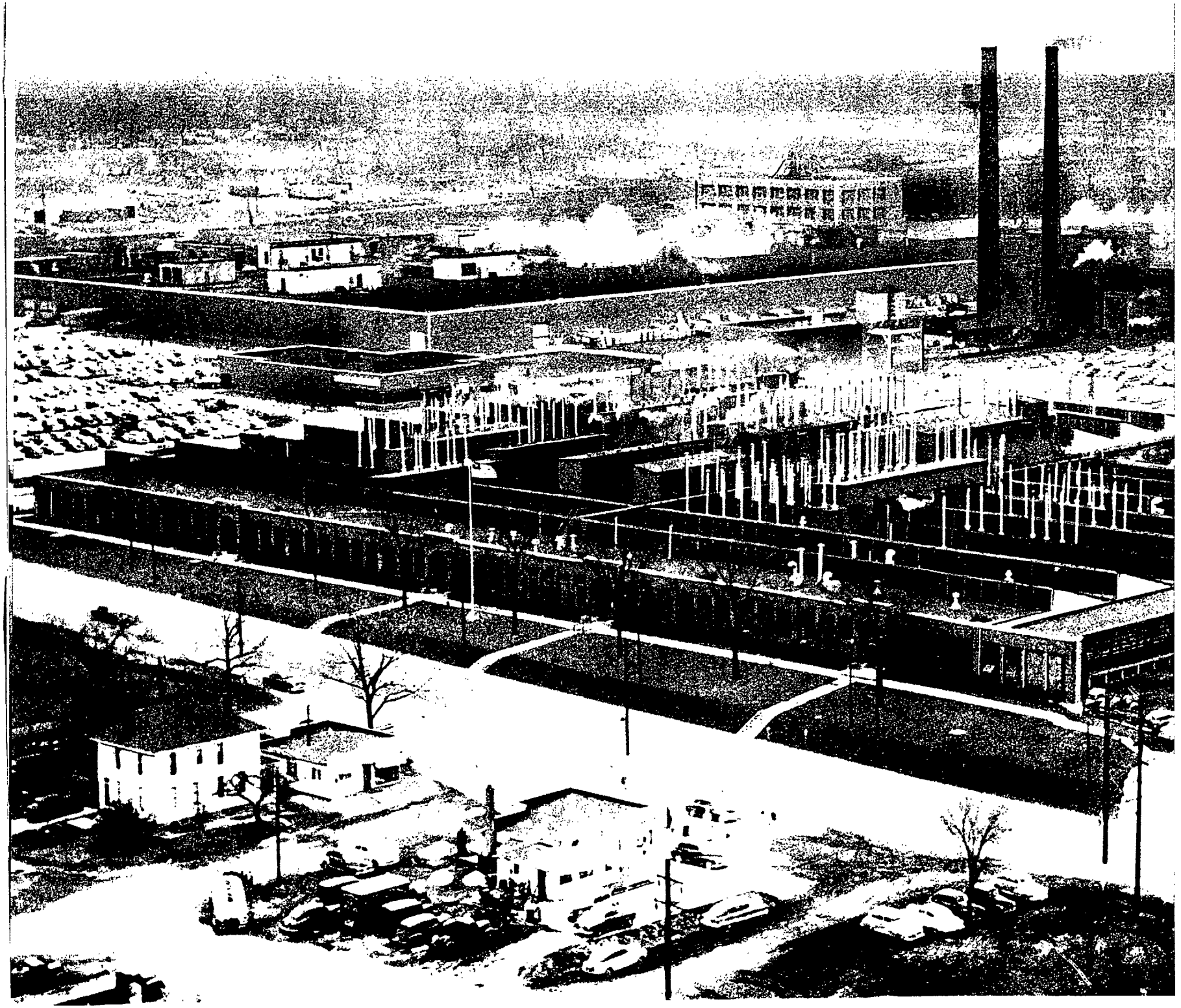
Plant Corporation, which financed the factories, mills, and equipment that enabled the corporation to expand production at its Morenci, El Paso, and Los Angeles facilities. Another was the Metals Reserve Company, which acquired so many million tons of domestic and imported copper and other metals for the war effort that it became sole buyer of all such commodities from domestic mines—and thus gained the power to set their prices. Uncle Sam became of supreme importance to Phelps Dodge's "bottom line."

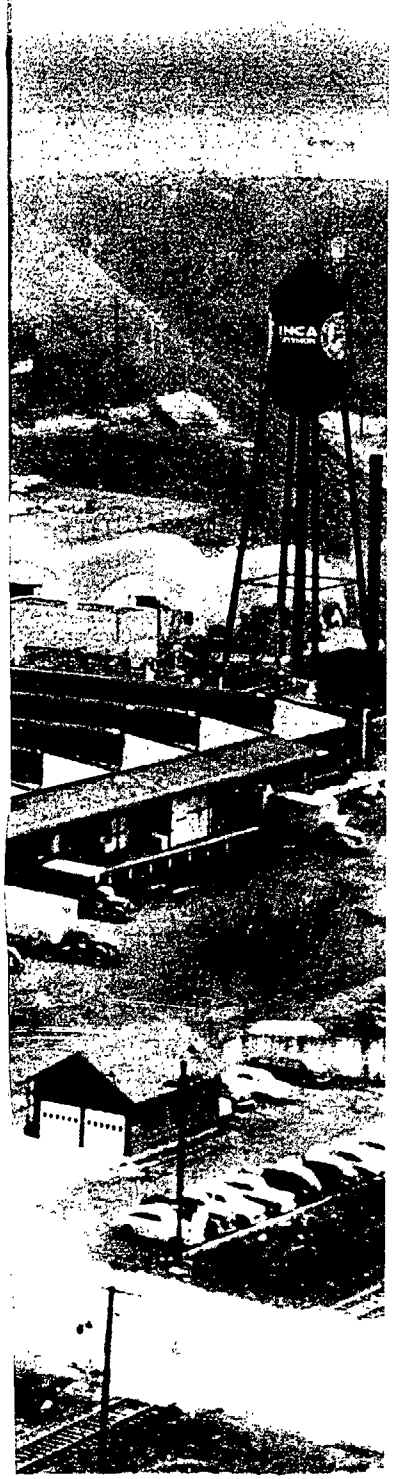
Invariably, wartime copper prices reflected opposition by the Roosevelt administration to any repeat of the industry's high World War I profit margins. That opposition explains why Uncle Sam arbitrarily pegged the price of copper at twelve cents per pound, compared to the market price of as much as twenty-six cents per pound during World War I, and permitted only minor adjustments at locations where the cost of production was demonstrably higher than the national norm.

President Cates wanted shareholders to understand why around-the-clock wartime production and record sales would not automatically equal soaring profits. Between 1941 and 1945 the corporation produced nearly twice as much copper as it had during 1936 to 1940, he explained, but severely limiting Phelps Dodge profits were the taxes that averaged 356 percent higher than during prewar years and payrolls that climbed 227 percent. True enough, Phelps Dodge earned sufficient money to maintain its quarterly dividend of forty cents per share, but the general purpose of government controls such as high taxes and ceiling prices for copper and other products, emphasized Cates, "was to restrict earnings as nearly as might be possible to a pre-war basis."[8]

LOUIS CATES RESIGNED the presidency of Phelps Dodge in 1947. The board of directors subsequently elected him chairman and chief executive officer of the corporation. By that time, he had had the opportunity to oversee nearly eighteen years of extraordinary growth and dizzying change, but anyone who thought that he would relax and enjoy the fruits of past labors was wrong. He remained chief executive officer until 1954, when he finally did relinquish that responsibility, but he continued as chairman until his death in 1959. Until just days before he passed away at age seventy-seven, Cates remained actively involved in day-to-day decisions at the corporation's offices in New York. Virtually everything that made Phelps Dodge the large and complex organization it had become by the end of the 1950s could be traced back in some way to his efforts. In all, it had been quite an extraordinary era, and Cates must certainly rank with Dr. James Douglas as one of the titans of Phelps Dodge history.

When the formal change of command came in the 1950s, Phelps Dodge was in superb financial condition. In 1954, for instance, it earned slightly more than $41 million (after a depletion allowance on the sale of more than 444 million pounds of copper); and it invested $27 million in new capital equipment and operations. Phelps Dodge Corporation had money in the bank, a total of $131.5 million in cash and securities, plenty of copper in the ground, and absolutely no long-term debt! Seldom had the future looked brighter.





Chapter Ten



IN SEARCH *of* EASY STREET

IN AUGUST 23, 1966, a massive explosion ripped apart the Fort Wayne offices of Phelps Dodge Copper Products Corporation. Surrounded by a lush lawn and big evergreens, the modern, two-story administrative building formed the centerpiece of a neatly kept oasis of beauty and quiet on the city's industrial east side. Directly across busy New Haven Avenue was the huge Inca works, from which wafted the faintly medicinal smell of magnet wire insulation, while on the opposite side was the sprawling plant of Indiana Rod and Wire, another division of Phelps Dodge Copper Products. What most people recall of that Tuesday morning was the sudden rumbling boom like a distant cannon as the office building vanished in a billowing cloud of white smoke and dust.

They recall next that shredded paper floated down like confetti in a ticker-tape parade, that desks and chairs lay tossed about like toys, and that tons of twisted steel and broken concrete dropped into the basement. The floors of the remaining offices tilted at crazy angles. The force of the blast stunned Walter Ainsworth, an Inca vice-president, and ripped the front off his second-story office, but otherwise left him unharmed. He climbed down a ladder put up by employees and immediately joined

THE SPRAWLING INCA *plant in Fort Wayne stood on the opposite side of New Haven Avenue from where the Phelps Dodge Copper Products Corporation office building, in this view not yet constructed, blew up in 1966. Tragic as the explosion was, it had no long-term impact on wire and cable manufacturing.*

the rescue effort. Ainsworth recalled that dazed and injured colleagues lay all over the front lawn. One person who had been blown through a front window was disheveled but apparently not seriously hurt.

Rastus Powell, an employee since George Jacobs founded Inca in 1929 and who knew everybody by name, did a quick inventory of personnel. In all, five people died in the explosion, a majority in the center section of the building, and two more died of heart attacks attributed to the blast. The death toll would likely have soared had the blast not occurred just before noon, during the lunch hour. Twenty people were injured, and the property loss was about $5 million.

Thirty minutes prior to the blast, employees smelled gas. A quick check of the building revealed nothing amiss, although in the basement private contractors worked to install a new gas main. They confidently assured everyone the odor was perfectly normal, but a coroner's inquest blamed the outside firm for the needless tragedy. For the next two or three years, every Fort Wayne office worker at Phelps Dodge Magnet Wire spent a few hours a week on "salvage duty" attempting to piece together barrels of tattered records recovered from the blast site.[1]

The Fort Wayne explosion notwithstanding, the 1950s and 1960s were generally good years for Phelps Dodge Corporation, an era of cautious and quiet growth. In fact, during the decade 1947–57 the company's stockholders enjoyed a string of fat dividends not seen since copper's boom times before World War I; the annual payout was at least four times greater than during the preceding decade. In addition, Phelps Dodge accumulated an ample financial reserve that during the best postwar years totaled more than $100 million, or nearly half the firm's net worth. *Forbes* magazine reported in 1958 that "in an industry famed for erratic winds of fortune, conservative, cash-rich Phelps Dodge makes its own luck by hewing strictly to the straight and narrow path of solid fiscal virtue."[2]

Robert G. Page, who succeeded Louis S. Cates as president of Phelps Dodge in 1947 and in later years as chief executive officer and chairman of the board, believed that because copper mining was inherently a cyclical business the only way to survive was to follow a conservative debt and cash policy. An additional reason to keep so much money in the bank was to build up the financial muscle needed to develop or buy new deposits of copper. "When a new venture comes up," Page told *Forbes* in 1958, "you've got to have ready cash if you want to get in on it." He recalled that Phelps Dodge had "borrowed $20 million in 1937" to finance its Morenci mine, "which was a lot of money in those days. But we have not had any need to borrow since."[3]

During the Page years the company's copper business generated profits year in and year out seemingly without heroic efforts. Analysts in the mid-1950s noted that Phelps Dodge could profitably produce copper for eighteen to twenty cents a pound at a time when it sold for close to thirty cents a pound. Furthermore, as Page noted in 1958, while mining, smelting, and refining provided a steady but relatively low margin of profit, fabricating copper into various industrial

products generally paid much better, particularly when a firm controlled its own source of supply, as Phelps Dodge did. In sum, the corporation's various branches and divisions meshed well in the 1950s and 1960s to ensure that one prosperous year followed another.

During the thirties and forties, Phelps Dodge Corporation had weathered the Great Depression and the breakneck pace of World War II production. Now it appeared basically content to enjoy the hard-won fruits of earlier efforts, notably when it integrated copper production from mine to market and brought the modern open-pit mine at Morenci into full operation. With copper seeming to take care of itself—in 1950 its mines yielded some 490 million pounds of red metal and substantial additional amounts of gold and silver—the time seemed right for Phelps Dodge to venture cautiously into oil and aluminum, two highly seductive industries compared to tried-and-true copper. In fact, between 1952 and 1962 Phelps Dodge actually spent more money exploring for black gold than searching for new deposits of copper.

Although the 1950s and 1960s were unusually prosperous years, and although Phelps Dodge often gave the impression that it had at last found easy street, chance misfortunes like the explosion at Fort Wayne reminded executives that they could take nothing for granted. Who in 1950, for example, could have predicted that sixteen years later the United States government would arbitrarily cap the rising price of copper at thirty-six cents a pound during a war in Vietnam (a distant place that on 1950 maps was still labeled French Indochina), or that thousands of miners from several different companies would remain on strike for eight months in 1967–68 in the longest industrywide work stoppage in the history of American copper?

Easy street had some bumpy stretches. That was to be expected in any business, but the rough places were neither extensive nor serious enough to harm Phelps Dodge's long-term prospects. Only later, in the late 1970s and early 1980s, would the combination of runaway inflation, copper prices sagging even lower in real dollars than during the worst years of the Great Depression, and strident environmental regulation stir up a whirlwind of troubles that at times completely obscured the road ahead.

New Leadership: From Cates to Page

IT WAS IN October 1947 that Phelps Dodge directors resurrected the office of chairman of the board for Louis S. Cates, who for a few more years also served as chief executive officer. Board members selected Robert Guthrie Page as administrative and operating head. Unlike Cates in background and temperament, Page in his own way came to be respected as much as his older, more dynamic colleague. One major difference between Cates and Page lay in the fact that Page was a lawyer, not an engineer. Born in Columbus, Ohio, in 1901 and a graduate both of Yale University and Harvard Law School, Page was the first member of the legal profession to preside over Phelps Dodge. The heads of the old partnership had been merchants; following them was a succession of three presidents renowned in

mining and metallurgy. Just as hiring Cates marked a major turning point in the company's history—bringing in the first outsider to run Phelps Dodge—so too did hiring Page. It began a forty-year era of lawyers at the helm of the corporation.

Old-timers at Phelps Dodge often used the word *brilliant* when they recalled Page. He was chief editor of the *Harvard Law Review*, and upon graduation in 1925 (with the highest grade point average in the history of Harvard Law to that time) he taught law for a year at his alma mater. One executive remembered that Felix Frankfurter, then a member of Harvard's law faculty, regarded Page as one of his most outstanding students. The future Supreme Court justice probably had a hand in securing his appointment in 1926 as secretary to Justice Louis D. Brandeis, a position that was a plum in any legal career. After a year, Page went into private practice, specializing in corporate organization and finance. In the mid-1930s he served a year as regional administrator in New York City for Uncle Sam's recently created Securities and Exchange Commission before becoming a senior partner at the firm of Debevoise, Stevenson, Plimpton and Page, general counsel for Phelps Dodge. In that capacity Page acted as special adviser to the corporation in financing its massive Morenci enterprise and subsequently represented Phelps Dodge almost full time in increasingly complex dealings with federal agencies during World War II. In all his work in Washington, Page demonstrated a formidable intellect.

After World War II, when Phelps Dodge directors recognized that their corporation's recent close association with federal administrators was no passing phase, they decided that top management should include a person who possessed the legal knowledge and experience the new business climate demanded. Page was their natural choice. Accordingly, in June 1947, they invited him to join the board of directors, and the following October they elected him president of Phelps Dodge. Page became chief executive officer in 1955 and chairman in 1966, and he continued in both positions until retiring in 1969.

The corporation's new administrative head—diminutive, urbane, witty, and a true gentleman of the old school who would always bow to ladies—was as wise as he was brilliant. He realized early that mining was scarcely his area of expertise, yet he gladly joined Cates on lengthy tours of company properties to acquaint himself with Phelps Dodge operations and personnel in the Southwest. He studied correspondence courses on mining, milling, and smelting, and afterwards whenever he went into company facilities, he posed numerous questions to individual operators. Always self-effacing, Page never tried to show off his newly acquired knowledge. In the end, he left policy on mining matters mostly to Cates and to his managers out West. In areas of his personal expertise—finance, diversification possibilities, and copper products—he always tended toward conservatism. Like a chess player carefully plotting strategy, he invariably made his move only after long and careful deliberation.

We speak somewhat glibly of the Page era, but in truth it was difficult to define with certainty when the era of Page began and that of Cates ended. Even after Cates's death in 1959,

A September 1958 photograph shows President Robert G. Page (1901–70) flanked left and right by the hatless C. E. Mills, manager of the Copper Queen Branch and Douglas Reduction Works, and Walter C. Lawson, vice-president and general manager of Phelps Dodge Corporation's Western Operations.

several talented men supervised ongoing mining operations and sustained his vision. Two key administrators, Charles R. Kuzell from United Verde and Walter C. Lawson from Calumet and Arizona, owed their appointments at Phelps Dodge to mergers that Cates pursued. Those men essentially "ran the west" during the 1950s and 1960s, when the corporation still maintained a modest administrative staff at its New York headquarters and delegated considerable day-to-day authority to general managers based in Douglas at Western Operations offices. Both Kuzell and Lawson, his successor, officially reported to Page or Cates, but New York exercised control mainly by making the big decisions that affected production rates, marketing, and pricing and by handling the purse strings in major financial matters. Kuzell was a metallurgical engineer by training and a genuine innovator in smelting technology, a field to which he devoted a lifetime. Lawson's specialty was open-pit mining, and it was he who was largely responsible for overseeing Morenci's breathtaking wartime growth. A square-jawed stereotype of a mining engineer, he was known as Laconic Lawson for his stinginess with words.

Others, notably the Phoenix lawyer Bill Evans, unquestionably deserved an ample measure of credit for the ongoing success of the corporation's vast mining complex in Arizona and New Mexico. In the quest for water to run the company's mills in Morenci and Tyrone, the names Evans and Phelps Dodge were closely linked. Behind all the developments of those years, however, stood Louis Cates, "King Louis," as some called him beyond his hearing. For certain, Phelps Dodge paid Cates generously for his many contributions to the corporation. In 1947, for instance, his salary totaled $163,750, a substantial sum for the era (Wylie Brown ranked next at $118,500), and growing wealth allowed Cates to live regally. He never emulated the showiness of Daniel Jackling, his mentor, who once paid to redecorate a full floor of San Francisco's gracious Saint Francis Hotel as his living quarters, but Cates enjoyed touring Europe in imperial style. He ranked high among a vanishing breed of copper industry grandees.

The late 1940s and early 1950s also witnessed the emergence of new leadership at Phelps Dodge Copper Products Corporation. Two years after Page arrived at the parent corporation in 1947, the indomitable Wylie Brown relinquished day-to-day management responsibilities to become chairman of its manufacturing sector. The man who for two decades was synonymous with the industries side of Phelps Dodge Corporation retired in 1950. Filling his shoes was not easy. The first person to succeed Brown as president was Whipple Jacobs, a thirty-year employee of Belden Manufacturing Company in Chicago,



but in 1952 at age fifty-five he suffered a fatal heart attack. Replacing Jacobs was Howard F. Brinton, who when he retired as chairman in 1965 had given more than half a century of service to Phelps Dodge Copper Products Corporation or its predecessor companies.

Regardless of its new leadership, Phelps Dodge Corporation in comparison to the other big producers, Anaconda and Kennecott, probably changed the least during the quarter century after World War II. If anything, the period of relative calm provided a welcome opportunity to catch its breath and quietly position itself to seize future opportunities. Of course, changes did occur at Phelps Dodge during the years between 1945 and 1970, but few innovations in technology or changes in its basic mix of businesses were as dramatic as those the company experienced during the preceding fifteen years—or would experience during the 1980s.

During the postwar era it made no significant alterations to the way it extracted ore. Except for 1949, a year of industrywide decline, Phelps Dodge expanded production each year to average almost five hundred million pounds of copper annually between 1947 and 1951, totals that compared favorably to the approximately three hundred million pounds it produced during each of four years preceding United States entry into World War II. Its consolidated net income rose accordingly, to approximately $40 million a year, or roughly six times higher than 1937–41 figures. The basic trend continued during the 1950s, when copper prices increased slowly from slightly more than twenty-one cents per pound in 1950 to nearly thirty-three cents in 1960.

Because yearly profits remained so robust for so long, Phelps Dodge felt no need to redefine its business strategy in any major way. It remained a model of prudence. When oil exploration excited other major copper producers, Phelps Dodge joined the search only cautiously by forming partnerships first with Carter Oil, then Continental Oil, and finally with the petroleum division of Cyprus Mines. Together they looked for black gold along the Gulf Coast of Louisiana and Texas during the 1950s, but without real success. Phelps Dodge did better through passive diversification, such as when it turned a profit on a 1952 purchase of two hundred thousand shares of Amerada Petroleum common stock.

Even if the 1950s and 1960s were not years of sensational growth and change like the 1930s and 1940s, several mileposts in the corporate landscape during the Page era were impressive nonetheless. It was then that Phelps Dodge noticeably increased its mineral exploration activity, added a large underground ore body at Safford, Arizona, and new open-pit mines at Bisbee and Tyrone, gained interests outside the United States in several wire- and cable-making businesses and a one-sixth stake in the Southern Peru Copper Corporation, expanded Phelps Dodge Copper Products Corporation, and entered the alluring new field of fabricating aluminum products. In the late 1960s, toward the close of the Page era, Phelps Dodge even joined the race to acquire uranium mining and milling property in Wyoming, supposedly the newest road to wealth.

By the time Cates died in 1959 he had

bequeathed to Page a financially robust Phelps Dodge. Its entire capitalization consisted of a relatively small ten million shares of common stock. It had issued neither preferred stock nor bonds, and it had no long-term debt. At that time its common stock sold for around $55, and behind every share were valuable and highly negotiable assets.

"Unless Further Discoveries Are Made"

Within the United States during the 1950s and 1960s, Phelps Dodge copper production came mainly from open-pit mines at Ajo and Morenci and both underground and open-pit mines at Bisbee. On the other hand, at Jerome both the quantity and quality of ore declined significantly following World War II. "Unless further discoveries are made," warned the 1947 *Annual Report*, Phelps Dodge expected to halt production there in the near future. In 1951 Jerome contributed slightly less than 20 million pounds of copper to the corporation's record total that year of 501 million pounds. Not surprisingly the United Verde Branch ceased all production two years later.

All in all, the Jerome gamble paid off surprisingly well. During eighteen productive years after Phelps Dodge acquired the mine in 1935, the United Verde Branch yielded an impressive quantity of metals, including nearly 920 million pounds of copper, 15 million pounds of zinc, 53 million ounces of silver, and 400,000 ounces of gold. Even in the late 1990s, Phelps Dodge continued to own the property and employ a small staff to maintain it. No one could say exactly what the future held, but in mining, as in movies, a sequel of some sort was always possible. The value of any remaining ore would depend on future mining technology and the all-important price of copper and zinc.

South of the international border, Nacozari and the Moctezuma Copper Company seemed destined to share the fate of Jerome and the United Verde Branch. In truth, the Mexico property would probably have remained shut after its 1931 closure had it not been for a subsequent rise in demand for copper. Operations resumed there in September 1937, and during World War II production at the Pilares mine and Nacozari concentrator was increased substantially at the request of the United States War Department. But when the conflict ended, production again dropped off sharply. Phelps Dodge ceased underground copper mining in Mexico in 1950, but it continued leaching operations for another decade. In 1979 a Mexican court dissolved the Moctezuma Copper Company and formed instead the Minera Pilares, S.A. de C.V. Phelps Dodge retained a 49 percent stake in the property.

Along with United Verde and Moctezuma, Phelps Dodge's coal mines at Dawson, New Mexico, steadily declined after the World War II boom. For employees with long memories, it was sad to watch the decades-long downward trend at Dawson. Its black diamonds had energized Phelps Dodge smelters, powerhouses, and railway locomotives, but blast furnaces gave way to more efficient reverberatory smelters, and by the mid-1920s, oil from Texas and later natural gas rapidly elbowed aside coal and coke for many industrial

uses. One major coal customer was the Southern Pacific, but the railroad increasingly burned oil in its steam locomotives. During the decade after World War II, railroads of the West rapidly converted to diesel-electric locomotives, which were far more efficient than the picturesque but maintenance-intensive steamers.

In its final years, Dawson had only one mine in production, and earnings of the Stag Cañon Branch were at best anemic. Dawson was so obviously dying that no one could have been surprised when Phelps Dodge permanently ceased production there on April 28, 1950, after workers ran a trip of cars out of the mine and unloaded the last of some thirty-three million tons of coal dug there during forty-six years of operation. Still, for some of the old-timers the shutdown hurt. On May 11 the opera house witnessed one final public gathering: Dawson High School's Class of 1950 graduated. By then the town's population had dwindled to about twelve hundred residents, and it was hard for anyone not to feel mixed emotions when living in a community composed mainly of empty houses.

For tax reasons, Phelps Dodge quickly disposed of most aboveground structures to the National Iron and Metal Company of Phoenix for half a million dollars, and the new owner razed or sold or moved to a new location about two thousand different structures. Before long, Dawson's only remaining dwellings consisted of sixteen houses used by cowboys who turned the fifty-two thousand acres of coal and timber property into Phelps Dodge's own Diamond D Ranch. Nearly two decades later, in 1968, the corporation leased the property to the historic CS Cattle Company of Cimarron, New Mexico, for grazing and for elk hunting. In the late 1990s, one of the remaining houses had been enlarged and remodeled to serve as a base for sportsmen.

Many former residents still gather every other year at what once was Dawson for a Labor Day–weekend reunion. They voice no bitterness because they understood the harsh realities of coal production. "Phelps Dodge did right by its employees, and there's a loyalty like you never find anywhere else." So noted Carol Myers, a 1946 graduate of Dawson High School who helped run the reunions. In the late 1990s they still attracted as many as eighteen hundred people.[4]

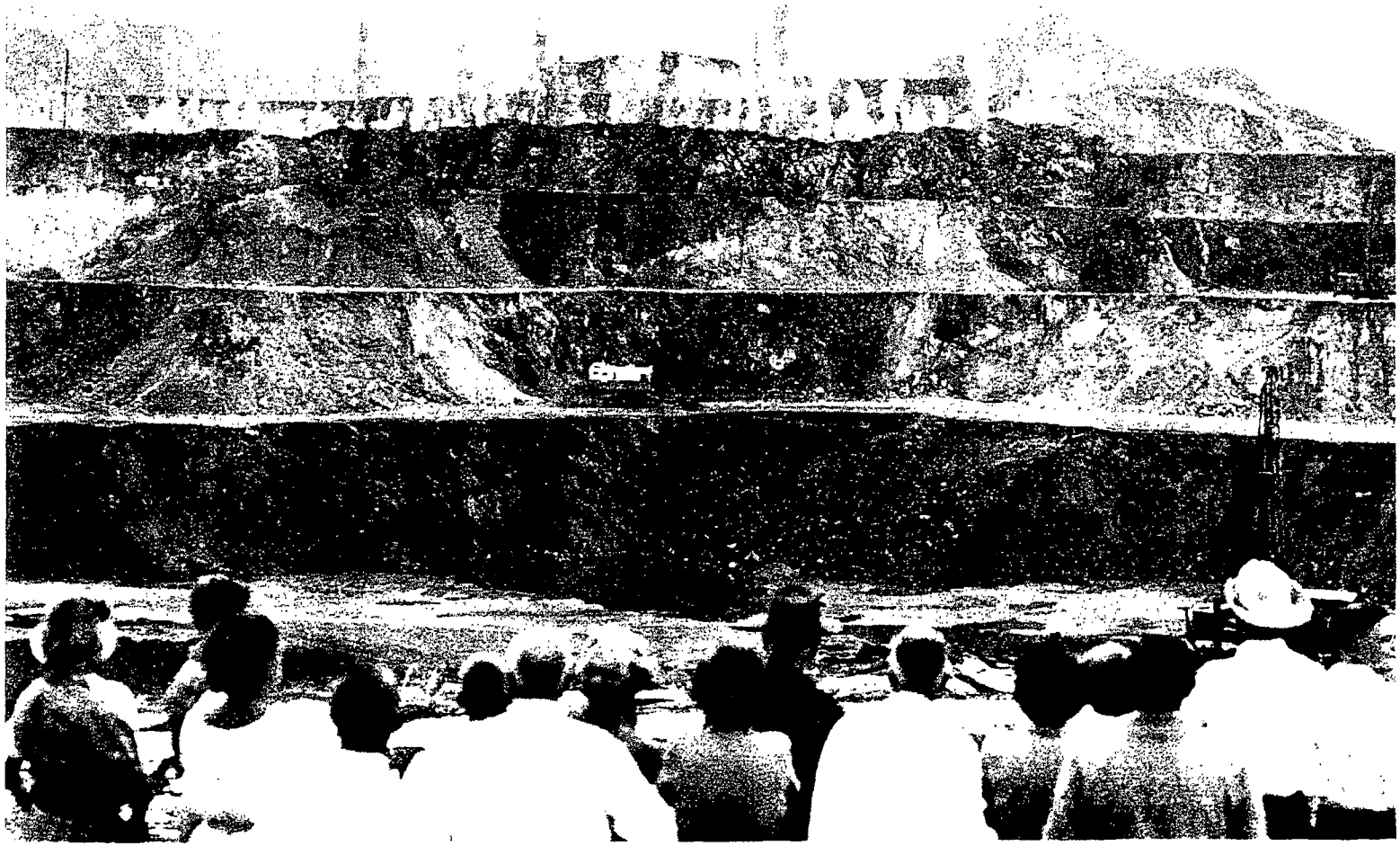
By that time, just about the only way for old-timers to reconstruct Dawson mentally, apart from sharing their collective memories, was to examine faded photographs or personally trace the pattern of eroded and weed-obscured streets and sidewalks. And in March 1997, most evidence of the urban landscape disappeared along with long-abandoned coal ovens and smokestacks in a Phelps Dodge remediation program. Old Dawson simply ceased to exist. It vanished even as a ghost town. Ironically, in the end the town's most permanent feature was its cemetery. Old William E. Dodge could probably have drawn a theology lesson from that.

As for the once mighty Copper Queen Branch in Bisbee, during the half decade following World War II it too declined as a big contributor to the corporation's bottom line, not only because long-reliable shafts, notably the Campbell, Cole, and Junction, lacked the rich ore of former years but also because underground operations required skilled miners. That category of worker became increasingly rare during and

Spectators watch *as the grand finale blast officially opens Bisbee's Lavender Pit on August 7, 1954.*

after the war. Yet in the early 1950s, the Bisbee operation avoided the fate of the United Verde and Stag Cañon branches and, remarkably, enjoyed one more copper boom.

In 1947, Phelps Dodge purchased the last of its major rivals in Bisbee, the Shattuck-Denn Mining Company. At about the same time it began evaluation of the Bisbee East ore body, a large low-grade copper deposit located just south of its long-closed Sacramento Pit. Workers in the early 1950s removed the first of some forty-six million tons of rock to launch development of what soon became the Lavender Pit. The name honored Harrison M. Lavender, the Phelps Dodge vice-president in charge of Western Operations, although he did not live to see completion of the project. The hard-driving man died early in 1952 of leukemia at La Jolla, California. Compared to the Sacramento Pit, which actually formed the northwest section of

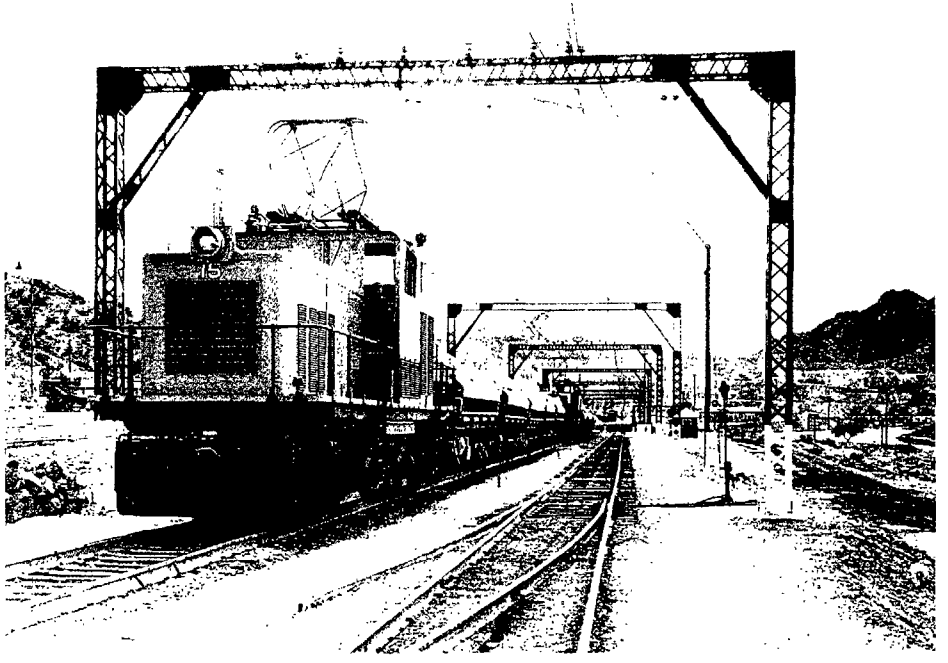


the Lavender Pit, Bisbee's newest mine excavation was approximately ten times larger than its predecessor, though its ore was of significantly lower grade.

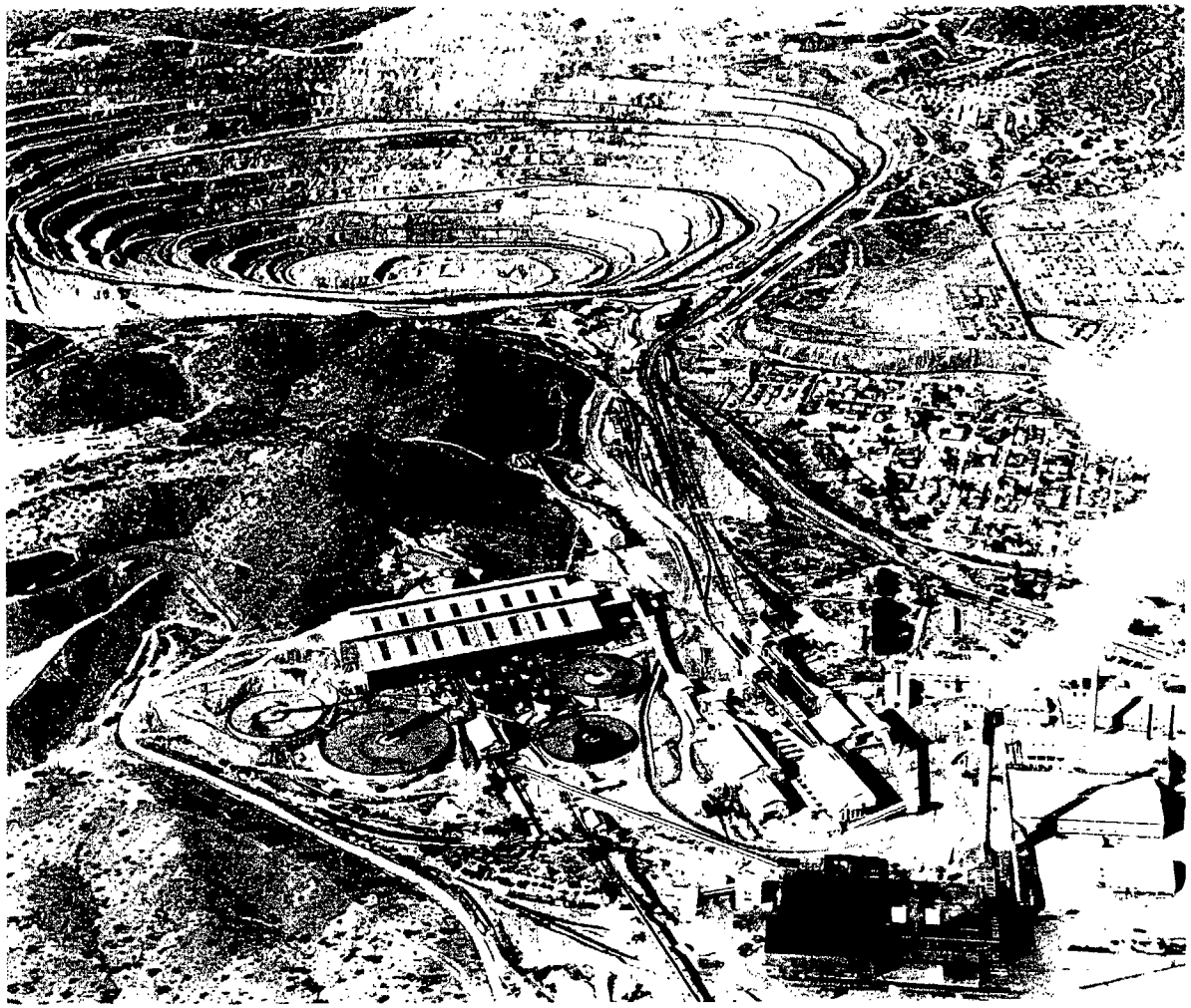
Ore from the Lavender Pit first reached the new concentrator on June 24, 1954, and production continued for the next twenty years. Phelps Dodge itself financed the $25 million mine and processing complex. Guided by Charles Kuzell and then Walter Lawson, the Copper Queen Branch quickly resumed its former standing among Phelps Dodge's major mine properties by outproducing Ajo's New Cornelia Pit in the mid-1950s to rank second only to Morenci.

The concentric rings of the expanding Lavender Pit spiraled gradually outward to consume some of Bisbee's earliest suburbs, notably the neighborhood of Lowell. The main highway through town ran next to the rim of the chasm, and that offered motorists a spectacular view of daily mining operations. They could watch as workers drilled holes sixty feet deep in the concentric benches and carefully loaded each one with about 450 pounds of explosives. Soon the Arizona earth trembled as simultaneous blasts fractured tons of rock. A cloud of dust drifted away with the wind as if to raise the curtain on the next act of an ongoing drama. Electric shovels scooped six cubic yards of muck at a time into twenty-five-ton diesel trucks, which hauled it a short distance to fill side-dump railroad cars that diesel-electric locomotives slowly pulled up to the rim. The impressive show was quite a tourist draw. Children raised in nearby Douglas remember when Sunday afternoon entertainment consisted of family outings to the Dairy Queen in Bisbee followed by a stop to watch the afternoon blast at the Lavender Pit.

The New Cornelia Branch continued to be a dependable producer, although news from Ajo rarely warranted more than a paragraph or two in the company's annual report, and what coverage it did receive often amounted to perfunctory news of a couple of new trucks, or modern drills, or an innovative explosive. Probably the two most significant developments occurred in 1946–47 with electrification of the railway line extending down into the pit and in 1950 with completion of Ajo's first smelter, as distinct from the vacuumizer and other technological frauds of earlier years. Phelps Dodge invested $8 million in the new facility "blown in" at Ajo in June 1950, the same



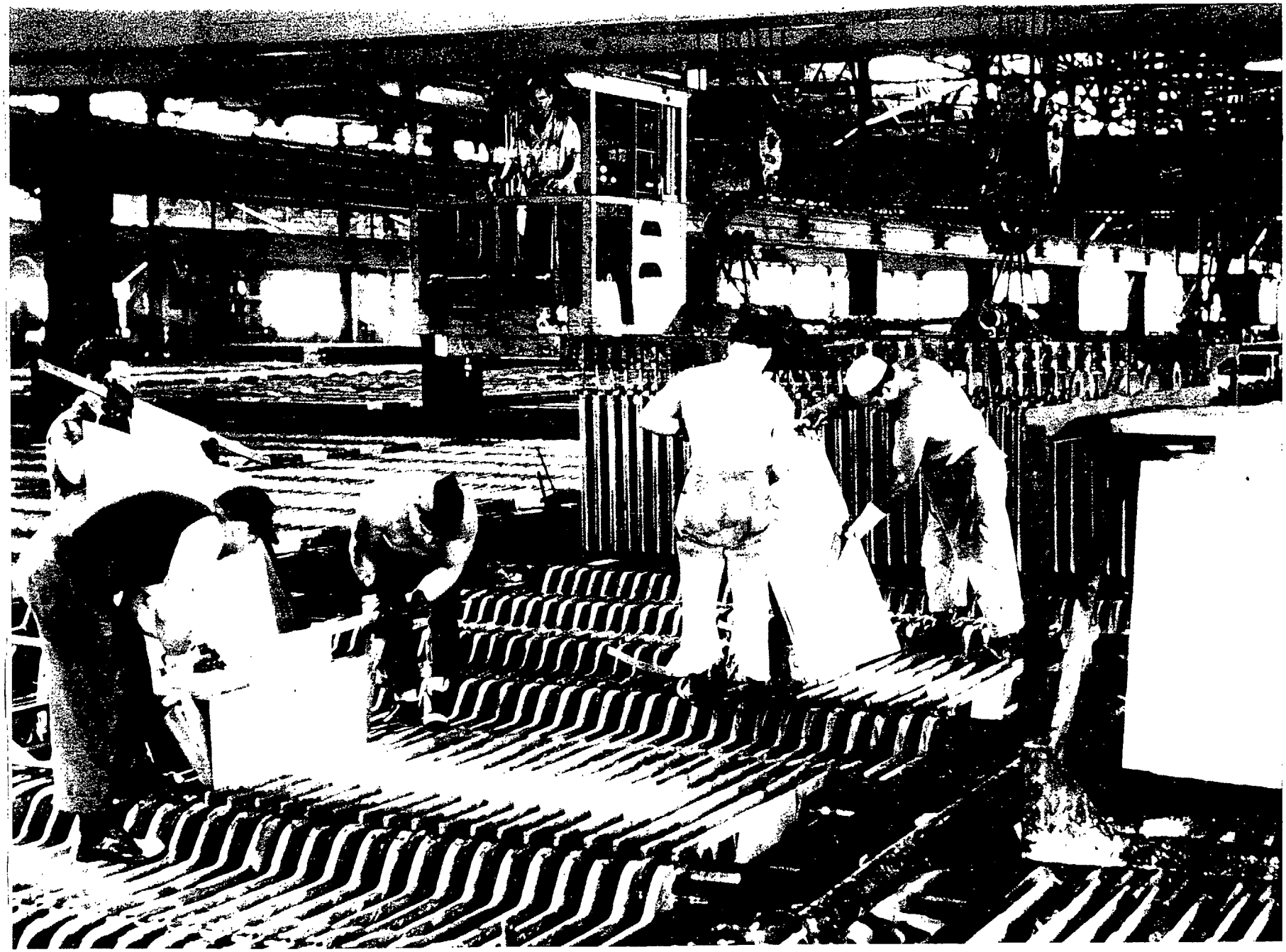
A photograph from *December 1947 shows the New Cornelia Pit after recent electrification of its haulage railroad. The substantial nature of the support structure shows that this was truly a first-class upgrade. When the Ajo mine launched production thirty years earlier, the principal motive power consisted of oil-fired steam locomotives.*



An aerial view of *the New Cornelia Branch in September 1956 shows its entire landscape of production: the open-pit mine, concentrator, and smelter. Following the outbreak of war in Korea in June 1950, production at Ajo climbed to the highest levels since 1943. During the 1950s and 1960s, Ajo consistently produced between 100 million and 140 million pounds of copper while requiring only modest infusions of capital.*

month it closed its venerable smelter at Clarkdale. Thereafter, the New Cornelia Branch rapidly scaled back and soon eliminated regular rail shipments of concentrate to Douglas. The Ajo smelter was strictly an in-house job, its design influenced by early-day operations at Clarkdale where some of its equipment originated and where its chief architect, the assistant general manager Kuzell, worked earlier.

The bellwether of Phelps Dodge copper mines during the Page era was still Morenci, the branch that produced as much as three hundred million pounds of copper a year starting in the late 1940s. Its annual profits rapidly repaid the corporation's earlier investment of nearly $100 million. Not content with its record production, the Morenci Branch further stepped up production by enlarging its concentrator to



A RETROSPECTIVE LOOK *at ongoing operations at the El Paso refinery in 1953, where workers insert the starter sheets used to make copper cathodes. Here anodes from Phelps Dodge's three Arizona smelters were electrolytically refined to produce virtually pure copper cathodes.*

handle sixty thousand tons of ore per day and by constructing a large precipitation plant to recover copper leached from dumps of copper-bearing material of grades too low for processing through the big concentrator. As had happened during World War II, expanded operations at Morenci increased the need for water and required that Phelps Dodge enlarge its already extensive hydraulic network.

During the 1950s and 1960s, Phelps Dodge personnel made almost continuous refinements to equipment and processes that at individual properties increased capacity and reduced costs. Among the projects were larger grinding mills and development of the leach-precipitate-flotation process at the Morenci concentrator. Near its Morenci complex in 1953, Phelps Dodge initiated exploratory drilling in the old King-Metcalf area where earlier it had abandoned several underground mines and where in the future it would launch the new Metcalf open-pit mine.

Phelps Dodge did not limit new construction during the post–World War II decades to industrial facilities. In September 1948 it completed a new recreational center for employees at Ajo that included a modern 660-seat movie theater, a library, and a community recreation room. The latter facility was used for dancing or banquets or as an auditorium. In 1953 Phelps Dodge provided 1,287 additional homes for employees and other eligible residents in the Morenci-Plantsite-Stargo-Clifton area. In the early 1960s, as Phelps Dodge expanded its open-pit mines at Ajo, Morenci, and Bisbee, it removed and replaced several mine buildings and processing facilities, but nothing it did was as dramatic as relocating the entire community of Morenci starting in 1965. The old town stood in the way of the big pit as it expanded south, and thus during the course of several years the company systematically relocated Morenci to a new site about three miles south of the mine. Opening a new high school in 1982 concluded the move.

Not Sticking Close to Home

ONE SIGNIFICANT DEPARTURE for Phelps Dodge during the quarter century after 1945 was the corporation's growing involvement in mining and manufacturing activities outside its familiar sphere of operation in the United States and Mexico. Overseas commerce of the old New York–based mercantile partnership had extended to Great Britain and continental Europe. That changed after 1881 when Phelps Dodge's growing involvement in copper in the Southwest caused it finally to focus its full attention on that one remote corner of North America. In the early 1930s its angle of vision expanded once again to encompass fabricating plants located in various parts of the United States, primarily the Northeast.

By midcentury, Phelps Dodge remained the only one of America's Big Three copper producers to avoid any direct involvement in mining properties outside North America. In fact, apart from the Moctezuma Copper Company and a few small properties in northern Mexico and a short-lived part-ownership of a

Canadian refinery in Montreal gained with acquisition of Nichols Copper, the corporation continued to restrict its mining and manufacturing operations to the United States.

To some extent, the narrow geographic focus resulted from deliberate policy. In the words of *Forbes* magazine, Phelps Dodge did not intend for "its fortunes to hinge, as Anaconda's may, on the outcome of an election in Chile, or as [Cerro de Pasco's] may, on the consequences of a military coup in Peru." That course had long seemed wise. For United States copper producers that had expanded into international operations, *Forbes* observed, "the rewards have been anything but commensurate with the risks in recent years," whereas by "sticking close to home, New York's Phelps Dodge has consistently led the copper industry in profitability."[35]

Ironically, by the time *Forbes* published those comments in 1964, Phelps Dodge had taken its initial steps toward greater international involvement. To outsiders they must have appeared rather timid, such as when Cates's postwar trip to Africa led Phelps Dodge to buy four million dollars' worth of stock in the American Metal Company (later AMAX)—or about a 10 percent interest. Because of American Metal's sizable investments in a northern Rhodesia copper venture, the stock purchase meant that Phelps Dodge became an interested party as well.

During the 1950s, Phelps Dodge executives cautiously scanned distant horizons in search of new mining opportunities, as distinct from passive investments abroad. They spotted an especially attractive prospect high in the Peruvian Andes near the borders with Chile and Bolivia, where several American mining companies



The Phelps Dodge *Mercantile in new Morenci. Abandonment of the old settlement commenced in 1965 and continued piecemeal for almost two decades. The last building to be vacated was the high school, built in 1950, where members of the Class of 1982 were its last graduating seniors. The football field there had the distinction of having been built on a former slag dump of the Detroit Copper Mining Company and at one edge of the open-pit mine. Players from both teams kicked all extra points and field goals at the same end of the field because at the other an airborne football could drop a hundred feet onto the highway below.*

discovered large deposits of copper ore. Phelps Dodge became involved in the isolated locale mainly because American Smelting and Refining (ASARCO), a company hitherto interested almost exclusively in metal processing and sales, obtained a promising ore body known as Toquepala. Nearby lay a second large copper deposit, Quellaveco, while about twenty miles northeast lay yet another, Cuajone, the latter owned jointly by two mining companies, Cerro de Pasco and Newmont. All together, the three deposits contained more than a billion tons of ore assaying around 1 percent copper.

Exploratory drilling in the late 1940s and early 1950s revealed that the deposits were amenable to open-pit mining. However, two difficulties stood in the way of easy development. One was the magnitude of the project and hence the high cost that development would incur. A second was the fact that the property-owning companies lacked adequate experience in open-pit technology. Phelps Dodge participation would contribute much to solving both problems. The owners, needing to secure an Export-Import Bank loan to develop their Peru properties, carefully sounded out Cates. He suggested that Phelps Dodge might be willing to join a consortium, but only if American Smelting and Refining, Cerro, and Newmont agreed to develop the properties jointly with a common infrastructure that encompassed Toquepala, Cuajone, and Quellaveco. The four companies turned the novel proposition over to their staffs, and after what one participant later referred to as "the battle of the burning slide rules," they joined forces to create the Southern Peru Copper Corporation early in 1955. That same year, the newly formed enterprise began the formidable task of stripping away 130 million tons of overburden and laying out a landscape of production at Toquepala.

The highly successful Peru consortium was largely Cates's brainchild. In some ways it was his last major contribution as Phelps Dodge's supreme authority on mining matters. The corporation also brought to the table the basic knowledge and mining skill it had previously gained from successful open-pit operations at Morenci and Bisbee. All this was important because the Southern Peru deposits were located in exceptionally difficult places, and they required even more massive commitments than Phelps Dodge had made in Morenci. The man who directed operations at Toquepala was Warren Smith, former superintendent at Bisbee's Lavender Pit.

Eventually, after minor realignments, the owners of Southern Peru divided the enterprise as follows: Phelps Dodge 16 percent, Cerro 22.25 percent, Newmont 10.25 percent, and American Smelting and Refining 51.5 percent. As an added inducement to Phelps Dodge, all parties agreed that when Southern Peru paid its first dividends, Phelps Dodge would recover part of its investment in advance of the other companies—which it did in 1966. Together with annual payments of $7 million during each of the subsequent five years, the money was sufficient to liquidate the corporation's loans of approximately $20 million to Southern Peru Copper. Further, they equaled a return on investment of nearly 100 percent a year on Phelps Dodge's remaining equity! So promising were the operations of Southern Peru Copper that its partners began in

the early 1970s to reinvest their dividends in a companion project, Cuajone, which was even larger than Toquepala.

The new landscape of production at Cuajone began operations in September 1976. Although it cost a whopping $750 million in United States dollars, as compared to $238 million spent to open the Toquepala complex sixteen years earlier, Cuajone proved a good investment because even a quarter century later it still processed many tons of copper ore each day. As for Quellaveco, its third major deposit of red metal, Southern Peru Copper ceded ownership to the Peruvian government in 1971.

In all, Southern Peru Copper retained two excellent properties where modern equipment and an efficient management team combined to make production costs among the lowest in the world. As a result, it was one of very few copper-mining companies able to produce a positive cash flow during the disastrous downturn of copper prices during the early 1980s. That was when Southern Peru Copper emerged as Peru's largest single producer, accounting for about two-thirds of that nation's output of red metal. Phelps Dodge's minority share of Southern Peru Copper added millions of dollars to its balance sheet over the years.

During the 1950s and 1960s, as construction work in Peru pounded ahead, Phelps Dodge entered into several wire and cable manufactories outside the United States. That was when a dapper young Dane named Edward H. ("Ted") Michaelsen planted the initial seeds of what later flowered as Phelps Dodge International Corporation. (A detailed story of the global enterprise that resulted from one man's unusual angle of vision appears in chapter 16.)

A "Full Market Basket" Includes Aluminum

DURING THE DECADE from 1952 to 1962, Phelps Dodge followed the lead of its major competitors and invested in oil exploration. But after ten disappointing years that yielded at best meager returns on investments, Phelps Dodge exited oil, at least temporarily, and turned its attention to aluminum, the "wonder metal" that America's big copper companies found all but irresistible in the early 1960s.

Aluminum represented the latest in a series of attempts by Phelps Dodge to extend its technological expertise from copper to other primary metals. For years it had recovered gold, silver, lead, zinc, molybdenum, and several other nonferrous metals as by-products of copper. On at least two occasions between 1927 and 1950, Phelps Dodge proclaimed itself a serious entrant into the field of lead-zinc ores, and it constructed lead-zinc concentrators in Bisbee and a sizable lead smelter in Douglas. By 1950 its on-again, off-again relationship with those two white metals was definitely off. Copper once more became the primary focus of the company's attention and the metal that remained the foundation of its business.

Robert Page's own prudent disposition, together with declining earnings in America's nonferrous metals industry during the late 1950s, inclined him to pursue a conservative course for

Phelps Dodge. Nonetheless, as one publication observed, Page "has never hesitated to spend when he could see a profit in the offing." He fully supported overseas investments in mining and manufacturing; and despite gloomy prognostications by many observers in the industry, he remained upbeat about copper's long-range future. "With the exception of the three postwar recessions," he liked to remind any naysayers, "the use of copper has been determined only by its availability."[6]

As Phelps Dodge entered the 1960s, the price of copper remained unprecedentedly stable at approximately thirty cents a pound through 1963, a fact that vexed speculators but was welcome news to the cautious Page. He realized that this unusual steadiness could not last indefinitely. As he had foreseen, tight supplies of red metal began driving up its price early in 1964. In the context of the 1960s that was not entirely good news.

During that decade, persistent interference by the United States government with copper prices once ostensibly determined by a free market agitated the economic waters, but Phelps Dodge was fortunate in having a man of Page's political dexterity at its helm. The problem grew most troublesome during the presidency of Lyndon B. Johnson. In a doomed effort to fund both the war in Vietnam and Great Society social programs, and all the while keep inflation in check, Uncle Sam strong-armed American copper producers into "voluntarily" selling their metal within the United States at substantially lower than world prices. That was when political instability in Africa, strikes in Chile and elsewhere, and fighting in Vietnam combined to boost the price of copper. When London Metal Exchange spot copper (that is, for immediate delivery) soared to more than seventy cents per pound, federal officials sought to "persuade" major American producers to hold the line against inflation by selling their copper mined in the United States at thirty-six cents per pound. Later, when voluntary restraints proved inadequate, on January 20, 1966, they outlawed export of American copper in any form.

The ongoing manipulation disgusted the usually composed Page. His great concern was that government attempts to hold the line against inflation in the near term would cause the price of copper to soar later. Because of the rapidly rising competition between copper and aluminum that was not a good thing for Phelps Dodge. Rising copper prices could easily cause the company's wire and cable customers to switch to lower-cost aluminum or stainless steel products. Once substitution became standard in what formerly had been mainly copper-based products, erstwhile customers might well be lost permanently to Phelps Dodge. The threat of substitution was a primary reason the company entered the aluminum business in 1964.

Aluminum to meet civilian needs rose sharply after World War II. Would-be manufacturers easily secured ample supplies, often with strong support from Uncle Sam, and because of its intensive efforts to meet war needs, the aluminum industry came to know more about the metal's special properties than ever before—and that included how to substitute it for copper in familiar products. Added to that was aluminum's seeming price edge over copper.

Precious Aluminum

Until the late nineteenth century aluminum was so difficult to produce that it posed absolutely no competitive threat to copper. For years, laboratory methods yielded aluminum in tiny amounts that cost about $545 per pound, a price equivalent to perhaps $8,000 per pound in late 1990s dollars! A French scientist in 1854 succeeded in cutting the cost of aluminum to a mere $90 a pound, but even with further reductions, the price of aluminum remained almost as high as that of silver at a time when copper sold for mere pennies a pound. The white metal's great value and durability were why builders of the Washington Monument capped it in 1884 with six pounds of precious aluminum.

Nothing much changed until February 23, 1886, when young Charles Martin Hall, a recent graduate of Oberlin College, discovered an electrolytic process (known as the Hall-Heroult process today) that offered a cheap way to produce pure aluminum, which at that time sold for about $8 per pound. His laboratory breakthrough gave rise to the newest primary metals industry in the United States. Hall established a plant in Pittsburgh, where its first mass-produced aluminum product in 1889 was the common teakettle. In 1907 the pioneering firm changed its name to the Aluminum Company of America, better known as ALCOA. As late as 1939 ALCOA remained the sole American producer of aluminum, but during World War II aircraft manufacturers required huge quantities of the lightweight metal, and several new makers successfully challenged the ALCOA monopoly.

Phelps Dodge almost joined the aluminum business then when Wylie Brown announced plans in mid-1943 to manufacture parts for planes and other implements of war. He had a plant partially built in Hammond, Indiana, before the War Production Board pulled the plug on the venture. It was a false start for a company that later became one of the biggest manufacturers of aluminum wires and cables in South America. However, within the United States the relationship between Phelps Dodge and the white metal was one of hope mixed with frustration.

When, for example, during a fifteen-month span in the mid-1950s the price charged by United States copper producers leaped 53 percent (from thirty cents to forty-six cents a pound) while aluminum held rock steady at about twenty-four cents a pound, copper users howled in protest. Many of them rushed to substitute aluminum as well as steel and plastic for copper, which rapidly lost ground in many common uses.

"Engineers," Page worried aloud, "were told to work designing copper out of products, particularly in the auto and electric utility

markets." Copper subsequently bounced back in many applications, but in several markets formerly dominated by copper and bronze, such as screen for windows and doors, aluminum held its newly gained ground. In other industries, engineers kept near at hand their recently drawn blueprints for cutting down copper consumption in the event that red metal prices spiraled upward anew.[7]

For all such reasons, during the years from 1956 to 1962, per capita consumption of copper in the United States declined 12 percent while that of aluminum increased by an identical amount—and plastics jumped by 40 percent. That was why the allure of aluminum overwhelmed major copper producers. At Phelps Dodge the man perhaps most eager to enter the white-metals business was Edgar Dunlaevy, president and chief executive officer of Phelps Dodge Copper Products Corporation. An engineer trained at the famed Massachusetts Institute of Technology, he understood far earlier than most people at Phelps Dodge that the future of overhead lines for long-distance transmission of high-voltage current belonged to steel-core aluminum cables. By being efficient conductors of electricity (having about two-thirds the conductivity of copper) but weighing less than half as much as copper, aluminum cables were already well on the way to becoming the industry standard by the late 1930s—and that worried Dunlaevy. He grew even more alarmed when the communications giant American Telephone and Telegraph switched to aluminum for some of its long-distance lines during the early 1950s.

Repositioning Phelps Dodge to gain it a competitive edge in the manufacture of aluminum cables and other metal products did not appear to be difficult at first. Aluminum fabrication, after all, seemed to closely parallel that of familiar copper in rod rolling, wire drawing, tube drawing, and insulating and cabling wire. On the other hand, there were plenty of good reasons not to join the rush to aluminum, especially when long-term success seemed to require a new-fashioned and integrated landscape of production wholly distinct from copper's; and Phelps Dodge would need both expertise and confidence to compete head-to-head with three established giants, ALCOA, Reynolds, and Kaiser, the trio that after World War II largely controlled production in the United States. There were several alternative strategies that beckoned to America's three biggest copper producers, which in 1956 ranked among the nation's top twenty-five money earners of all industrial companies and may have been overconfident as a result.

Kennecott launched a program of portfolio investments in aluminum and other metals as early as 1949, and by the end of the 1950s it had gained a position in Kaiser Aluminum valued at almost $100 million. Far more aggressive was Anaconda, which launched its own aluminum subsidiary in 1953 and boldly sought to position itself as the fourth member of the ruling aluminum oligopoly. Its $65 million quest, which meant building a new aluminum smelter at Columbia Falls, Montana, and fabricating plants elsewhere, ended in financial disaster that weakened the once great copper producer.

Phelps Dodge too responded to the allure of aluminum, but in its own carefully reasoned way. Unlike Anaconda, it wisely did not sink millions

of its dollars into the costly smelting and reduction stages of aluminum production. Phelps Dodge based its entry solely on the need to complement its primary line of copper products. That is, if it made its own aluminum wire and cable, it could serve its customers better and thus strengthen its overall marketing position. To that end, Phelps Dodge in 1963 built a fabrication plant in Du Quoin, a town in southern Illinois, and acquired a small extrusion, or shaping, facility at nearby Murphysboro. Neither plant required a huge outlay of capital, but together they formed a solid foundation upon which to erect Phelps Dodge Aluminum Products Corporation.

As Page explained, "We wanted to get into aluminum fabricating first, to have a so-called full market basket. And, second, it was a chance to diversify and grow in a field with which we were somewhat familiar." By making only this modest commitment, Phelps Dodge hoped to remain fully competitive in its usual lines of business "with the smallest possible capital expenditure." Whatever fields the company chose to expand into, emphasized Page, "we have hoped and still hope to finance our capital program internally without borrowing."[8]

Threatening to upset his conservative calculations were large outlays of money required for Phelps Dodge to guarantee itself a steady supply of aluminum to fabricate. That meant a troubling new level of commitment. "You can't just start with a smelter," Page explained. "You've got to start with alumina, which means if you're going to make any sense, you've got to start with bauxite," the raw material mined in Australia, the Caribbean, South America, and elsewhere. In simplest terms, mining four pounds of bauxite, a reddish substance composed of aluminum oxide and water, yielded two pounds of alumina, which, in turn, was refined to make one pound of finished aluminum. Only at that point did Phelps Dodge hope to enter the stream of production as a fabricator and thus avoid the mind-boggling financial commitment that successful aluminum mining and processing required.[9]

To that end Phelps Dodge developed an ingenious strategy. Having learned from Anaconda's horrific miscalculations, it charted a far safer course for itself by lending money to two well-established Dutch and Swiss firms, mining and industrial giants, to enlarge their productive capacity, and then it negotiated long-term contracts to assure a steady supply of aluminum. N. V. Billiton Maatschappij agreed to supply alumina from its bauxite mines in Dutch Guiana, and the Consolidated Aluminum Corporation (CONALCO), an American subsidiary of Swiss Aluminium Ltd. (Alusuisse), refined the alumina at its plant in New Johnsonville, Tennessee. Phelps Dodge guaranteed to take a minimum of thirty thousand tons of aluminum a year starting in 1966 to supply its growing number of fabricating facilities. So promising did the future seem for the lightweight metal that Phelps Dodge increased its annual commitment to forty thousand tons. The Billiton and CONALCO deals together cost about $30 million, a bargain price for the steady supply of aluminum that Phelps Dodge needed. "We don't make as much money this way," explained Page. "But we don't have to put in nearly the amount of money we would otherwise have to do."[10]

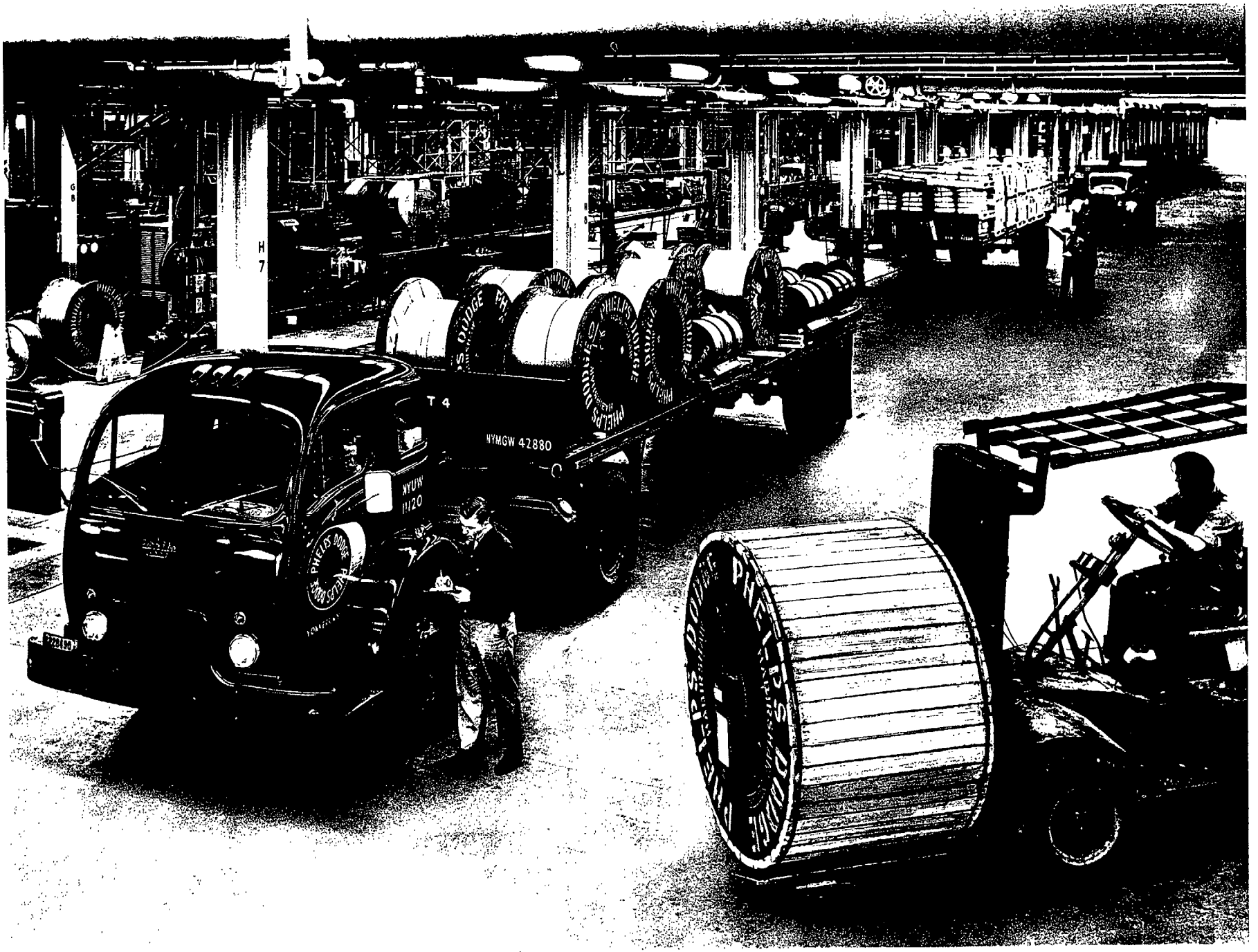
By the late 1960s Phelps Dodge Aluminum

Dramatizing Phelps Dodge's *role as a major manufacturer of aluminum products is this 1979 image. To place its commitment to the white metal in perspective, during the years 1964 to 1970 Phelps Dodge invested fully $112 million in aluminum production, $195 million in copper mining, $15 million in refining, and $79 million in domestic copper fabrication.*



Products Corporation comprised seventeen plants, located chiefly in the mid-South, that in addition to supplying aluminum needed for power and communications cables also fabricated such items as wire screens, fasteners, furniture, and ladders. By the end of Page's tenure in 1969, however, serious doubt had arisen within the corporation concerning its aluminum venture. No matter what anyone did or said, Phelps Dodge never realized the profits it originally anticipated, and substitution never became quite as serious a threat as some people feared earlier in the 1960s. Clearly, the corporation had to do something about what had become less-than-alluring aluminum. Phelps Dodge, though never suffering the great losses of Anaconda, still spent more than $100 million in its bid to fabricate aluminum between 1964 and 1970, money that might have yielded appreciably greater returns if invested elsewhere. With that perspective in mind, company executives took corrective steps in December 1970 to merge Phelps Dodge Aluminum Products Corporation with Consolidated Aluminum Corporation and the Gulf Coast Aluminum Corporation, two subsidiary firms of Swiss Aluminium Ltd. In return, Phelps Dodge gained a 40 percent stake in CONALCO.

With the advantage of hindsight, some people may look back at Phelps Dodge's aluminum venture as a mistake. Certainly, early on the prospect of substitution had seemed far more menacing than it ever became in fact. Meanwhile, Phelps Dodge's investments in Amerada Petroleum and American Metal Climax Company appreciated handsomely, but the 195,000 shares of New Jersey Zinc it acquired in


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PHELPS DODGE

OPPOSITE: INSIDE THE *Habirshaw Division's new Nepperhan plant in Yonkers in 1956, which had commenced production a year earlier. This factory specialized in production of building wire.*

INSIDE THE HOPKINSVILLE, *Kentucky, plant of Phelps Dodge Magnet Wire Company, a facility completed in 1967 to double the firm's manufacturing capacity, at that time concentrated in Fort Wayne. An innovation called catalytic fume burners kept air inside the plant clean.*

1956 for $10.3 million performed poorly. That was a small setback. Phelps Dodge still earned attractive profits by selling its copper.

Reshuffling the Deck at Phelps Dodge Industries

DURING THE 1950S and 1960s, Phelps Dodge Copper Products Corporation experienced its own unique combination of advances and setbacks. It was unhappy to report in 1960, for example, that Fidel Castro's new government had nationalized the four-year-old wire and cable plant in Cuba and thus forced Copper Products to write off one of its most promising joint ventures abroad. At times it appeared that Page grew discouraged with the entire fabricating side of Phelps Dodge: "Today we could do just as well selling mine products without fabricating facilities," he explained to one interviewer in 1962. "Primarily we thought we could make money in fabricating, and now we don't like to give it up. Maybe if we hadn't spent that money we might be out of fabricating." At the time, hardly any participant in the greatly overbuilt fabricating sector made a real profit either. Page's occasional pessimism notwithstanding, Phelps Dodge Copper Products stayed the course, though on several occasions it reshuffled the component parts of its fabricating operations in hopes of finding a winning combination.[11]



By 1959, the four plants of the Habirshaw subsidiary were leaders in making defense products such as coaxial transmission cables essential to the Distant Early Warning (DEW) radar line, a cold war electronic shield extending across Arctic Canada and Alaska, and special high-frequency copper-sheathed cables installed at the Minuteman Missile Wing VI site at the Grand Forks air force base in North Dakota. To better serve its commercial customers, Phelps Dodge Copper Products added a mammoth new tube mill at South Brunswick, New Jersey, in 1958, to the one it already operated in Los Angeles, and Habirshaw constructed a plant in Fordyce, Arkansas, in 1966 to enlarge its production of telephone wires and cables.

The Inca Manufacturing Division in Fort Wayne positioned itself in 1967 to become the world's largest producer of magnet wire for electric motors and various types of electronic and automation equipment when it formally adopted the more descriptive and modern-sounding name Phelps Dodge Magnet Wire Corporation and opened a large state-of-the-art

plant in Hopkinsville, Kentucky, primarily intended to make yoke coils that wrapped around the necks of television picture tubes, then a booming business. From executive offices that remained anchored in Indiana, President S. Allan Jacobs oversaw the expanding operations.

In addition, by the end of the 1960s Phelps Dodge had established more than twenty joint manufacturing ventures abroad, and it greatly multiplied its fabricating facilities within the United States after a buying and building spree earlier in the decade. Most of the acquisitions and expansions were not of major consequence, but the aggregate still looked impressive. Among the new properties was Edlen, Inc., a maker of electrical cable connectors, which the parent firm moved from New York City to suburban Yonkers soon after its acquisition in 1960. Another early 1960s addition formed the basis for Phelps Dodge Electronic Products Corporation, established in 1962 to make specialty antennas and high-end broadcast equipment in North Haven, Connecticut, and Marlboro, New Jersey. The following year Phelps Dodge gained Lee Brothers Foundry Company of Anniston, Alabama, an old-line manufacturer of brass and bronze cast fittings and valves for plumbing and refrigeration. All those 1960s acquisitions had in common that they were significant end users of copper and its alloys.

Following still more additions, the management of Phelps Dodge acknowledged that the expanding family of fabricating subsidiaries had outgrown the old organizational structure. That was the main reason it formed a new wholly owned subsidiary, Phelps Dodge Industries, Inc., on December 16, 1966. Edgar Dunlaevy, who had been with Phelps Dodge Copper Products Corporation since its creation back in the early 1930s, served as first president of what was essentially a management company. Phelps Dodge Industries provided legal, technical, marketing, and other services to several distinct operating subsidiaries having a total of twenty plants in the United States and another fifteen abroad.

At the time, the structure of the manufacturing sector seemed reasonably clear and simple. Phelps Dodge Corporation occupied the topmost rung of the organizational ladder, and one rung down stood Phelps Dodge Industries, which from offices in New York City provided various forms of management assistance to eight separate subsidiaries: Phelps Dodge Copper Products Corporation, Phelps Dodge Aluminum Products Corporation, Phelps Dodge Electronic Products Corporation, Phelps Dodge Magnet Wire Corporation, Lee Brothers Corporation, Mackenzie Walton Company, Inc., Phelps Dodge Puerto Rico Corporation, and Phelps Dodge International Corporation. There seemed little that Phelps Dodge Industries and its far-flung fabricating plants couldn't do with copper, brass, or bronze.

They alloyed, cast, extruded, drew, rolled, formed, welded, and tin coated and insulated copper to make an impressive array of insulated cable and wire, magnet wire, telephone and communications cable, tubes, and plumbing fixtures. In short, apart from not making copper sheets or strips, nothing was missing at Phelps Dodge Industries—except robust profits!

Because the financial performance of Phelps Dodge Industries during its initial years was so

TIME FOR SOME *harmless fun at Phelps Dodge Magnet Wire: "Miss" Poly-Thermaleze. The product name referred to the first in a line of high-temperature, dual-polyester-coated magnet wires designed to perform well in difficult applications. Over the years those products included Armored Poly-Thermaleze® 2000, a series of Bondeze® products, and Thermaleze® Q^{s} (Quantum Shield™ for inverter-driven motors).*

unimpressive, the parent corporation in 1968 promoted Dunlaevy to chairman of its manufacturing sector and chose Ted Michaelsen, a young and energetic executive vice-president, as his successor. It gave the new president of Phelps Dodge Industries full responsibility to do something about its sickly earnings, which had declined each year after its formation. Michaelsen, who had most recently served as president of Phelps Dodge International Corporation, his first love, and where he remained as chairman another decade, reshuffled the deck several times before he at last drew a winning hand for Phelps Dodge Industries.



The structural details are unimportant. The real question was whether restructuring would make any real difference—whether the 1971 incarnation of Phelps Dodge Industries would perform any better than the 1966 and 1969 models. It certainly seemed to. In fact, even before Michaelsen administered a second strong dose of organizational medicine, observers noted signs of a recovery. The parent corporation reported record sales and earnings for 1970, helped in part by improvements in its once-lagging manufacturing sector. Among the stellar performers Michaelsen singled out in 1972 was Phelps Dodge Magnet Wire. He warned, however, that he would quickly prune away any plant that failed to show satisfactory profit or marketing potential. Only recently he had closed plants in England and Germany for those reasons, and "it was I who started the plants," he added wryly in one interview.[12]

End of the Page Era

GROWTH OF PHELPS DODGE'S manufacturing arm had been in large measure the result of Page's personal interest in expanding what Cates began. That did not mean, however, that the eastern-educated lawyer neglected the vital extractive sector. Page understood well that copper mining remained the company's core business, and in time he emerged as an acknowledged leader of America's copper industry. He played a major role in the new Copper Development Association, which he served as its first chairman, and in the International Copper Research Association, of



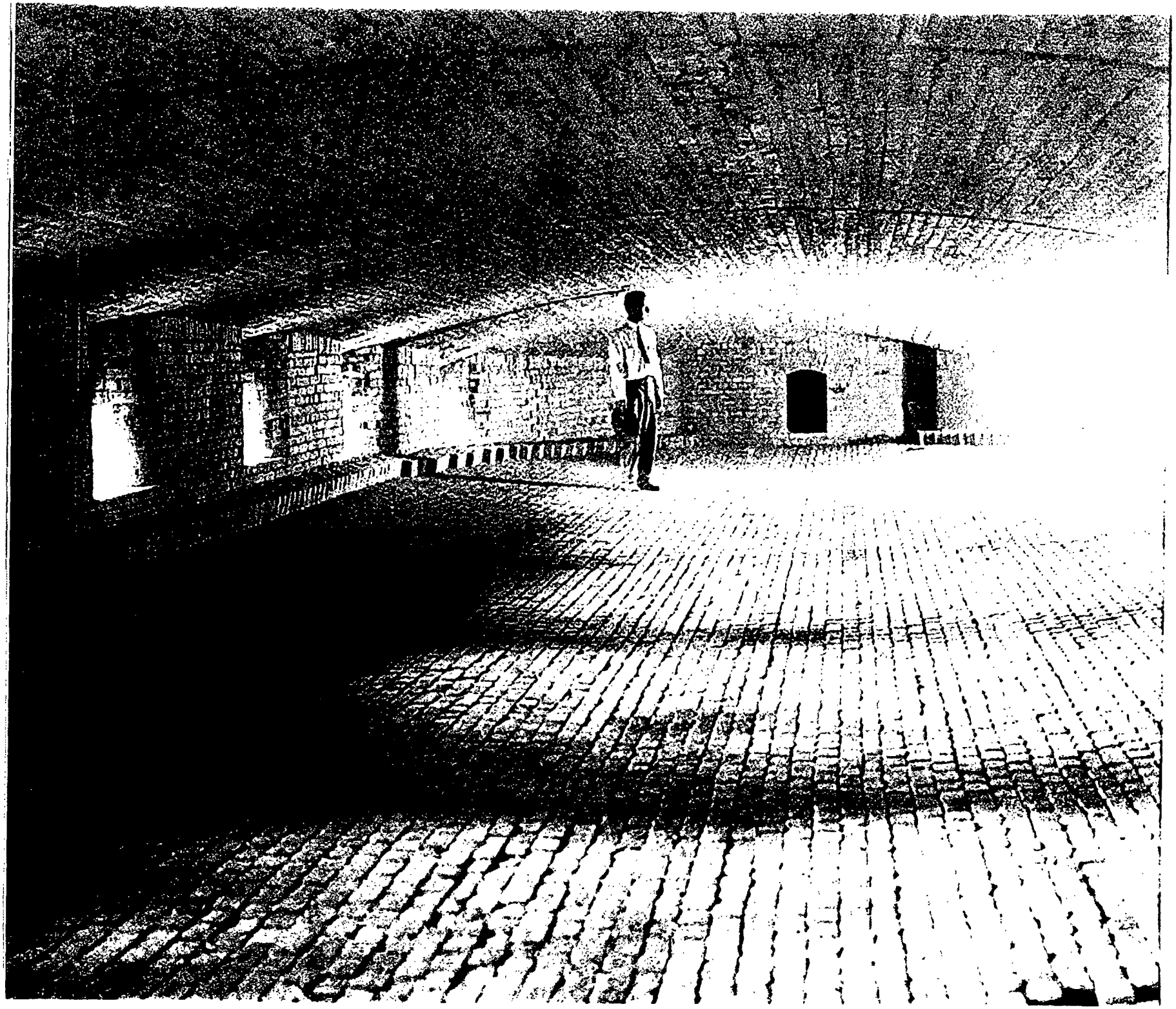
FOR A SINGLE DAY *in February 1963, New York's Times Square celebrated the source that lit its famous lights by acquiring a descriptive new name: Electric Square. The man on the left is William K. Dunbar, vice-president of Phelps Dodge Copper Products Corporation and longtime associate of Wylie Brown; and on the right is Armand D'Angelo, the city commissioner of water, gas, and electricity.*

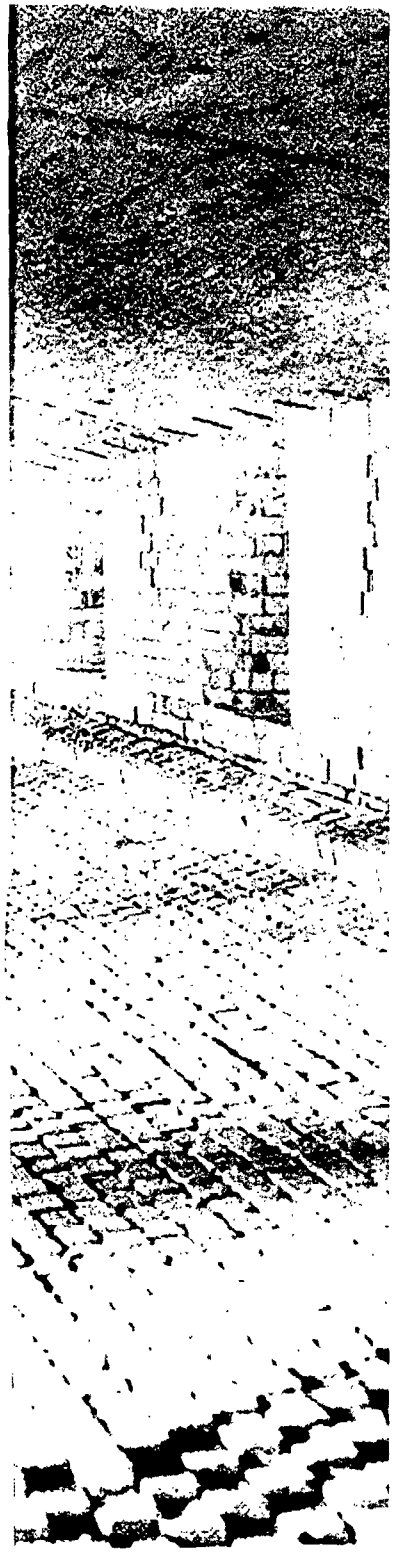
which he was chairman at the time of his death. For several years he was a director also of the American Mining Congress. But perhaps Page attempted too much. He was anything but mercenary, having refused several proposed pay raises by professing that he "was being paid enough now." By habit he was inclined to overwork. He even answered his own office phone. "It was hard, in a way, to help him," remembered his successor George Munroe. "He was such a bright guy, and grasped things so easily, that a lot of people around him tended to come to Bob with every problem."[10]

Munroe summed up Page's preoccupation with Phelps Dodge by recalling a Christmas Eve when Page uncharacteristically had forgotten to purchase a gift for his wife. After rushing to Cartier's just before it closed, he presented her with a lovely piece of jewelry. Noticing that she looked bewildered, he asked if she liked it. "Why, it's beautiful, Bob," she replied. "But it's the same thing you got me last year."

A heavy smoker much of his life, in his later years Page suffered from such serious emphysema that he kept a special oxygen breathing apparatus in his office. A slender man with a steady cough, he died of acute bronchitis and cardiac arrest on Christmas Day in 1970, exhausted no doubt from twenty-three years of heavy responsibilities at Phelps Dodge, twenty-two of them as president or chairman. He was sixty-nine.

During the 1950s and 1960s, he had guided with resourcefulness and vigor the company's continued growth in mining and refining copper and its expansion into aluminum manufacturing. Page was a man of numerous talents and broad interests, dedicated to the well-being of Phelps Dodge, its employees, and its shareholders. For all his caution, Phelps Dodge Corporation during his tenure generally ranked as the most profitable major producer in the industry. At one point in the mid-1960s, it recorded a 14.7 percent return on equity as compared to 12.2 percent for Kennecott and 7.1 percent for Anaconda. In turn, Page gained the respect and affection of all his associates. His passing was a sad event for Phelps Dodge.[11]





Chapter Eleven



A DECADE *of* UNCERTAINTY

THE MODERN OPEN-PIT mine complex that took shape at Morenci between 1937 and 1944 always ranked as one of the most complicated and expensive projects Phelps Dodge ever undertook, but a project requiring perhaps even greater commitments of money in real dollars and even more breathtaking technological leaps of faith was the Hidalgo smelter it opened in New Mexico in 1976. To that end Phelps Dodge acquired a land area larger than the state of Rhode Island, built a completely new town called Playas, and trusted that the technical experts could design and operate a plant with unprecedentedly low levels of atmospheric emissions and an ingenious way of causing the sulfur in sulfide ores to ignite and burn hot enough to conserve precious fuel during a time of sharply rising energy costs.

Building a "flash smelter" had never before been attempted in the United States. Certainly it was Phelps Dodge's boldest response to the numerous bewildering uncertainties, both economic and environmental, it faced during the 1970s. The Hidalgo smelter complex was, all things considered, a daring move by Page's successor, George Munroe, and his generation of Phelps Dodge leaders and the corporation's board of directors.

A FORM OF INDUSTRIAL ART: *inside a reverberatory furnace, possibly in Douglas, before the newly reworked smelter was fired up in 1915.*

Facing the Environmental Whirlwinds

To understand what was at stake at Hidalgo, let us recall briefly the formative years of smelter technology, when glassmakers in the early 1600s became the first artisans to use reverberatory furnaces—so named because the arched ceiling of the furnace deflected rising flames and caused intense heat to "reverberate" downward toward the hearth. This fuel-saving innovation helped to conserve England's rapidly dwindling forests. Woodcutters chopped down one stand of trees after another to provide fuel enough for an earlier invention, the household fireplace. Because the fireplace made warming individual rooms of a home easy, it greatly increased popular demand for window glass, which, in turn, required a steady supply of wood for charcoal to heat the glassmaking furnaces.

Parliament in 1593 outlawed all such glassworks within eight miles of England's rivers to safeguard the supply of wood required by the British navy. About two decades later, someone invented an efficient glassmaking furnace that metalworkers soon adapted to their trade as well. By burning England's plentiful coal instead of its increasingly scarce wood, the reverberatory furnace was popularly hailed as environmentally friendly technology.[1]

That bit of medieval history was unfamiliar to most people living in the 1960s and 1970s, when protection of the environment became a mainstay of American politics and the nation's vital mining industry a convenient whipping boy. Much earlier in the century, small groups of influential citizens had worked to focus popular attention on specific conservation or preservation concerns, such as protecting remnants of the great bison herds that once roamed the Great Plains, but never before had so many Americans been interested in so broad a range of environmental issues—or, more specifically, so inclined to punish copper producers because the tall stacks of their reverberatory furnaces vented plumes of smoke into the atmosphere during the smelting process.

It was a rare individual who understood that reverberatory furnaces originated as environmentally friendly technology or sought to learn why copper smelters continued to use them. People angry about environmental pollution, both real and perceived, upheld federal and state regulations that deluged America's mining industry and sent it reeling.

To put events of the 1960s and 1970s into historical perspective, the first federal environmental regulatory law in the United States was probably the Migratory Bird Treaty Act of 1918. Not until nearly half a century later, in 1963, did Congress pass a Clean Air Act, which with subsequent amendments implemented the first federal air pollution laws. At the same time, federal and state legislators added measures intended to protect water quality, control lead emissions, or outlaw the popular pesticide DDT. The list of lawmakers' environmental concerns grew longer each year. The most encompassing federal enactment was probably the National Environmental Policy Act of 1969, which President Richard M. Nixon signed into law on January 1, 1970, to create the Environmental Protection Agency.

Four months later environmentalists celebrated their first Earth Day, and more vocal adherents popularized environmentalism on college campuses and in street demonstrations. Television sets multiplied images of Americans protesting environmentally callous practices; and buzzwords like *conservation*, *ecology*, and *environment* became part of the public vocabulary.[2]

For at least a century prior to the 1970s, Phelps Dodge and its various subsidiary companies had responded to legitimate concerns voiced by individuals or communities about the impact of mining and smelting on local air and water quality. It acted according to accepted practices of the time. In one case, back in the fall of 1900, a rancher living south of Clifton lodged a complaint against both the Arizona Copper and the Detroit Copper companies by alleging that concentrator tailings they discharged into the San Francisco River had damaged his orchard and garden. The two producers not only settled the rancher's claims but also agreed to supply him with ample fresh water by means of a specially constructed pipeline. At about the same time, they dammed Chase Creek (which flowed through the heart of their industrial landscape) to prevent tailings from reaching the San Francisco River and thence the Gila River, where downstream farmers and ranchers had complained about damaging water pollution. Phelps Dodge also worked to prevent mine water from discharging into nearby rivers.

After Edward H. Robie, associate editor of the *Engineering and Mining Journal*, visited Douglas, Arizona, in 1928 he wrote that "its group of smelter stacks, belching into the atmosphere all the sulphur contained in the Bisbee ores, make a distinguishing landmark." All the smoke, however, created a landmark headache for copper companies even in that environmentally innocent age. Phelps Dodge regularly paid farmers in the Douglas area for any sulfur dioxide damage to their crops. Personnel from the corporation's Smoke Department toured farms on both sides of the international boundary to assess damages, if any, and operated a greenhouse in which they exposed common farm plants to controlled concentrations of sulfur dioxide gases to provide them benchmarks for settling claims. Corporation scientists learned that certain crops were very susceptible to excess sulfur dioxide in the air, while others were far less so. In fact, they discovered that sulfur dioxide in some instances acted as fertilizer. That intriguing discovery prompted the general manager Charles R. Kuzell to quip that the farmers should pay Phelps Dodge for smelter smoke.[3]

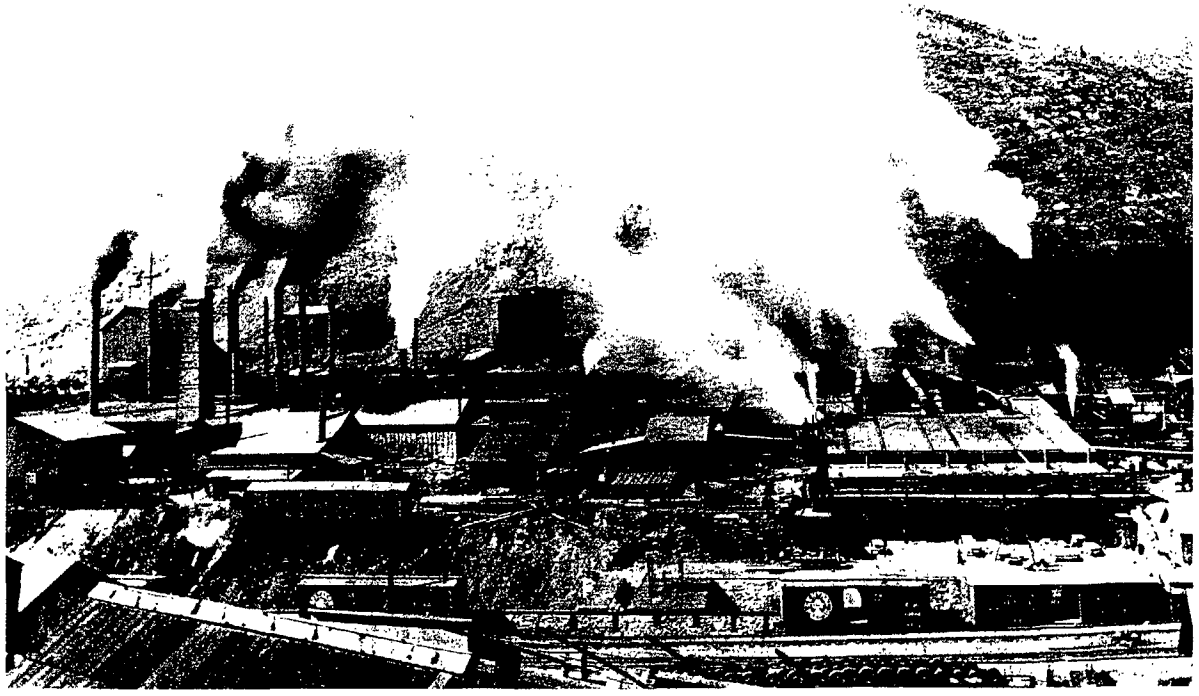
In truth, there was once considerable uncertainty among copper industry veterans about any deleterious effects caused by sulfur dioxide smoke. Feeling a cold coming on, some old-time employees actually asked to go into the smelter to inhale deeply the sulfurous fumes, and smelter workers did tend to have fewer colds, or so insisted the onetime president of Phelps Dodge Corporation Richard T. Moolick. "That was well known," he emphasized during a 1997 interview. Warming to his controversial subject, he hastened to add that New England housewives once burned pure or elemental sulfur to disinfect homes during spring housecleaning.[4]

Such claims caused the corporation's retired engineering vice-president Richard Rice to

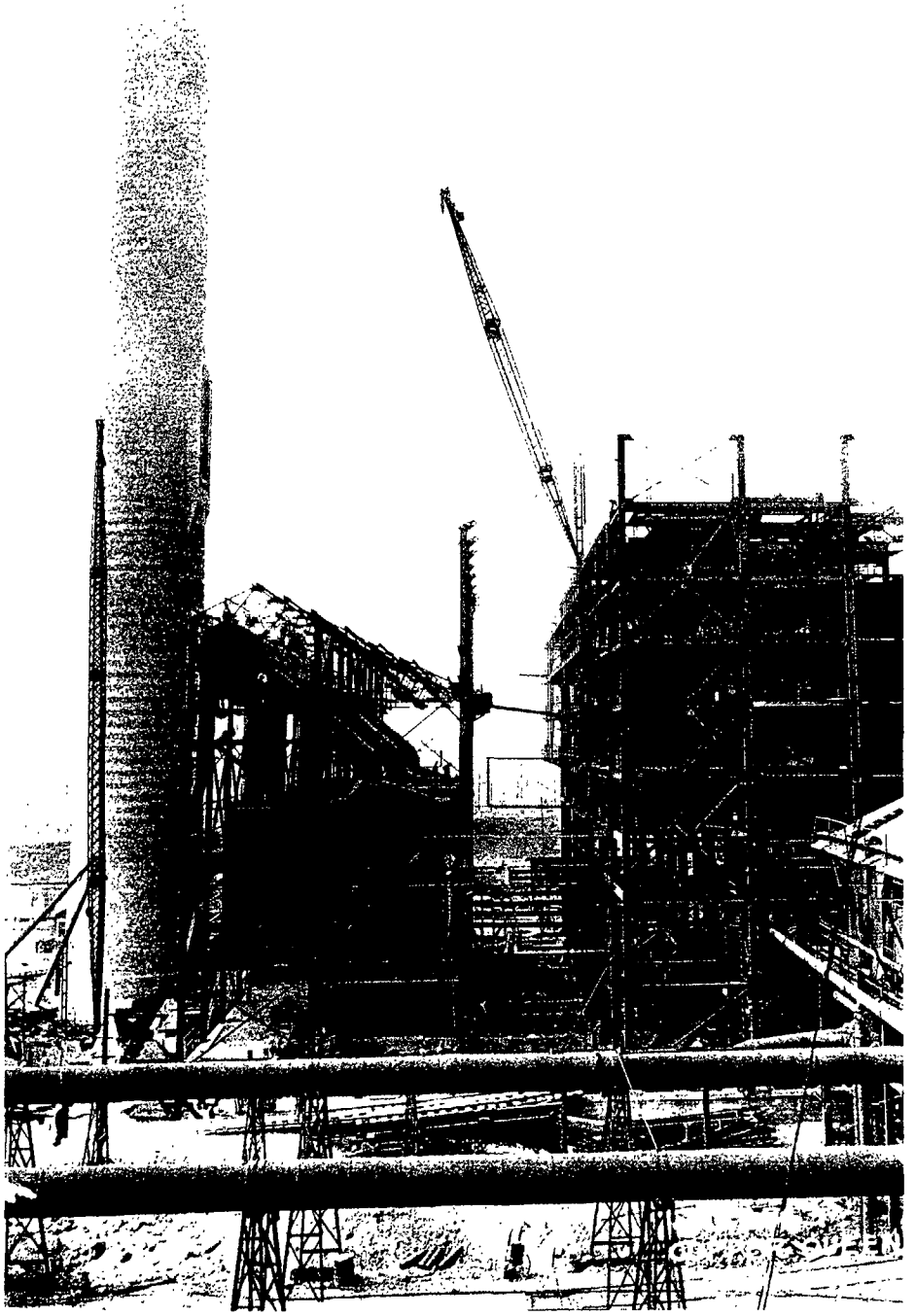
Hidalgo smelter for five years and don't remember that stuff ever helping my colds." He recalled mainly the sulfurous smell *and taste* of smelter smoke that wafted through Morenci when he grew up there, but "people tolerated it because it represented their jobs." Indeed, until the late 1960s and early 1970s, smoking stacks continued to symbolize progress, industry, and jobs to a good many Americans. That was especially true in Pittsburgh and many other gritty centers of heavy industry, even if the smoke-filled air required executives to change their white shirts at least twice a day and sometimes brought darkness at noon.[5]

In the late 1940s an employee in the smelter office at Morenci wrote a poem of praise that summed up sentiments shared by many of her coworkers. Published in the *Prospector*, a branch newsletter of the time, its verses perhaps sound odd in today's environmentally conscious age, but undoubtedly they came from the heart. "The Smelter" begins with these words:

> *Out into open spaces, drifts this mighty cloud,*
> *Belching forth its magnitude of which we're very proud.*
> *It symbolized copper produced by many hands*
> *And solves the metal needs our nation now demands.*[6]



No one doubted *that smoke equaled jobs in turn-of-the-century Bisbee, but during the late 1890s, as sulfide ores increasingly replaced oxide ones, people became aware of emission problems in the confines of the mountain canyons. This image shows Bisbee smelters and power plants before the Copper Queen moved its reduction works to Douglas in 1904 to form a massive new landscape of production.*



The image of stacks belching forth smoke causes many Americans today to cringe, but in its historical context it reminds us why any attempt to judge and condemn practices commonly accepted until the 1960s and 1970s is a bit like condemning our own grandparents because they had no emission controls on their automobiles. No one did. The earliest such device, incidentally, was the positive crankcase ventilation valve first mandated in the United States on 1964 models. Quite simply, smoke remained of little concern to most people until recent times, although a few residents of Swansea, Wales, complained about dense concentrations of fumes from smelter furnaces as early as the 1600s. Those were voices crying in a wilderness of world indifference.

In twentieth-century America, the reverberatory furnaces favored by copper producers were low, hulking structures into which operators blew oil, gas, or pulverized coal to create heat intense enough to melt the concentrate. It was in the early 1970s that environmental activists claimed copper smelters were a major cause of atmospheric contamination and successfully promoted state and federal laws forcing them to install high-priced pollution-control equipment—or else shut down. Everyone

In an early *quest for clean air, Phelps Dodge constructed a large and expensive dust collector as part of a major renovation project at its reduction works in Douglas during the mid-1920s. By the 1970s the Douglas works had become the corporation's oldest smelter and, because of changing environmental standards, its most troublesome environmental headache until plant closure in January 1987.*

wanted clean air, but retrofitting an aging reverberatory smelter to limit its sulfur dioxide emissions was a costly procedure, and some mandated modifications were at best of marginal or even unproved effectiveness.

All the while, the ranks of an earnest but often scientifically and technologically inexpert or naïve cadre of regulators, both state and federal, kept growing. To mining company executives, themselves worried and uncertain about what the future held, it sometimes appeared that the goal of government was to raise the bar of industry compliance to impossible heights—and then set it higher still. "Every time we'd do something," recalled the onetime Phelps Dodge vice-chairman L. William Seidman, "there would be three more things" needing our attention.[7]

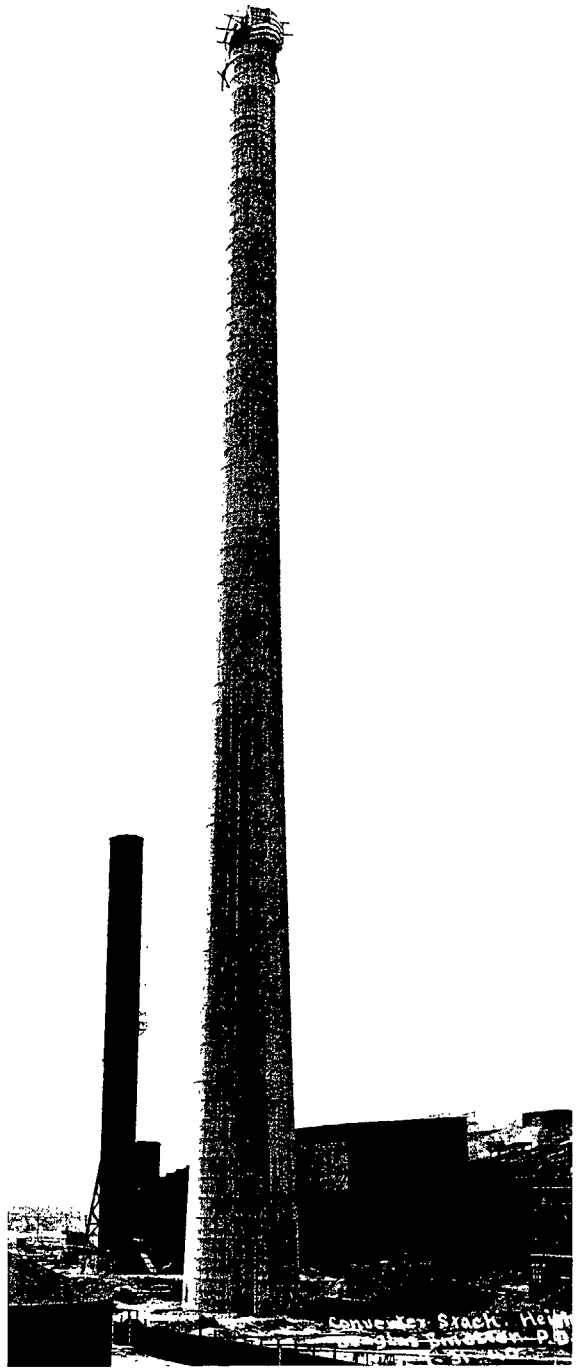
For example, the Arizona legislature, which decided that federal standards were not strict enough, enacted a tough new air quality law in May 1970 that set state pollution standards and regulations for copper smelters. It required them, as of 1974, to recover at least 90 percent of all sulfur released from concentrate during smelting, though no known technology could be applied to existing plants in order to meet the standard—only new plants could achieve a 90 percent recovery rate. What was effectively a death sentence for many Arizona smelters became a subject of enormous concern for producers because in 1972, of the fifteen copper smelters in the United States, seven were located in Arizona. There was only one each in eight other states. Most troubling for Phelps Dodge in the near future, the 90 percent requirement, if not modified by state or federal regulators, meant permanently closing the big Douglas Reduction Works, which would cost hundreds of workers their jobs and create major logistical headaches as the corporation scrambled to find (or build) other facilities to smelt its concentrates.

Various pollution-control devices then in existence were at best able to recover 70 percent of the sulfur dioxide emissions from Phelps Dodge's reduction works at Douglas, Ajo, and Morenci. By the dawn of the 1970s most smelters had long had some kind of dust collection system in place to recover particles that might otherwise vanish up their stacks. At Douglas in 1940, dust-filtered sulfur dioxide gas drifted into desert air from a 572-foot smokestack, recently raised to become the tallest in the state. White and blue smoke when diluted with clean air simply trailed off into the distance instead of collecting above the city and its surrounding ranches. Engineers had claimed that the tall stack's lighter, filmier smoke was nearly free of noxious gases and dust. Back in 1942 the company added an electrostatic precipitator to its recently completed Morenci smelter and a baghouse where discharged gases passed through a series of large porous bags (not unlike those used in home vacuum cleaners) to collect dust particles from which were recovered copper and other minerals.

By the early 1970s copper producers could no longer address the smelter emissions problem merely by adding another baghouse or further raising the height of stacks to dilute smoke to harmless levels before it reached the ground. Quite simply, there was no easy way to deal with sulfur dioxide smoke because it easily passed through the big bags used to collect dust.

Back in the early 1920s, when both Phelps Dodge and the Calumet and Arizona Mining

When construction workers completed a 572-foot-tall stack at the Douglas Reduction Works in 1940 (and one of the world's tallest), they topped it with an American flag to salute their achievement.



Company wrestled with the problem of smoke damage to crops around their Douglas smelters, someone suggested that fumes might be transformed into sulfuric acid. Colonel John Greenway of the Calumet and Arizona apparently quipped that "his smelter alone might furnish all the acid needed in western America." Despite the limited market, only by capturing sulfur dioxide in a sulfuric acid plant or as elemental sulfur could smelters keep any portion of it from reaching the atmosphere. In fact, by the time Phelps Dodge acquired the Calumet and Arizona smelter in 1931 the facility actually contained two acid plants.[8]

During the early 1970s Phelps Dodge spent approximately $25 million to construct acid plants at both Ajo and Morenci, sites far more remote than Douglas, in an effort to bring those two big smelters into compliance with very stringent standards established by Arizona's new air quality law. The "solution" created other problems. Although sulfuric acid was an important raw material for a number of industries, all markets for it near Ajo and Morenci remained almost as limited as in Greenway's day. Further, it was difficult to store at the site of production as well as expensive to ship to customers. Sulfuric acid soon glutted national markets, and Phelps Dodge found itself producing far more than it could sell at a profit. Further, concluded the senior vice-president and general manager Arthur Kinneberg, "the enormous pollution control expenditures . . . have not increased our production capacity by even one pound of copper!"[9]

The estimated cost of bringing Phelps Dodge's three Arizona smelters into full

compliance with state demands was astronomical—at least $240 million, a sum that represented fully one-third of the corporation's total capitalization. Thus did the mounting whirlwinds of environmentalism test Phelps Dodge's new generation of leaders. They worked diligently to save the three Arizona smelters, preserve the jobs involved, and remedy emissions problems.

The emergence of environmentalism, as embodied in various recently fashioned laws and mandates, and what it portended for Phelps Dodge was foremost among the several uncertainties George B. Munroe faced after he succeeded Robert Page—and *uncertainty* was truly the operative word for the 1970s from the corporation's perspective. Those years were, in addition, a time of skyrocketing inflation, when wages, energy costs, and interest rates climbed sharply. The corporation recorded numerous accomplishments during the decade, but always seeming to overhang everything was a sense of uncertainty, even malaise, about the world in which it operated, uncertainty that at times seemed to spin almost out of control. "There is going to be the devil to pay with the environment," Page confided to Munroe. "And, George," he emphasized shortly before his death in 1970, "I'm not sure we can get through this one."[10]

New Leadership for Difficult Times

Until the late 1960s, Phelps Dodge had continued to enjoy a surplus of cash. Then troubles started to loom large on the horizon. The corporation's innate conservatism helped it weather the early 1970s when the industry leader, Anaconda, suffered a one-two punch delivered by Chile's expropriation of its lucrative Chuquicamata mine complex and by its own ill-starred diversification into aluminum, which *Forbes* called "a bomb." At that time too, Kennecott incurred mountainous legal expenses trying to defend its recent acquisition of Peabody Coal, and still it lost the antitrust fight. In 1972 the Federal Trade Commission ordered Kennecott to divest itself of Peabody (although in the end it came out slightly ahead financially from the forced sale).

Of far more concern to America's Big Three copper companies, as the developing nations won progressively greater control of metal mines within their borders, they flooded world markets by large increases in production. Curiously, in the near term the price of red metal skyrocketed. That was because the major industrial countries stockpiled copper in 1973 in the misguided belief that world supplies would be tight. Realizing their blunder, they then unloaded massive tonnages of the metal, glutted markets, and briefly caused the price to plummet. Even when buffeted by these strange gyrations, Phelps Dodge continued to take a long-range view. During the decade of the 1970s it invested approximately $1.5 billion to replace exhausted mines, add modern smelting, refining, and fabricating facilities, and install expensive emission controls.

Guiding the corporation during those sometimes troubled but always challenging times was a new and soon-to-be-battle-tested generation of leaders. As president of Phelps Dodge, Robert Page had recruited two especially



WARREN FENZI AND *George Munroe (right) flank a portrait of Anson G. Phelps in the late 1970s. When Munroe became chairman of Phelps Dodge in 1975, Fenzi succeeded him as president. By the time Fenzi reached the corporation's mandatory retirement age of sixty-five in 1980 he had devoted his entire career to Phelps Dodge, a span of forty-three years broken only by World War II service.*

able assistants: George Barber Munroe was an Ivy League attorney from Page's former law firm in New York; Warren E. Fenzi was a civil engineer educated at the California Institute of Technology who, since joining Phelps Dodge at Morenci, had shown a flair for management. Munroe from the East and Fenzi from the West would play out their respective leadership roles at Phelps Dodge and in the process become close friends.

The Illinois-born Munroe was an intellectually and physically ambidextrous person: as a Dartmouth student he earned both a Phi Beta Kappa key and popular acclaim as one of the Ivy League's star basketball players. Though standing only slightly more than six feet tall, he helped power the Dartmouth team to the 1944 National Collegiate Athletic Association finals. During World War II Munroe served in the Pacific as an officer aboard the battleship *Maryland*. Afterwards he played professional basketball for the old Saint Louis Bombers and then for the Boston Celtics while attending Harvard Law School.

Following graduation, Munroe worked for three years in the Office of the United States High Commissioner for Germany, first on the legal staff in Bonn and later, at age thirty-one, as the youngest judge on the United States Court of Restitution Appeals in Nuremberg. In that capacity he worked to recover property stolen from the victims of Nazi persecution—"everything from jewelry in the pawnshops to the Hermann Goering Steelworks," he recollected.[11]

Then Munroe returned to New York City, where he joined Debevoise, Plimpton and McLean, the firm that served as outside counsel for Phelps Dodge Corporation. There in 1958 he came to the attention of Page, who offered him a job as assistant to the corporate secretary John E. Masten. That was an unexpected turn of events, and because he knew relatively little about Phelps Dodge—apart from having been briefly associated with the personable Ted Michaelsen while working out legal details for a wire and cable venture in Venezuela—Munroe took three weeks to educate himself about the corporation before he accepted Page's offer. Although he had no formal title at first, he soon became assistant to the president.

Fenzi, a California native, had joined Phelps Dodge some twenty years before Munroe. That was in 1937, a portentous year both for young Fenzi and Phelps Dodge. Just two days after he graduated from the California Institute of Technology, his father, Cammillo, died in an automobile accident. A quarter of a century

earlier, the elder Fenzi had prepared landscape plans for Walter Douglas and the El Paso & Southwestern system, and in more recent years he had beautified the grounds of the Pasadena home of Louis D. Ricketts, a big supporter of Caltech and its engineering graduates. It was the legendary Ricketts, a member of the Phelps Dodge board, who interceded with management during the job-tight depression era to help Fenzi find work at the Morenci Branch just as it embarked on its huge open-pit venture. There he had worked for Walter C. Lawson, chief engineer, and for a time supervised drilling and blasting. Apart from service as a navy Seabee officer in the Pacific during World War II, Fenzi spent two decades at Morenci, where he became mine superintendent and then general superintendent.

Whatever his title, Fenzi proved an immensely popular leader. Appointed assistant to the general manager of Western Operations at Douglas in 1957, he relocated to New York only two years later as assistant to President Page. Even in the button-down bastion of corporate power, Fenzi did not discard his big Stetson hat, long a symbol of the wild American West. Employees recalled fondly that Fenzi had an impressive ability to remember their names and those of their family members—even of their dogs.

It was after the 1961 retirement of Cleveland E. Dodge, a longtime vice-president and the last direct living link between management and the Phelps Dodge founders, that Fenzi and Munroe moved up to vice-presidencies. Munroe succeeded Page as corporation president five years later and as chief executive officer in August 1969. It was significant that Phelps Dodge replaced one lawyer as chief executive with another. Training in the law, Munroe once observed, "is helpful in overseeing a complex organization in three ways. It sharpens mental discipline. It helps one communicate effectively. And it teaches one to steep himself in any field."[12]

Those attributes, plus the fact that the soft-spoken and thoughtful Munroe possessed a generous measure of a largely indefinable quality called presence, proved especially helpful during the environmental hearings held in the 1970s. Charles A. Burns, Phelps Dodge's retired vice-president for government relations, once quipped that, when he and Munroe made "Hill Calls" to visit members of the Arizona and New Mexico delegations in Congress, it was "sort of like having Cary Grant with you." Munroe, a skilled debater and public speaker, often attended meetings where big and contentious crowds of people wanted to argue about whether smelters should be shut down, but he was not at all flustered. He did much to determine the corporation's positive response to mounting environmental political pressures.[13]

Between them, Munroe and Fenzi amassed a wealth of training and experience by the time they attained top leadership positions, and that was fortunate. They needed it all during the tumultuous 1970s, when whirlwinds of change obscured the road ahead and presented major American copper producers with uncertainties totally different from anything Cates or Page had faced just a generation or two earlier. Above all, the new leaders of Phelps Dodge Corporation

would be good stewards of the environment if only someone would provide a reasonable definition of what that meant.

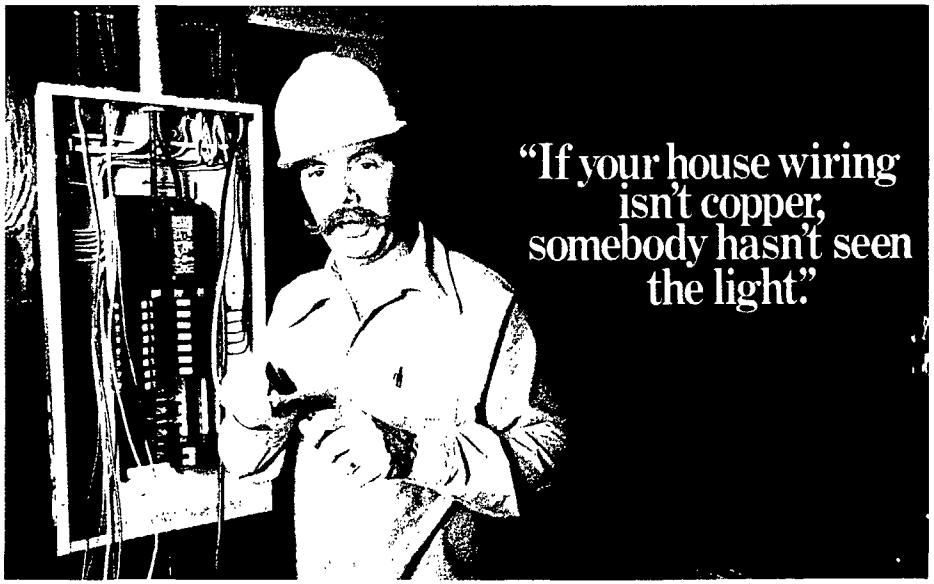
Uranium Frenzy

EVEN AS IT responded to a variety of vexing challenges during the 1970s, Phelps Dodge continued to search for a winning formula to make its ventures outside copper profitable. The company maintained a 40 percent stake in the Consolidated Aluminum Corporation, the nation's number four producer and fabricator (behind ALCOA, Kaiser, and Reynolds) into which it merged its several aluminum products plants in 1971. But no longer was its heart in aluminum, and the return on its investment in CONALCO was not satisfactory.

Early in 1977, when substitution once again tested Phelps Dodge's commitment to copper, it waged a million-dollar advertising campaign to stress copper's advantages over substitute materials such as plastic for household plumbing and aluminum for wiring. It placed advertisements in the *Wall Street Journal*, *Business Week*, *Forbes*, and some trade journals and magazines to emphasize the nation's self-sufficiency in copper and copper's recyclability and scrap value. The hard-hitting series usually ended with the tag line, "Today, more than ever, there's no real substitute for copper."

Significantly, among several advantages that Phelps Dodge claimed for copper in the advertisements was that it required roughly one-third less energy to produce than an equivalent amount of aluminum. No doubt that was an important selling point during a decade when sharply rising energy prices dismayed and frightened producers and consumers alike. In response to energy shortages that resulted from an Arab embargo of oil shipments to the United States in the spring of 1973, when fuel prices escalated almost daily, Americans endured long lines and limited supplies at service stations and slowed their automobiles to the newly imposed nationwide speed limit of fifty-five miles per hour to conserve precious gasoline. For its part, Phelps Dodge established a small venture that could provide gas and oil for its operations in the West, and it stepped up pursuit of uranium, which at the time was an alluring mineral that promised an alternative to fossil fuels.

The road to success in uranium, like that in aluminum, proved anything but straight. In each metal, Phelps Dodge expected to make a sizable profit. And why not? Several nuclear-powered



A Phelps Dodge *Cable and Wire Company advertisement from the late 1970s stressed that there was no substitute for copper. Early in the decade electricians sometimes did not understand how to install aluminum building wire properly—the white metal had a tendency to creep, or to expand and contract between load and no-load conditions, which could result in arcing and fires—so some contractors switched back to familiar copper conductors.*

electric generating plants were already in operation, and many more were on the drawing boards. All those installations required uranium oxide for fuel, and utilities paid well for the radioactive substance. Alas, Phelps Dodge's uranium venture, though an interesting tale, does not end happily. It shows how all business calculations involve some element of risk, and it underscores the wisdom of Phelps Dodge's innately conservative approach to all such alluring prospects. Caution kept the corporation from being swept along in what one commentator labeled an episode of "uranium frenzy" in mining circles or from committing more than a minor portion of its financial resources to pursuit of the exotic metal.

The story of Phelps Dodge's interest in uranium dates from the mid-1950s when a largely forgotten fad spurred Americans, often people of limited means and aided by little more than a clicking Geiger counter, to crisscross the Mountain West in search of telltale signs of uranium deposits that they hoped would make them rich. As was also true of its first investments in Arizona copper in 1881, Phelps Dodge entered the picture mainly after prospectors had located and started to develop some of the more promising finds.

Exploration, whether for uranium or copper, was not a corporate priority until the early 1950s. Only after America's other big copper producers implemented multimillion-dollar programs did the general manager of Western Operations Harrison Lavender and his assistant Charles R. Kuzell set up a separate office in Douglas in 1949 to assist with search activity that until then was scattered and localized. The Geophysical Research Department was in due time headed by Elmer E. ("Red") Maillot, a "swashbuckling" geologist whom Phelps Dodge sent to the Colorado School of Mines to take a six-week-long crash course in geophysics. Even with professionalization of exploration, members of the company's Douglas personnel were initially not welcome at the Morenci Branch, which preferred to use its local staff to search for metal deposits. In 1957, Herbert Z. Stuart became the first manager of exploration based at headquarters in New York. Six years later, because of increased emphasis on mineral exploration, the Geophysical Research Department was renamed the Western Exploration Office of Phelps Dodge Corporation.

Apparently spurring Phelps Dodge to increase the pace and sophistication of its metal exploration activity was the corporation's growing interest in uranium during the 1950s. At Robert Page's urging, Walter Lawson, now general manager of Western Operations, launched a program to find uranium mines. That led in due course to Robert W. Adams, a short and barrellike man who was a pioneer in the frenzied pursuit of the radioactive metal on the high plains of Wyoming. The storied romance of the frontier had earlier lured him west to seek his personal fortune. Adams worked as a short-order cook in Rawlins, Wyoming, a job that did not seem likely to lead to success, but during the excitement of the mid-1950s he acquired several leases at Crooks Gap and the Browns Park area in central Wyoming and won financial backing from C. W. Jeffrey (after whom Adams named Jeffrey City, the ramshackle company town at the heart of his would-be uranium empire).

At one time Adams prospected the Wyoming backcountry from the air using a small airplane equipped with a Geiger counter. With a fourteen-year-old boy as his pilot, he identified promising sites by dropping sacks of white flour. Keen-eyed rivals on the ground who rushed to the marked locations to stake claims ahead of him forced Adams to deploy numerous decoy bags. Such was the unbridled nature of competition in the early days of the uranium frontier.

The initial mine of Adams's Lost Creek Oil and Uranium Company began production in June 1957 and the next month its mill, with a capacity of four hundred tons per day, rumbled to life, processing uranium into yellow cake, or uranium oxide (U_3O_8). After expanding operations north into Wyoming's Gas Hills area to develop uranium reserves large enough to warrant a contract with the United States Atomic Energy Commission, Adams reorganized his firm in 1959 as Western Nuclear, Inc.

A decade later, because the future of uranium seemed so promising, Phelps Dodge paid almost $13 million in cash and a like amount in stock to obtain Western Nuclear, which in 1971 became a wholly owned subsidiary based in Denver. From his Colorado offices, Adams presided over mine and mill operations centering on the high plains of Wyoming and over exploration activities in several far-flung locations. In that way Phelps Dodge expected to profit from an anticipated boom in uranium driven by Uncle Sam's cold war defense program and the world's growing nuclear power industry.

That was the plan. "I thought nuclear was going to be the answer to the environmental problem," recalled L. William Seidman, a onetime vice-chairman of the corporation. "I thought we had a good thing in nuclear." In reality, Phelps Dodge lost money on uranium almost from the start. Yet so complete was its confidence in uranium's long-term prospects that the corporation seemed resigned to near-term losses while it slowly nurtured its new subsidiary. In time some executives within Phelps Dodge reluctantly concluded that Adams was far better at finding uranium deposits than in making any profit from them. Some recalled him, not always fondly, as a great entrepreneur "who could sell ice to the Eskimos."[14]

Buoyed by its faith in the future of uranium and nuclear power, Phelps Dodge continued to commit development money to uranium projects located in central Wyoming, in western New Mexico near Grants, and in eastern Washington on an Indian reservation about forty miles northwest of Spokane. The latter development, known as the Sherwood Project, it based largely on fully priced contracts entered into with the Washington Public Power Supply System. Western Nuclear also gained a 50 percent joint-venture interest in the Beverley deposit unearthed in South Australia.

Western Nuclear at last turned a small profit in 1978, and again the following year when production rose to almost 2.1 million pounds and the company made deliveries on the last of its low-price contracts that retarded earnings. Now with additional contracts in hand that provided for substantial purchases of uranium oxide by Washington Public Power Supply System and Union Electric Company of Saint Louis at good prices, Phelps Dodge seemed on the verge of realizing its long-deferred dreams for Western

Nuclear. Its future never looked brighter than in 1979. Then the unexpected happened. No one could have predicted the Three Mile Island disaster, but within the context of the 1970s it seemed timed almost perfectly to provide a sensational finale to the decade of uncertainty. Early on the morning of March 28, 1979, at a Metropolitan Edison power plant south of Harrisburg, Pennsylvania, a valve failed, and water required to cool the atomic reactor stopped flowing because of confusion in the facility's control room. That resulted in a partial meltdown of the uranium core and release of radioactive gas within the big containment building.

Three Mile Island was an accident that was never supposed to happen, and the unfolding drama focused the nation's attention as never before on the safety of nuclear power. The reactor core did not completely melt and burn through the earth toward China, a scenario feared by some overwrought imaginations, and only a tiny amount of radiation ever escaped into the atmosphere, but financial fallout from Three Mile Island was immense. It spread like a black cloud to blight the landscapes of uranium production across the West.

As the market for uranium oxide contracted rapidly, prices plummeted from around $40 to less than $25 a pound in 1980, a figure well below Western Nuclear's production costs. Soon prices dropped still lower. The Phelps Dodge subsidiary suspended Wyoming operations in 1981. The parent corporation hoped that the uranium market would improve during the mid-1980s, but it never did. Ironically, the only substantial money Phelps Dodge made from uranium came from settlements in multimillion-dollar lawsuits against two utilities that defaulted on their commitments to buy uranium from Western Nuclear. It received almost $25 million from Washington Public Power Supply System in 1984 and approximately $47 million from Union Electric the following year. Even so, by 1985 Western Nuclear owed its parent more than $85 million, and that was at a time when rock-bottom copper prices imperiled the entire corporation. Hard-pressed, Phelps Dodge decided to close its uranium operations and sell off whatever assets it could. In the end, dollars spent to reclaim mine and mill sites in Wyoming and Washington far exceeded any money Phelps Dodge earned from its great uranium misadventure. Fortunately, after the allure of uranium and aluminum faded, it still had copper.

Growing the Corporation

From the mid-1940s, after Morenci's open-pit mine came on line, until the late 1960s, when it still had money in the bank and no long-term debt, Phelps Dodge worked hard to maintain the steady production of copper, often by rearranging parts of its landscape of production. For instance, even before the first pound of red metal came from Bisbee's Lavender Pit in the early 1950s, the corporation had constructed a new smelter at Ajo to handle New Cornelia concentrates and free its venerable Douglas Reduction Works for anticipated production from Bisbee.

During the 1960s, Phelps Dodge planned for the day when the historic mines of Bisbee no

longer produced copper. That meant stepped-up exploration both in Bisbee and elsewhere. Searchers found an especially promising site in New Mexico beneath old Tyrone, the long-deserted company town designed by Bertram Goodhue. Back in the 1950s, Phelps Dodge geologists had revisited the remote Burro Mountains and bored more than seven hundred holes to delineate a large low-grade copper deposit amenable to mining by open-pit methods. On September 2, 1966, Page, who was in his final years as head of Phelps Dodge, formally announced that the corporation would launch construction of a modern mine and mill complex in New Mexico. The news rated front-page coverage from New York to Phoenix. The *Wall Street Journal* noted old Tyrone's impending conversion into an enormous pit; a headline in the *New York Times* reported, somewhat erroneously, "$100 Million Bringing Western Ghost Town to Life"—though, in fact, the old ghost town would soon be gone.

It was newsworthy too, in contrast to the debt incurred during the 1970s, that when Phelps Dodge announced its $100 million Tyrone project, it did not need to borrow any money to finance the new mine and mill. Those were the days! The corporation explained that it needed three or four years to complete the project, after which it would ship copper concentrates from Tyrone to its smelter at Douglas. In that way it proposed to phase out ore from the Copper Queen Branch, where the end of mining was in sight.

Phelps Dodge launched development of the Tyrone pit in 1967. During the next two years, crews worked with rotary drills, electric shovels, and a fleet of eighteen eighty-five-ton trucks just to remove fifty million tons of overburden. They sculpted an impressive canyon with fifty-foot steps winding to its ever-deepening floor. Eventually the pit grew to nearly two miles in diameter and thirteen hundred feet deep. Tyrone's new concentrator loomed large among the mine structures, even if it seemed diminutive next to the pit and rock dumps. Nearby stood settling tanks that conserved and reused precious water from the Gila River.

Water was crucial to successful production at Tyrone. That was why as early as 1955, Phelps Dodge arranged with the Phoenix law firm Evans, Kitchel and Jenckes and with its own Pacific Western Land Company subsidiary to purchase thousands of acres of agricultural and grazing land along the Gila River—and in that way gained rights to fourteen thousand acre-feet of water a year. That was a monumental achievement not unlike building its extensive water-gathering system in Arizona. Phelps Dodge completed a diversion project that redirected its share of Gila River water into Bill Evans Lake, a sixty-five-acre reservoir named for the lead attorney of the Phoenix law firm and the water wizard whose vision helped make the mining and milling operations at Morenci and Tyrone possible. When completed in 1968, the big reservoir stored water that was then pumped more than twelve miles uphill to the Tyrone mine and concentrator site.

At the mine site itself, giant earthmovers smashed through dilapidated pastel-tinted, tile-roofed dwellings. That was all that remained of Goodhue's model company town. Phelps Dodge built a newer, but less picturesque Tyrone in

Pipeline Draw about five miles northeast of its bygone gem in the Burro Mountains. Before building some two hundred modern homes, construction crews contoured a hillside landscape covered with live oaks and bear grass into lots and streets that gradually ascended from the base to the top of the slope. Unlike residences in old Tyrone, all new ones included running water, sewers, electricity, and a garage. Dirt and noise problems vanished because all the streets were paved and curbed and because there were no industrial operations close by. Because virtually all employees now owned cars, some of them chose to live outside Tyrone in other parts of Grant County.

Under Munroe's leadership, Phelps Dodge formally reopened its onetime underground operation at Tyrone as an open-pit mine. In all, the corporation had successfully integrated various parts of a complex new industrial landscape. During Tyrone's first full year of production in 1970, the mine and mill complex designed to produce 110 million pounds of copper a year turned out almost 120 million pounds, and that helped boost the corporation's total production to a record 627 million pounds. The results were so encouraging that Phelps Dodge announced it was proceeding to expand Tyrone's capacity to 180 millions pounds, at an additional cost of $38 million.

By July 1972, when its expansion was substantially complete, Tyrone easily ranked as a truly world-class copper producer. During 1973, it produced more than 208 million pounds of copper, compared to a little less than 240 million pounds for Morenci, the corporation's longtime pacesetter. Phelps Dodge again set production records, turning out a total of 639 million pounds of copper that year.



The Justice Court *is one of a handful of buildings that survive of Tyrone, the town that Bertram Goodhue designed. Although saving all its architecturally valuable properties has not been practical, Phelps Dodge has done so where possible—for example, the former Copper Queen Mine headquarters now houses the Bisbee Mining and Historical Museum, and the attractive plaza complex in Ajo stands intact.*

Crews seeking to replace Bisbee's dwindling supply of copper also found a promising site across the canyon from the Morenci open-pit mine and above the abandoned town of Metcalf, where drilling revealed substantial tonnages of low-grade copper ore. Development of the Metcalf open-pit mine and concentrator complex began in 1969, two years after Tyrone. In importance it was fully equal to Tyrone, though it did not receive the same kind of national media attention. The Metcalf project required removing no less than seventy-five million tons of overburden, building both primary and secondary crushing plants and a concentrator capable of processing forty thousand tons of ore per day, adding a power plant and housing for employees, and acquiring considerable mining and related equipment. Phelps Dodge's capital investment

in Metcalf totaled $194 million, including the premerger mine development expense of $28.5 million.

The Metcalf mine and concentrator launched production early in 1975, just about the time the last mines of Bisbee shut down. During its first year of operation, Metcalf produced slightly more than 62 million pounds of copper; during the next year, 1976, it more than doubled that amount to almost 140 million pounds.

Addition of the Metcalf concentrator to other installations at Morenci gave Phelps Dodge greater flexibility in processing ores from both the Morenci and Metcalf mines. By the end of the 1990s it was Metcalf, in fact, that formed the heart of Morenci's still-expanding mine complex that originated more than half a century earlier with the Clay ore body, now effectively exhausted.

As for Bisbee, where the Copper Queen



Early Metcalf, *a town that gradually disappeared after miners abandoned its underground workings in the early 1930s. Four decades later this was the location for Phelps Dodge's open-pit Metcalf mine, shown on the following page.*

Branch was once the corporation's proud flagship property, a century of production ended with the closing of all its mines. In late 1974, Phelps Dodge ceased production at the Lavender Pit and laid off 488 workers. It continued layoffs at a slower pace through the winter and spring of 1975 until in June it finally shut down underground production as well and discharged a final 360 workers. As of June 13, 1975, only a skeleton crew of approximately fifty employees remained where a thousand people had worked a short time earlier. "You always knew there was going to be an end, but nobody would believe it," recalled Jack Ladd, Phelps Dodge's former director of labor relations, who helped relocate Bisbee employees to the new Tyrone and Metcalf mines, the Hidalgo smelter, and other company operations.[15]

For the first time in nearly a century, mining did not set the pace of life in Bisbee. Just as low-cost copper from mines in the western United States had earlier closed high-cost operations in England and northern Michigan, so cheap copper from low-cost mines in Africa and South America humbled the once mighty Copper Queen as its reserves dwindled. For a time, gloom and depression gripped Bisbee. Several downtown businesses closed their doors for good, including the corporation's venerable Mercantile in 1976.

Phelps Dodge launched development of its Safford project in 1971 in anticipation of the day when copper demand and prices would rise again. Also within Arizona, the Copper Basin near Prescott looked more promising than it had in years. Overseas, Phelps Dodge devoted an increasing amount of attention to both its mining and its manufacturing operations. During the 1970s, the company intensified the search for ore deposits, and not just for copper, but also for metals such as molybdenum, gold, silver, lead, zinc, cobalt, tin, and tungsten.

From the mid-1950s until the late 1960s, Phelps Dodge had spent a paltry $2 million a year on exploration activity. That financial commitment (along with the pace of exploratory work) stepped up noticeably after George Munroe grew unhappy with Phelps Dodge's relative lack of success in finding major new mineral deposits and hired William K. Brown to head its corporatewide exploration program. Brown, an English mining engineer educated at Cornwall's prestigious Camborne School of Mines, would leave after a decade to become president of Gold Fields Mining Corporation, yet he brought Phelps Dodge a wealth of experience gained in the mining industry around the world. He and Munroe decided that the time was right for the corporation to expand its exploration activities beyond the United States and Canada to Australia and South Africa, which were two of a handful of nations where the threat of government expropriation was low and thus offered a safe field for mining investments.

During the three years from 1969 to 1971, Phelps Dodge's exploration budget grew to almost $9 million per year—and unlike Anaconda and Kennecott, the company maintained its commitment to exploration even during times of low copper prices and operational cutbacks. During those years too, its exploration teams located promising ore bodies at Woodlawn, near Canberra in Australia, and at a remote location north of Cape Town in South Africa, which became the site of the Broken Hill Mine of the

IN JUNE 1969, *Phelps Dodge initiated development of the Metcalf complex (located a short distance north of the Morenci mine). The removal of tons of overburden began early in 1970, not long before this picture was taken, but later that same year Phelps Dodge decided to defer the Metcalf project and launch a $438 million expansion project at Tyrone. The first ore was delivered to the new Metcalf concentrator in 1975. Phelps Dodge later combined the Metcalf and Morenci pits.*



Black Mountain Mineral Development Company, Ltd. When it went into full production late in 1979 it became a major producer of lead and zinc along with copper and silver.

The Quest for a Nonpolluting Smelter

UNDER THE LEADERSHIP of Munroe and Fenzi and their lieutenants in Western Operations, Phelps Dodge by the mid-1970s developed the capacity to produce nearly 20 percent of all copper mined in the United States, and that was at a time when it phased out mines at Bisbee and brought new ones into production at Tyrone and Metcalf. Moreover, partially in response to the growing environmental challenge, the corporation built a state-of-the-art smelter that was the cleanest in the United States—and a whole new company town to go with it. It was perhaps the company's boldest response to the uncertainties of the 1970s.

Phelps Dodge initially responded to passage of the federal Clean Air Act and subsequent state regulations by slowing production at its Morenci smelter in order to reduce sulfur dioxide emissions. Even so, the corporation still needed a way to process the vast output of copper concentrates coming from Morenci as well as those anticipated from the new mines at Tyrone and Metcalf. Retrofitting its existing "reverbs" to capture sulfur dioxide emissions seemed both a costly and only a temporary solution at best. That was why Bill Evans, the indisputable mastermind behind Phelps Dodge's modern land and water acquisitions in the desert Southwest, suggested building a large, ultramodern smelter in the remote and sparsely populated boot heel of southwestern New Mexico.

To do that Phelps Dodge needed to purchase most of the Playas Valley, a vast and isolated landscape covered with mesquite, wild grasses, yucca, and greasewood, or creosote bush, that extended north from the Mexican border. In total, the expanse of rangeland was seventy-five miles long and twenty-five miles wide. Because the sprawling valley generally received less than ten inches of rain a year and had virtually no surface water, Phelps Dodge needed to acquire many thousands of acres of land solely for their water rights, because without water it could not transform troublesome sulfur dioxide into beneficial sulfuric acid. One big question was, why would a long-established and tightly knit ranching community sell land and water rights to an industrial outsider who wanted to construct something so alien to agriculturists as a copper smelter and acid plant?

Once an avid outdoorsman, Evans was confined to a wheelchair by multiple sclerosis, but his mind remained sharp. He formed the Great Lakes Land and Cattle Company and two other firms and arranged for a Phoenix real estate man, Milton D. ("Bud") Webb, to run them all. Webb spent several lonely months on the road quietly purchasing more than six hundred thousand acres of land for Phelps Dodge, although no seller ever knew who the real buyer was. Because all checks were drawn on the Harris Bank of Chicago, rumors circulated up and down the Playas Valley. One claimed that Cuban

A ONCE FAMILIAR *scene in Bisbee: going to work underground in this undated post–World War II photograph.*

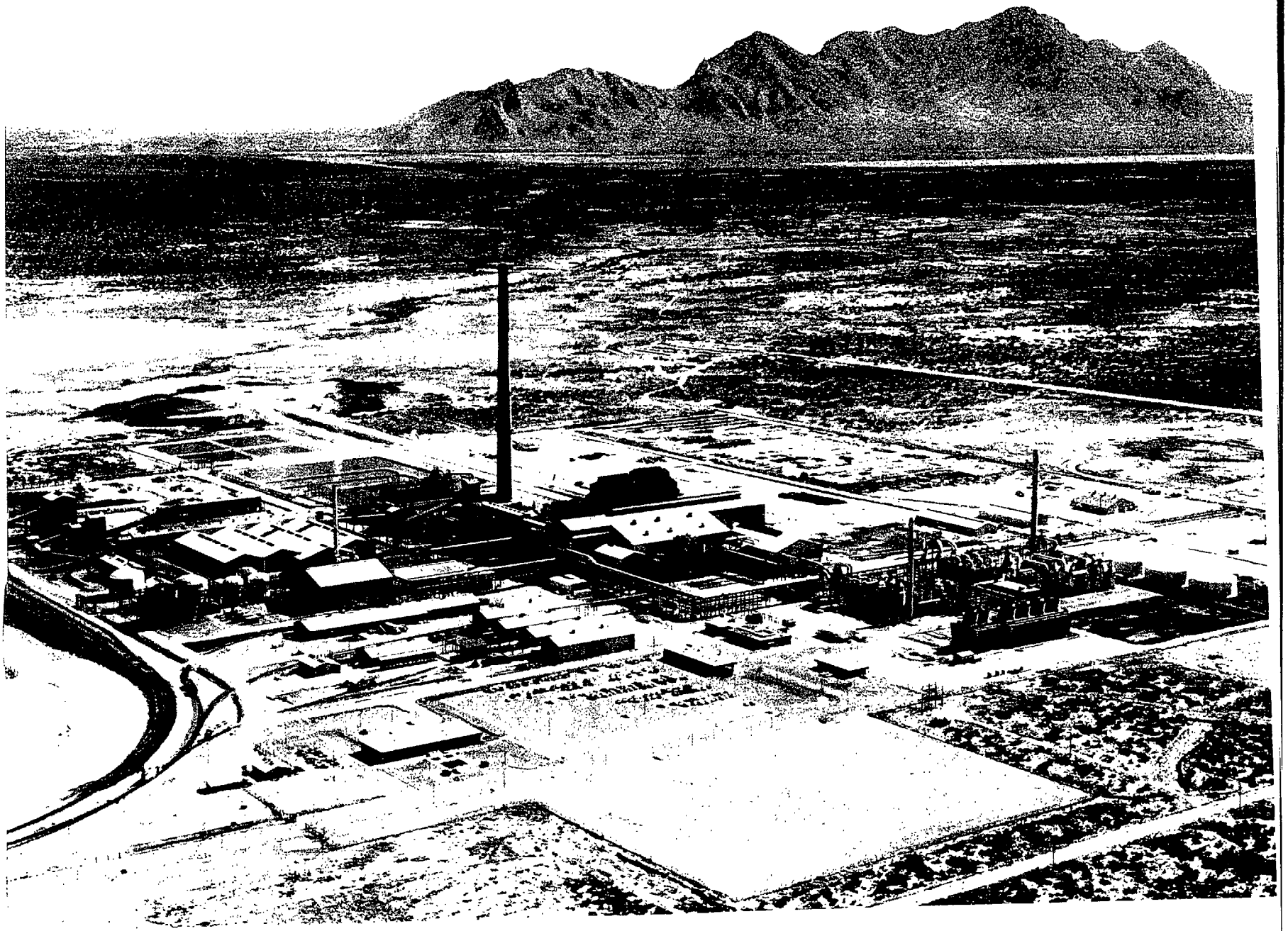
refugees sought land to build a giant casino complex to replace the ones in Havana lost to Fidel Castro; another asserted that the purchaser was the Mormon church. Webb's only contact with Phelps Dodge was through brief and infrequent conversations with the Western Operations general manager John A. Lentz. To exchange information the two men usually huddled in Tucson in the bleachers amidst the noisy crowd at University of Arizona football games.

So well guarded was their secret that nearly everyone was caught by surprise when Phelps Dodge announced in March 1972 that it planned to build a $100 million smelter complex at a remote site in Hidalgo County, New Mexico. It was a surprise for two reasons. First, few people, not even employees of Phelps Dodge, understood fully how the copper giant had quietly amassed its new landed empire; and second, leaders of the copper industry assumed that no United States producer of sound mind would build a new smelter while emission standards remained unresolved. "If we can't build a modern, low-emission smelter in one of the least populated areas, then there will never be another copper smelter built anywhere in this country," Munroe boldly proclaimed in the pages of *Forbes* magazine. According to the law as Phelps Dodge understood it, at that time federal officials could not monitor stack emissions until they wafted beyond the edge of private property, but the corporation went one step farther and determined that little sulfur dioxide should be emitted in the first place.[16]

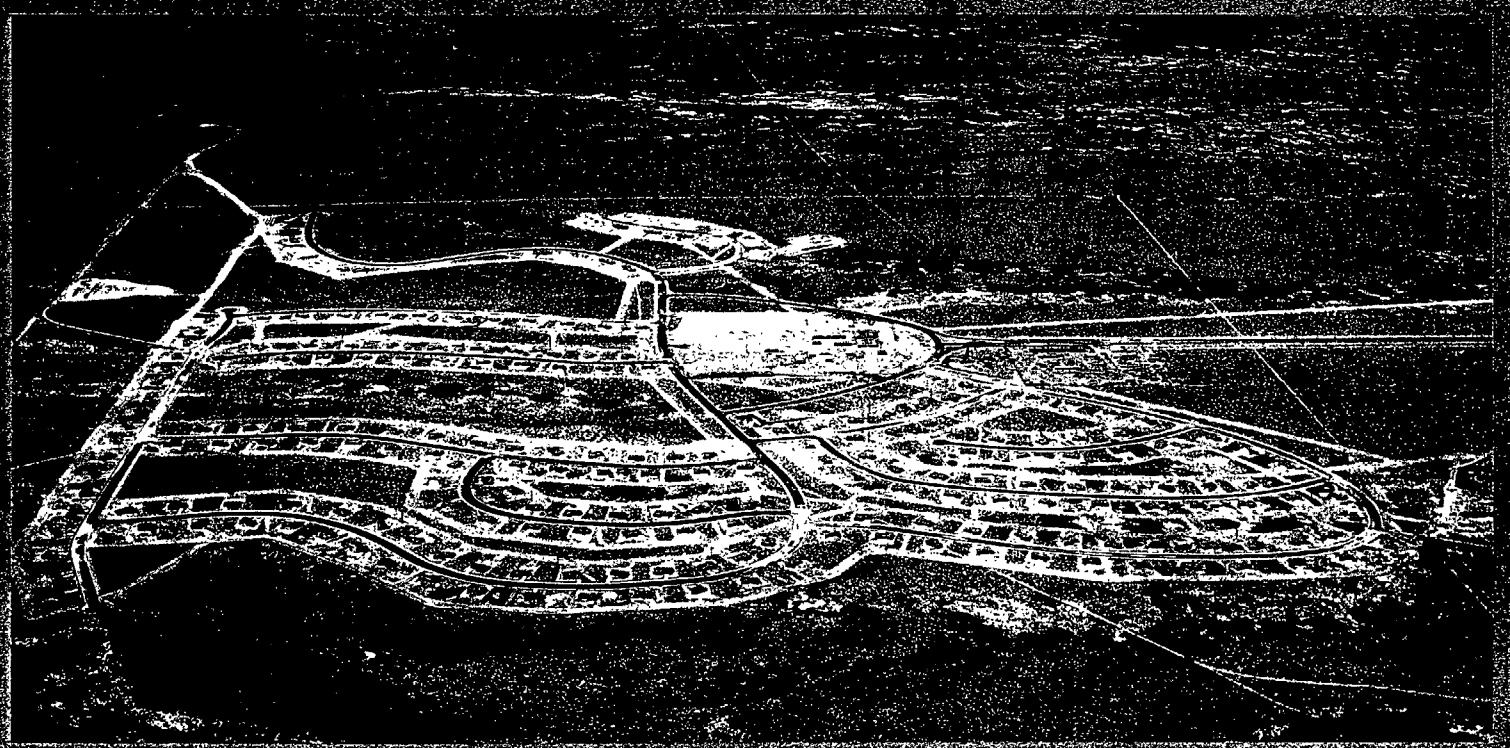
Construction of the Hidalgo smelter began in March 1973, and production commenced during the second quarter of 1976. Rising out of a seemingly desolate landscape inhabited mainly by jackrabbits, coyotes, and rattlesnakes, Phelps Dodge's first new reduction works since the Ajo smelter twenty-five years earlier was specifically designed and constructed to comply with a growing body of pollution-control regulations. In fact, Hidalgo was the first copper smelter in the United States to meet established standards. It was also the first in the nation to use flash-furnace technology, a process that partially offset the large amount of energy required to control sulfur dioxide emissions. Developed by Outokumpu Oy of Finland to overcome that country's lack of fuel, flash smelting appealed to Phelps Dodge because, of all technologies it evaluated, it was the one that permitted the greatest degree of air pollution control. The process had already proved itself since its introduction in Finland in 1949. To that nation's mining outback newly hired Leonard R. Judd headed with his family in early 1973 to learn everything he could about the fiendishly complex process he soon would be overseeing in New Mexico.

The flash furnace combined the roasting and smelting of a conventional roaster-reverberatory series into one step. The fine concentrate—a mixture consisting principally of copper, sulfur, and iron—was combined with preheated air and flux and dropped through a reaction shaft where it released nearly enough heat to sustain the smelting process. The secret was that it literally burned the concentrate's own sulfur along with a small amount of fuel oil or coal to produce the intense heat needed to melt copper-bearing material. That was important in a country like

The newly built *Hidalgo smelter. Here and at all its mine facilities, Phelps Dodge fashioned a new landscape of production around the smelter. For many years, beef cattle owned by its subsidiary Pacific Western Land Company grazed nearby.*



Playa Vista: The Nation's Company Town



Playa Vista, the Ballmer Group's planned community on the Westside of Los Angeles, is the largest development project in the city's history. Its 1,087 acres will eventually contain 5.8 million square feet of office space, 3,246 residential units, 2,000 hotel rooms, and 1.3 million square feet of retail space. Playa Vista's master plan, prepared by Moshe Safdie and Associates, calls for the development of a "new urban village" that will be "pedestrian oriented, environmentally sensitive, and culturally diverse." The project's first phase, which is currently under construction, includes the Playa Vista Corporate Campus, the Playa Vista Village, and the Playa Vista Central Park. The Corporate Campus will be the headquarters for Electronic Arts, Inc., a leading developer and publisher of interactive software for personal computers and video game systems. The Village will include 1,000 residential units, 200,000 square feet of retail space, and a 70,000-square-foot community center. Central Park will be a 32-acre public park.

Overlooking the Playa Vista development site is this aerial photograph, which shows a pattern of suburban residential tract housing. Playa Vista's Corporate Campus will be in the middle of the photograph, separated from its neighbors by broad buffer zones of undisturbed land. The Ballmer Group plans to maintain a variety of habitats on the site. The Pacific Ocean can be seen in the distance beyond the top edge of the photograph.

He soon received the position and moved to the area with his office and family and asked if he wanted to help with the new town. Judd says the company was very fair, but as a young man that had never geographically strayed—this was the biggest move of the most dramatic one and changed everything that had been his life to that point. He decided to maintain that kind of stability and stayed with Phelps Dodge, after all, a company town.

Later, Leonard Judd became the sole manager (the job management position at Hidalgo in 1963). Playas consisted of 50 prefabricated houses, most of them occupied by workers and their families. At the smelter site itself, where his job was to oversee Phelps Dodge's new technological wonder, he found everything in the world to maintain. All roads were dirt. Judd recalled that when he, his wife, Gloria, and their two young children first arrived at the main gate, the sole entrance to both the town and the smelter, just off the primary state highway, the guard was seen furiously to shoot a nasty rattlesnake before he checked them through. When they reached their new living quarters, Gloria turned on the faucet at the kitchen sink and out came a two-inch-long scorpion.

She did not complain, but later, after a rough-and-ready community dance in an abandoned schoolhouse in nearby Hachita, she commented, "Len, I promised to follow you to the ends of the earth, and I think you've found them." To buy groceries, she regularly drove 150 miles each day to the store in Douglas. For weekend recreation, the Judds occasionally motored around the vast Phelps Dodge outback, dug cactus plants, and replanted them in their yard—where they inevitably died. Judd recalled that in early Playas you were grateful for any recreation opportunities, even digging cactus.

A quarter century later, in the late 1990s, Playas consisted of 256 three-bedroom homes, 28 apartment units, a business plaza, a medical clinic, recreational facilities, and a population of about nine hundred people. At its heart lay a green common of grass and shade trees that made the company town look very much like the campus of a modern community college. Social life centered on the two churches and on the Copper Pine Recreation Center, which boasted six bowling lanes, billiard room, game room with twelve different electronic games, snack bar, multipurpose room with kitchen facilities, and hair-styling salon. Opened in 1981, the recreation center was operated by Phelps Dodge Mercantile Company. Outdoor recreation there was a junior Olympic–sized swimming pool complex, softball fields, tennis courts, a children's playground, and basketball courts. Equestrian-minded residents of Playas built corrals for their horses.

The town did not have its own school, but Playas children were educated in Animas, New Mexico, twenty miles to the west. The logistics of medical care were even more complex. When a Playas resident was sick or injured, the local clinic was linked by two-way television to the Med Square Clinic in Silver City, New Mexico. Physicians there could converse with the patient and a physician's assistant in Playas to diagnose an illness or injury and prescribe needed medication and treatment, as if everyone were together in the same examining room. Implemented late in 1975, the Telehealth system at Playas was the first privately funded system of its kind in the nation.

(Based on interviews with Leonard R. Judd, Paradise Valley, Arizona, March 20, 1996; Matthew P. Scanlon, Phoenix, Arizona, March 22, 1996; and a telephone interview with Leonard Judd, September 7, 1998.)

Finland which lacked fuel resources, and no less so in the energy-conscious United States during the 1970s. Some industry observers prematurely sounded the death knell for smelting, but smelting experts outsmarted them with their clever new technology.

The flash smelting process captured 97 percent of all sulfur dioxide emissions, which Phelps Dodge then treated in an acid plant to produce sulfuric acid. In fact, Hidalgo produced nearly four times more sulfuric acid by weight than anode copper. One-third of the cost of the huge facility went for air pollution–control equipment, of which the acid plant was a major part. The remaining steps of the fiery process needed to transform copper concentrate into heavy anodes of 99.7 percent pure copper paralleled those in a conventional smelter.

The new smelter site was advantageous not just because it offered Phelps Dodge abundant land and water but also because it was located only a moderate distance from other key features of the landscape of production. It was easy to build a thirty-eight-mile industrial railroad to link the Hidalgo complex with the Southern Pacific main line east of Lordsburg. That enabled trains to arrive at the smelter with hopper cars filled with copper concentrates from Morenci and Tyrone and outgoing trains to depart with leased tank cars full of sulfuric acid and flatcars of copper anodes destined for the electrolytic refinery in El Paso. Hidalgo typically shipped out twenty to thirty tank cars of sulfuric acid each day, seven days a week. Some of it traveled to other Phelps Dodge operations in the Southwest and some went as far as Florida to produce fertilizer from phosphate rock.

To handle additional supplies of copper, Phelps Dodge soon enlarged the smelter's capacity from fourteen hundred to nineteen hundred tons of concentrate per day, an amount that ranked it among the largest reduction works in the world. In all, it was capable of producing 500 tons of anode copper, 2,500 tons of sulfuric acid, and 1,350 tons of slag every twenty-four hours.

Initially, Phelps Dodge's own Pacific Western Land Company held title to all rangeland it had acquired in the Playas Valley and raised approximately seventy-five hundred head of cattle and crops of grain, sorghum, corn, alfalfa, potatoes, onions, beans, and chilies. By the late 1990s, though local water was still used predominately for industrial purposes, cowboys from other ranch outfits herded cattle across large expanses of grazing lands leased from Phelps Dodge. The big smelter complex, which once employed about five hundred people, provided work for a number of former cowboys. Hidalgo hired about 40 percent of its original workforce from its sparsely populated corner of New Mexico, and no more than 5 percent had ever worked in a smelter.

A Gathering Storm

By the time the Hidalgo smelter came on line in 1976, its final cost, including industrial railroad and townsite, topped $360 million (or probably $1 billion in today's money). By contrast, the last smelter Phelps Dodge had built—at Ajo between 1948 and 1950 with about half the capacity of Hidalgo—cost slightly more

than $8 million. The difference was not merely a result of greater capacity or runaway inflation, though both added to Hidalgo's eye-popping price tag. It was that about a third of Hidalgo's capital cost could be attributed to pollution-control equipment required to meet state and federal air quality standards. To that end it was, in the words of Len Judd, who knew it intimately, one of the "most complicated processing plants on the planet." To the future president and chief operating officer of Phelps Dodge, it placed the corporation on record as having made a major commitment to clean air.[17]

Apart from being by far the cleanest smelter in the United States in terms of atmospheric emissions, Hidalgo also relieved some of the load carried by Phelps Dodge's three aging smelters in Arizona, all of which waged a long struggle to meet federal and state air pollution rules and ultimately lost. Hidalgo's success involved a major trade-off, however. More than 40 percent of all energy it consumed went for pollution abatement.

Originally, some observers thought Phelps Dodge was crazy to think about building a new smelter. They mistakenly regarded environmentalism as only a passing fad or, conversely, believed that copper companies could do nothing to satisfy highly vocal critics of smelter emissions. For a time the surge of environmentalism seemed to leave the American mining industry dazed and uncertain which way to turn.

George Munroe recalled his own rude introduction to the strident side of modern environmentalism during a trip to Tyrone in 1969 to dedicate Phelps Dodge's new mine. The corporation had invited five thousand guests to a barbecue to celebrate the opening. Afterwards at a smaller dinner for the press at the rustic Buckhorn Saloon in Pinos Altos, near Silver City, Munroe made a few remarks to the assembled reporters and offered to answer their questions. One journalist shot back, "When are you going to quit poisoning the citizens of Arizona?" Munroe responded that Phelps Dodge was working hard to control emissions but did not have the technology to meet a 90 percent sulfur removal requirement then being considered by the Arizona legislature, and if it enacted and enforced such a regulation, the company's existing smelters would have to close. Because his words created a furor, Munroe, who was new to his job as chief executive officer, worried that he might have sunk the corporation by his hasty but honest remarks.[18]

In some ways, Munroe and Phelps Dodge, like the American mining industry in general, were unprepared for the environmental onslaught. During the decade of the 1970s, despite its expensive commitment at Hidalgo to virtually pollution-free technology, the corporation often appeared to fight a rearguard action on environmental matters so as to continue producing copper as usual. What to do about its smelters at Ajo, Morenci, and Douglas was a continuing problem. The Douglas smelter was especially troublesome because, unlike the other two, it employed roasters to drive off sulfur from concentrates, especially those from Bisbee, where local ore contained far more sulfur than ores mined in Ajo or Morenci.

The 1970s posed uncertainties for Phelps Dodge quite apart from environmental regulations, which the corporation, after

Phelps Dodge in Washington

One reason Phelps Dodge director Robert Page was that he knew his way around Washington during World War II and the cold war that followed. The need for the corporation to deal closely and effectively with Congress was even more compelling after the rise of the environmental movement in the late 1960s. By early 1973, George Munroe formally recognized that federal rule makers had become a permanent addition to the management scene at Phelps Dodge by hiring Charles A. (Chuck) Burns to be the corporation's first director (later vice president) of government relations. Having earlier been administrative assistant to a North Carolina congressman and in charge of legislative matters for the American Mining Congress, Burns, an amiable Southerner who loved politics, knew the way around Washington.

That was helpful to Phelps Dodge, the last of the big American copper companies to open a permanent office in the national capital, where it became Burns' duty to present the corporation's views on pending legislative and regulatory matters. After 1974, when Congress changed the law affecting corporate political contributions, he also headed Phelps Dodge's federal political action committee.

Munroe had once told Burns' friend that his lobbying Congress to protect the corporation's interests during the difficult years of the late 1970s and early 1980s might make the difference between success and failure for Phelps Dodge. "That's a thought that terrifying," he later confided. Burns served Phelps Dodge for twenty years. Succeeding him in 1993 was Linda D. Findlay, among the first women to serve as vice presidents in the history of the corporation.

Sources: Interview with Charles A. Burns, October 1, 1998.

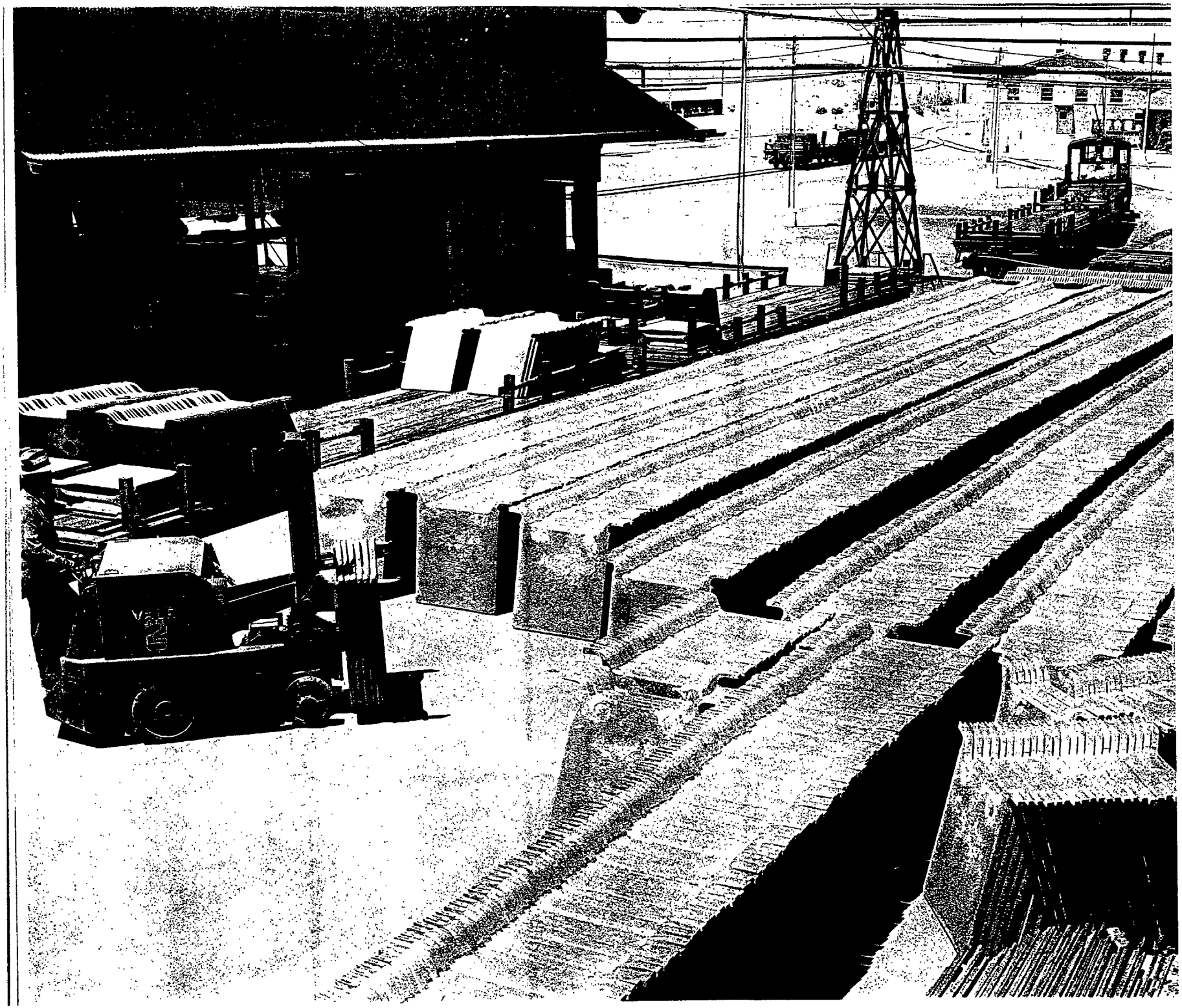
recovering from the initial shock, learned to address in a positive way. There were escalating fuel costs—a primary reason for the decade's runaway inflation; and with inflation came the sharply rising interest rates that only added to the growing burden of long-term debt that Phelps Dodge incurred mainly to meet air quality standards at its four smelters.

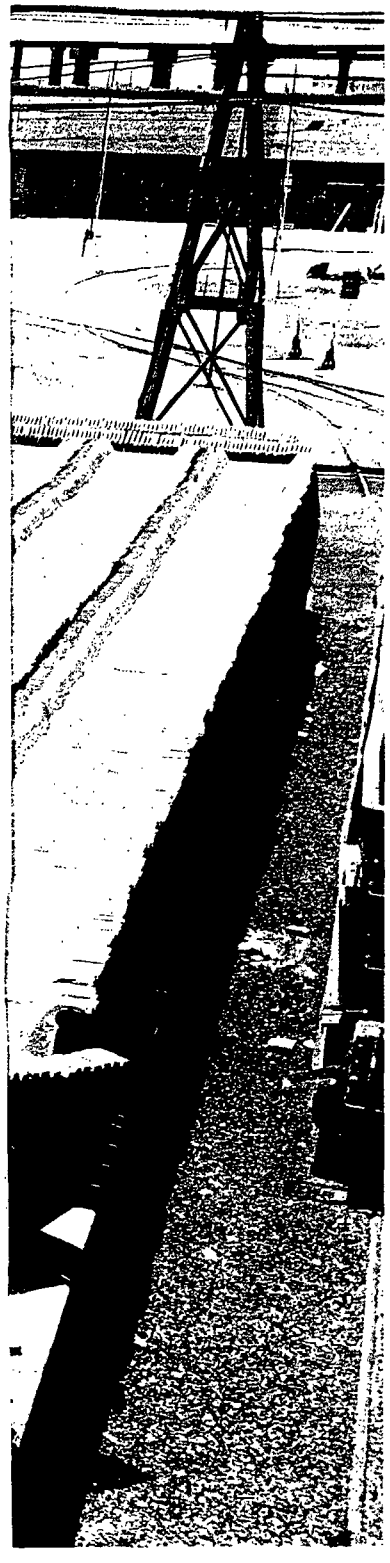
In total, Phelps Dodge spent a third of a billion dollars on pollution-control devices intended to address the constantly changing rules set forth by federal and state bureaucracies. Operating that antipollution technology contributed to the sharply rising cost of producing copper. Because current earnings covered only part of those capital expenditures, Phelps Dodge spent its surplus funds in the bank and then in 1967 borrowed a modest $2.7

million. After more than eighty years of pay-as-you-go mining, the company bowed to changed rules.

By the end of the 1970s its total long-term debt had climbed to $606 million, of which about half could be attributed to compliance with environmental regulations. Even that sum created no undue alarm as long as the all-important price of copper remained in harmony with the cost of production. Alas, as the corporation headed into the 1980s that was not the case. During the years 1981–84, instead of wrestling with uncertainty in terms of environmental remediation and inflation, the nation's Big Three copper producers ran headlong into a genuine economic disaster.

As if to portend the deluge ahead, a tailings dam at the Tyrone Branch ruptured on October 13, 1980, and covered nearly three hundred acres of Mangas Draw, mostly owned by Phelps Dodge Corporation, with varying thicknesses of finely ground rock. The flood, which ripped out power lines and broke water mains, shut down the mill for about three weeks. Fortunately, a series of check dams along the dry streambed contained the mess, and there were no personal injuries. Phelps Dodge spent months moving spilled tailings, covering the affected area with soil, and fertilizing and seeding to reclaim the land. Grass soon blanketed the ground, and the rapid regrowth of native vegetation provided good forage for the cattle and deer. Not all challenges of the 1980s were so easily met.





Chapter Twelve



RED METAL BLUES

COPPER IS USUALLY referred to as the red metal, but in solution it is blue, about as blue as the mood around Phelps Dodge during much of the early 1980s. "A very heavy dependence on one commodity gives you some real ups and downs," Chairman George B. Munroe once confided to *Forbes*. "I'm not saying that's bad. But the extent and suddenness of the swings take some getting used to." Because the time-honored corporation had a history of adjusting successfully to swings in the price of copper, what was so different about the four-year period from 1981 through 1984?[1]

The early 1980s were by far the worst of times for Phelps Dodge, when its troubles multiplied like breakers across the face of a stormy sea. In the second quarter of 1982 it paid its last dividend until December 1987. During part of that period it suffered a string of money-losing quarters unprecedented in its history—thirteen quarters in all with the lone exception being the second quarter

BECAUSE THE PRICING of copper is difficult to illustrate, the photographs on pages 280 through 291 offer a retrospective look at copper production during the four prosperous decades between 1940 and 1980. In the 1940s, no less than in the 1970s and 1980s, rows of anodes awaiting shipment from the Douglas Reduction Works to the El Paso refinery symbolized the heavy dependence of Phelps Dodge on the price of copper.

of 1983 when it enjoyed modest net income totaling $300,000. Not even the decade of the Great Depression was so bad for so long.

In the pages of *Phelps Dodge Today*, an in-house magazine, the senior vice-president and general manager Arthur H. Kinneberg worried aloud in early 1983 about the previous year's losses of $74.3 million. He could not know that during 1983 the corporation would again lose huge sums of money—and still more the year after that. In all, losses for the three-year period amounted to a whopping $400 million (including a nonrecurring pretax charge of $195 million in 1984 that reflected an asset-restructuring program). Any way you calculated it, those were dreadful years for Phelps Dodge and other American copper producers—and for other major industries too, like the nation's automobile giants, brought low by swift-footed Japanese competitors.[2]

The copper crisis of the 1980s, though it appeared to leap suddenly into prominence, was actually several years in the making. It emerged only after certain long-noticed trends converged unexpectedly to form a combination both frightening and dangerous, much as happens when charcoal, sulfur, and saltpeter unite to form gunpowder, an explosive mix far more volatile than any of its constituent parts. America's copper crisis took shape when the distinct legacies of events occurring during the 1970s—nationalization of mines overseas, double-digit inflation at home, and long-term debts that producers shouldered to meet changing emission standards—coalesced in a menacing new way.

Starting in 1982, one money-losing quarter followed another with depressing regularity until employees of Phelps Dodge wondered whether their corporation had a future. It still had plenty of copper in the ground, but as the vice-president Richard Pendleton noted in the *New York Times* in April 1982, "the more we sold the more we lost." No wonder some executives quietly pondered whether to dust off their résumés and seek new jobs outside the copper industry. Pay cuts for salaried employees and sales of major assets helped to fuel dark rumors of impending bankruptcy. Some members of middle management were certain that the corporation's chairman already had the necessary legal documents drawn up and waiting in his desk.[3]

Not so, emphasized Munroe during a 1998 interview at his New York office. "There was never any danger of bankruptcy," he recalled, and any claims to the contrary he branded a "total falsehood." Phelps Dodge was "in bad shape. No question about it," he agreed. "There were plenty of dark days." But Munroe was quick to cite the many positive measures that he and his lieutenants took to navigate Phelps Dodge around all mortal dangers. By the end of the 1980s, in fact, it had become a stronger and far more nimble enterprise than just a few years earlier. Improbably, company observers could judge the last two or three years of the decade the best of times. Perhaps that was only the natural giddiness and sense of relief that come from surviving a life-threatening situation, but certainly there was a noticeable, even profound, mood swing at Phelps Dodge after early 1985 when the corporation started making real money once again. To place the decade's crucial events in proper perspective, Munroe adds, one need only recall that among the firm's longtime rivals

Anaconda did not survive the 1980s copper crisis and Kennecott emerged only a shadow of its former self. For Phelps Dodge, the events of that tumultuous era shaped the corporation's future course every bit as much as those of the 1880s, when it first acquired a stake in Arizona copper.[4]

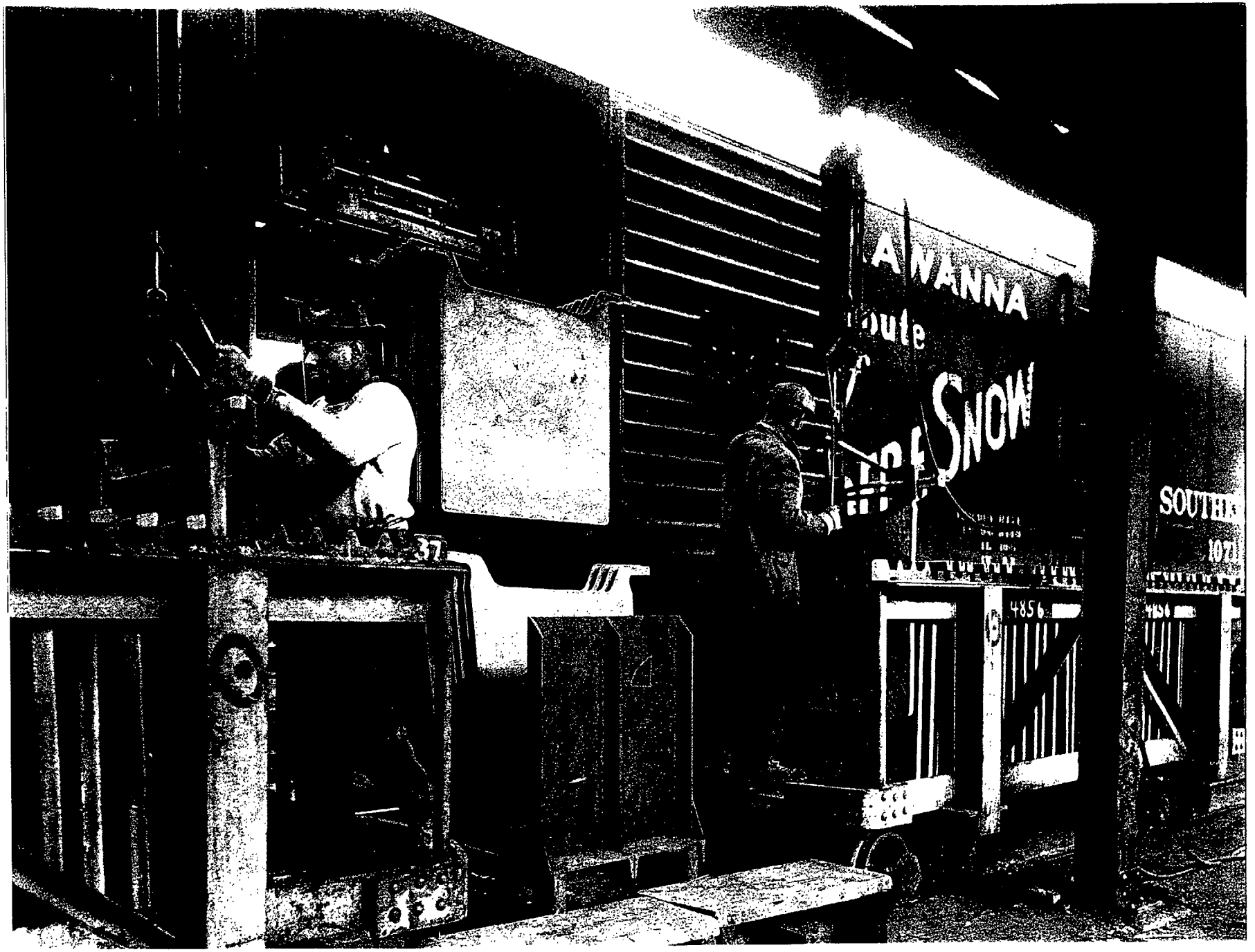
More Dark Days Ahead

PRESIDENT WARREN E. FENZI in New York typically talked by phone to the Arizona-based general manager of Western Operations every day. And when Art Kinneberg held that post he flew back to New York at least once a month to attend meetings of the senior management committee. Further, it was a long-standing Phelps Dodge custom for top executives based in the East to visit corporation properties in the Southwest each January. That was why in early 1980, Munroe and Fenzi headed west to tour the refinery and new rod mill in El Paso, the mines and smelters in Arizona and New Mexico, and the new La Caridad mine and mill near Nacozari, Mexico. Along the way they renewed old acquaintances and made a special effort to talk with as many members of branch personnel as possible. The annual January tour by New York executives provided western mine and mill employees an occasion to roll out the red carpet. However, the mood this time around appeared slightly less upbeat than usual.

During that swing through the West, Munroe addressed luncheon meetings of business and civic leaders in Phoenix, Albuquerque, and Tucson to report on the current status of the copper industry and discuss its outlook. In his remarks the Phelps Dodge chairman hammered home an important point: although American copper producers had enjoyed a reasonably successful year in 1979, their profits were not excessive if evaluated in terms of inflation.

From 1974 through the mid-1980s, except for one year, Phelps Dodge saw the price of copper remain at uninspiring levels even as the corporation spent an ever-increasing number of dollars to operate its facilities in compliance with environmental regulations. The lone exception, 1979, was a good year because strong demand for copper and its products by the electric utility, construction, and automobile industries resulted in the highest production figures yet recorded by the corporation: 686 million pounds. If evaluated in constant dollars, however, Phelps Dodge's 1979 earnings of nearly $111 million actually fell below those recorded in half of the previous twenty-five years. Still, 1979 offered a happy contrast to the dark days that soon followed.

The average price of a pound of copper increased from thirty-eight cents in 1967 to ninety-three cents in 1979, but after correcting for inflation it equaled only forty-two cents a pound in 1967 dollars, or an anemic gain of just four cents. In other words, when runaway inflation was taken into account, copper prices barely crept upward while production costs virtually skyrocketed. That dramatic variance equaled trouble ahead. So too did the fact that during the decade of the 1970s Phelps Dodge found it harder to reduce its long-term debt than company experts had anticipated. "Normally we would have paid that debt down rather rapidly," explained Munroe. But those were not normal times. The corporation and its several


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IN THIS OFTEN-REPEATED *scene from the 1950s or 1960s, a load of copper anodes arrives at the Laurel Hill Refinery in New York.*

competitors, at least those that remained independent, entered the 1980s carrying a heavy and unaccustomed load of debt. That burden nearly crushed American copper producers when the price of red metal sagged even lower in terms of constant dollars than it had during the hard times of the 1930s.[5]

Consider that the nation's nine leading copper companies recorded aggregate debt of $250 million back at the end of 1964. By the mid-1970s that figure had ballooned to $3.2 billion, a twelvefold increase attributable for the most part to capital expenditures for environmental controls. And the total continued to climb.

In all, federal and state environmental programs added about fifteen cents per pound to the cost of producing copper. That was the unavoidable legacy of the previous decade's heavy borrowing and spending for new facilities, especially for environmental technology that promised to clean up smelter emissions even as it greatly increased operating costs. Further, because of the way terminal markets priced copper (explained later in this chapter), Phelps Dodge was unable to pass increased costs along to customers in the form of higher prices, unlike electric utilities, for example, which simply added the cost of emission controls at their power plants to rates they charged customers. A copper company could pass those costs only to its stockholders through reduced profits—if it had any profits.

In January 1980 the price of copper in constant dollars remained below the level needed to justify any new mine development. However, Munroe predicted to listeners during his annual tour that, because demand for copper exceeded supply, copper prices should move up to the level needed to attract investment in new productive capacity by the mid-1980s. He expected that the opening years of the new decade would be good ones for the copper industry, assuming reasonable federal and state policies regarding taxation, the environment, and various regulatory matters. Those were big assumptions, however, and as it soon turned out, no one in the American copper industry accurately foresaw the time of trouble that lay just ahead. Since its founding in 1834, Phelps Dodge had weathered many periods of hard times, but nothing in its lengthy history compared to the disastrous combination that swamped and nearly sank it during the first half of the 1980s. In fact, from hindsight, the New York management's January 1980 tour of the Southwest actually looked like a rare moment of sunny optimism amidst gathering gloom.

In September 1980, President Fenzi retired (although he continued to serve as a member of the board of directors until 1984). In a move that was a first for Phelps Dodge, George Munroe then added the title of president to that of chairman and chief executive officer. The previous June he formalized a senior management committee composed of himself, three vice-chairmen (a newly created post), and the general manager of Western Operations. During the two previous years, members of the group had gathered on an unofficial basis in an effort to break down barriers that had long separated the corporation's mining and manufacturing sectors.

The trio of executives that Munroe, age fifty-eight, had named vice-chairmen were Edward H. Michaelsen, sixty-two, who was responsible for Phelps Dodge Industries; Richard

J. Moolick, fifty-nine, who had climbed through the ranks of western mining to gain responsibility for the mining and smelting side of the company; and L. William Seidman, fifty-nine, a senior vice-president and the corporation's chief financial officer. Seidman, who had been Munroe's roommate at Dartmouth and more recently President Gerald Ford's economics adviser (a member of the so-called Michigan Mafia at the White House), joined Phelps Dodge in 1977. He added to his stature as a money wizard when he later headed the Federal Deposit Insurance Corporation and the Resolution Trust Corporation that brought order out of the savings and loan chaos of the early 1990s. The final member of Munroe's newly formed team was Arthur H. Kinneberg, fifty-eight, a senior vice-president.

Listing the men's ages in news accounts of the management restructuring was important because it seemed to signal that no one from within the senior group was likely to succeed Munroe when he retired at sixty-five. The chairman after him would probably come from the corporation's next younger tier of executives. Talk of succession might have been dismissed as corporate politics, a subject mainly for speculation around the watercooler, but within the context of the monumental problems Phelps Dodge soon faced, questions about the next generation of leadership came to loom far larger than they would in ordinary times. What no one foresaw in 1980 were events culminating four years later in what Seidman recalled as an "internal takeover" unprecedented in the annals of American business.[6]

Meanwhile, it was Munroe and his senior managers who must have sometimes turned and tossed at night wondering what new troubles the dawn of a new day would visit upon Phelps Dodge. The nagging recession that started during the second quarter of 1980 moderated somewhat during the centennial year of 1981, when the corporation commemorated how it first looked west for its future. That year the combined output of all Arizona producers was a record 2.3 billion pounds of copper, or nearly 68 percent of the total production in the United States. Then the price of copper crashed hard during the first half of 1982.

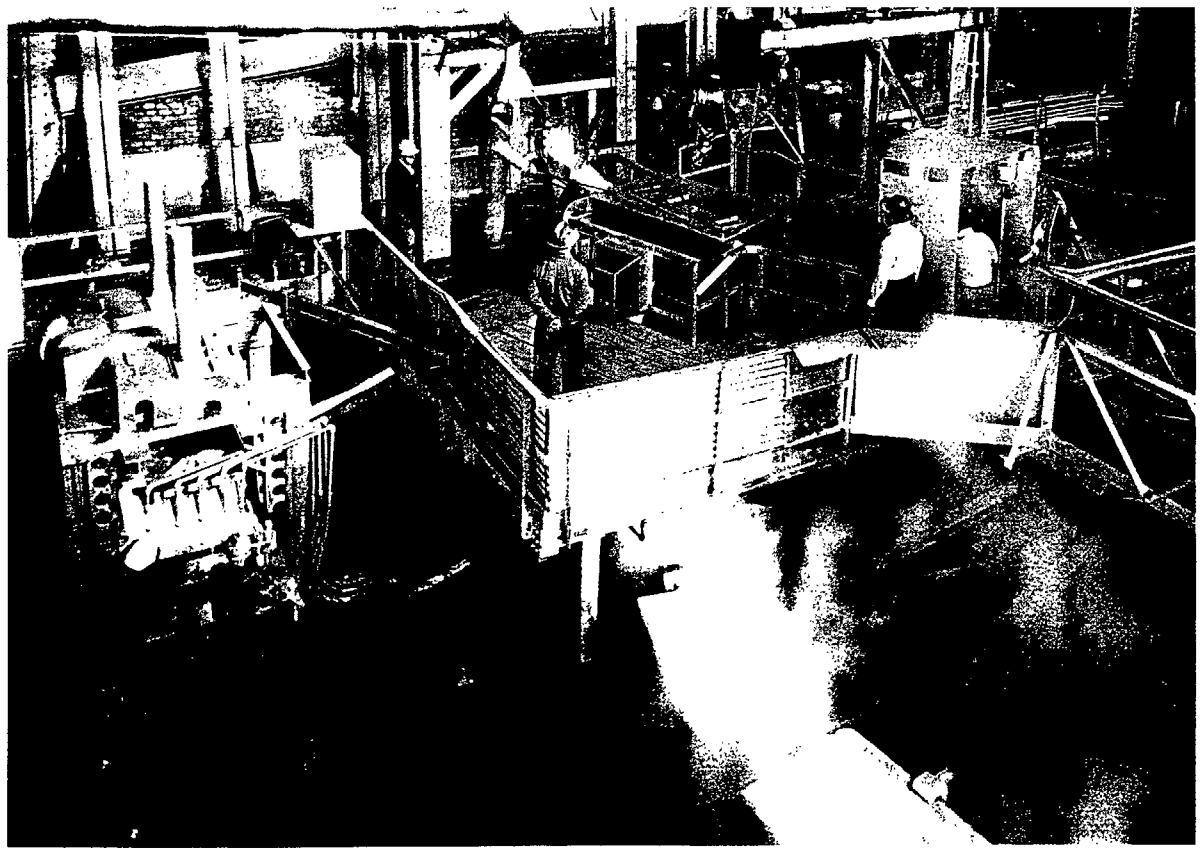
Because unlike most industries copper producers cannot set prices, they had to fight back with sharp pencils to pare away any unnecessary costs. When the cost of producing red metal far exceeded its selling price, fourteen of Arizona's twenty-four mines suspended operations for an indefinite period, while others operated on a reduced work schedule. In total, some twelve thousand miners lost jobs between December 1981 and September 1982, and that predictably had a negative impact on the state's economy—not to mention the household budgets of the miners themselves.

Phelps Dodge spotted trouble ahead as early as the fall of 1981. At that time it became common for employees to speak of hard times, particularly after corporation officials announced production cuts at all branches. They did that by adding five days to the usual Christmas shutdown at Tyrone, six days at Ajo, and twelve days at the Morenci concentrator in addition to an eight-day shutdown previously scheduled for the entire Morenci complex. As hard times persisted, especially after the fourth quarter of 1981, the

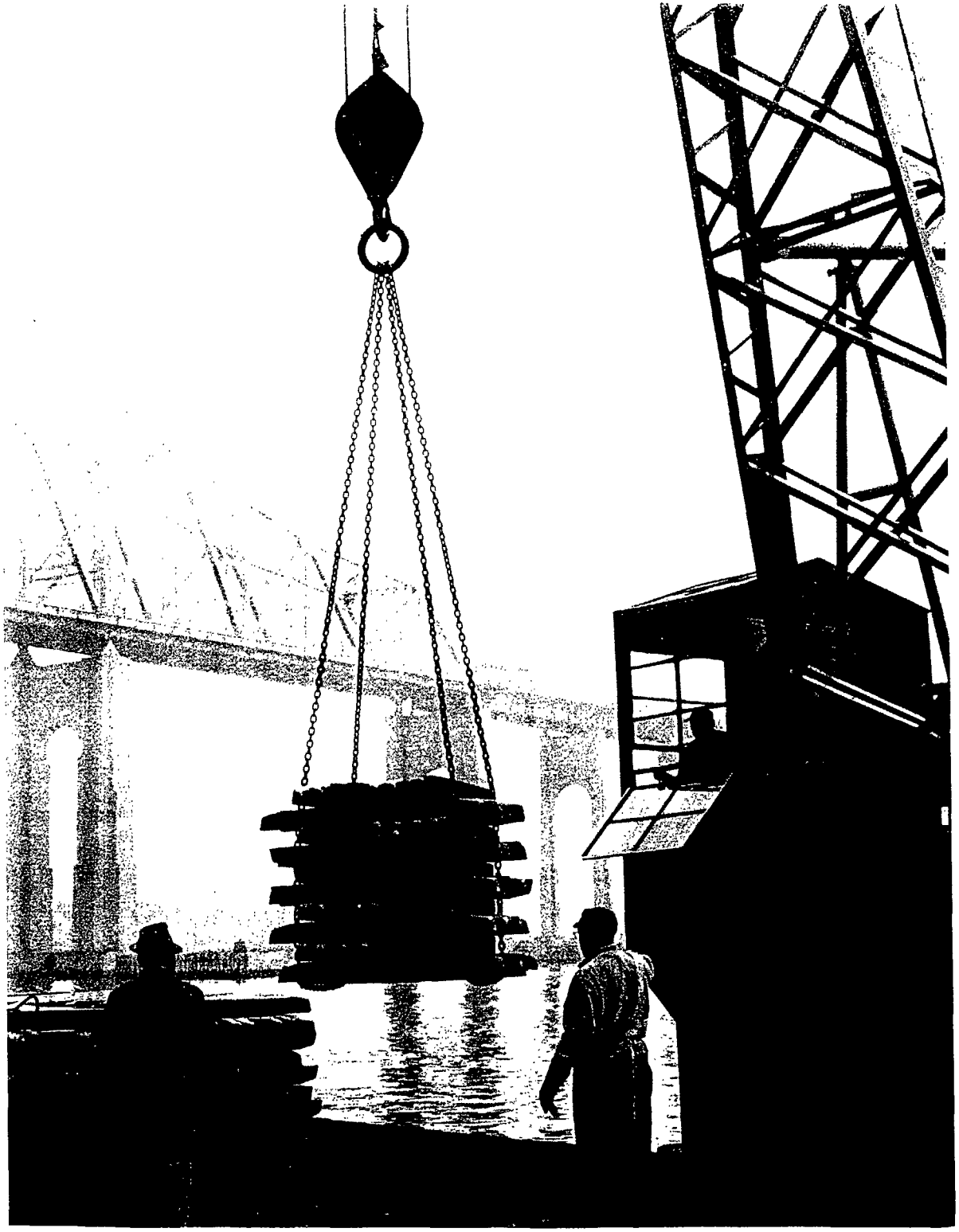
drain on corporation cash grew so severe that in April 1982 Phelps Dodge closed all its mines in the United States and its three Arizona smelters for an indefinite period. Only the Hidalgo facility in New Mexico continued to operate to fulfill smelting commitments to other companies. The $1.4 billion Phelps Dodge Corporation entered a state of suspended animation when it laid off about thirty-eight hundred of its six-thousand-member workforce and simply sold copper from its inventory.

"We deeply regret the hardship this action will cause the employees and communities affected," observed Munroe of the shutdown, "but the current recession has driven copper prices to their lowest levels in real terms in more than thirty years." He emphasized that during the early months of 1982 the company lost money virtually each day until its April shutdown, the first such suspension in fifty years. Phelps Dodge's "current predicament," observed *Business Week* in a mid-1982 article that many people considered unduly critical, "is a far cry from its glory days of the 1960s, when it had virtually no debt and was flush with cash."[7]

Munroe preferred to emphasize that "sooner



CASTING COPPER *wirebars at the Laurel Hill Refinery in the early 1950s. From here they typically traveled aboard barges to the Bayway, New Jersey, manufactory, where heavy machinery hot-rolled each of the 265-pound bars into rod used for drawing wire.*



THE NEXT STEP: receiving wirebars at Phelps Dodge's Bayway facility in New Jersey in the early 1950s, when it was a leader in rolling wirebars. Bayway at that time formed the heart of the corporation's manufacturing landscape.

or later" the country would work its way out of recession. Meanwhile, a pall of gloom and uncertainty hung over the copper towns. No one was sure what the immediate future held. Phelps Dodge sought within its newly limited means to aid laid-off employees. It continued their life insurance benefits for sixty days, medical and dental benefits for ninety days, extended limited weekly credit at Phelps Dodge Mercantile stores, and allowed those who lived in company housing to defer the payment of one-half their rent. As a result of a past labor agreement, it also supplemented unemployment compensation by fifty dollars per week from a trust fund into which it had contributed for the past seventeen years.

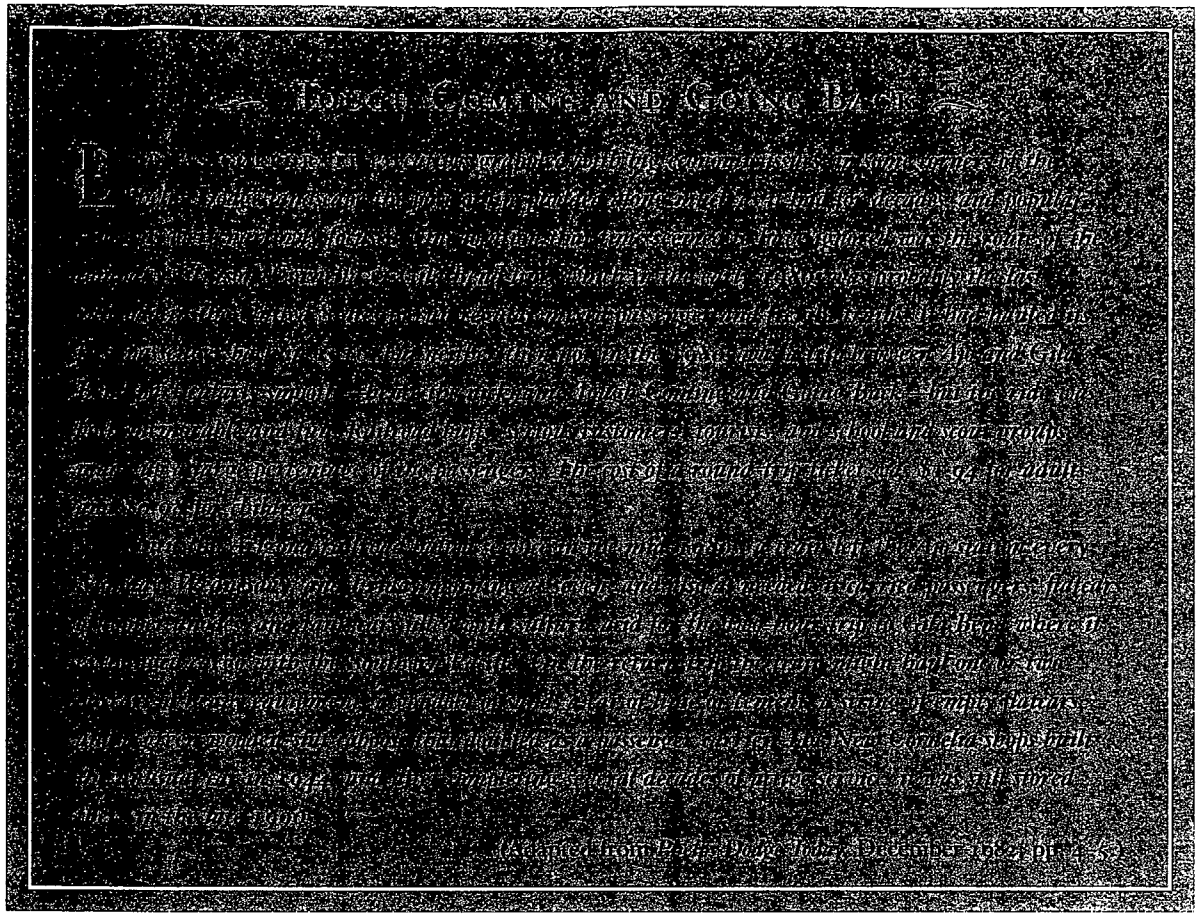
Unfortunately, mining and smelting operations did not resume on June 1, 1982, as many at Phelps Dodge had hoped, and because of the copper country's extended depression, medical, dental, and life insurance benefits expired. Perhaps worst of all, the trust fund for supplemental benefits ran dry for New Mexico. Approximately two thousand layoffs at Morenci plus their impact on the local merchants pushed unemployment in all of Greenlee County to 64 percent in May 1982. A series of community workshops called "How to Survive on $165" a week sought to help out-of-work families in Clifton.

In a May tour of Phelps Dodge properties, Munroe attempted to explain the continuing copper crisis to employees and their families. By that time the message should have been familiar: "Phelps Dodge is experiencing one of the worst economic depressions in the company's history." He emphasized that the price the company received for a pound of copper, in real terms, was lower than it has been at any time in the twentieth century, except for very brief periods following the world wars and a somewhat longer period during the Great Depression of the 1930s.[8]

Despite austerity measures at every level, Phelps Dodge suffered a net loss of $38.5 million during the first six months of 1982; a year earlier, it had earned a net income of $54.3 million for the same period. In view of the continuing economic slump, directors omitted the dividend on common stock for the third quarter of 1982. Arthur Kinneberg assured employees in Western Operations that there was "no chance" that Phelps Dodge would "go out of business. We have premier copper mining properties, and we have good people—we expect to be in business a long time, and we expect to be mining copper for a long, long time." He was unwilling to predict, however, when operations would resume. "The timing depends upon Phelps Dodge's cash flow position—whether we would lose less money if we remained shut down than we would lose if we resumed operations."[9]

Not surprisingly, when the corporation offered its employees an opportunity to retire early if they met certain age and service qualifications, the number of retirements jumped sixfold during the spring months of 1982. Morenci did finally reopen the following October, Ajo in February 1983, and Tyrone in early May 1983, but with only 70 percent as many salaried and hourly employees as had been on corporation payrolls in April 1982. Times remained difficult and threatened to grow even worse.

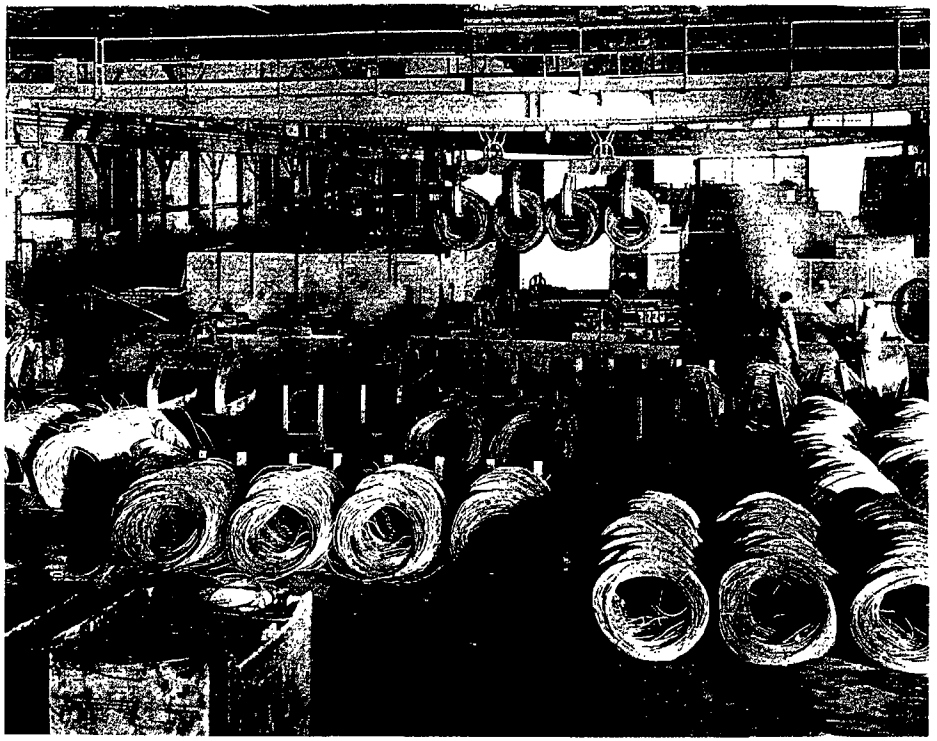
From a national perspective, the United States in the early 1980s was in a recession, but for commodity producers in Arizona, New Mexico, and other western states, it was



appropriate to speak of full-blown economic depression. In addition to the world glut of copper, the exceptionally high value of the American dollar vis-à-vis other world currencies put United States producers at a global disadvantage. At home, interest rates rose so high that consumers delayed purchases of big-ticket items like automobiles and appliances, all of which were sizable users of copper. The ongoing copper crisis prompted a great deal of soul-searching at Phelps Dodge as people sought to understand its causes and find a cure.

The Gospel of Efficiency

THE ONLY THING for certain in the copper industry is change, and in the late 1970s and early 1980s there was plenty of that. For old-timers, it was sometimes hard to think of Morenci and not Bisbee as the company's copper flagship. With each passing year Morenci grew bigger and more important, until by the late 1990s it alone produced about one-third of all red metal mined in the United States. When



THE OLD WAY. *After workers hot-rolled wirebars into rod, they welded the short segments together before shipping coils to wire and cable manufacturers. Unfortunately, each weld increased the chance of breakage during the wire-drawing process. After the modern continuous-casting process overcame that difficulty, the loaflike wirebars became a novelty.*

Phelps Dodge purchased the Western Copper property for $10 million in 1981, it consolidated virtually all viable copper claims in the Morenci area under its control and completed a process of acquisition that began exactly a century earlier when it first invested in the Detroit Copper Mining Company. Acquisition of the eighty-one Western Copper claims enabled Phelps Dodge to increase efficiency at its Morenci and Metcalf open-pit mines by removing any physical obstacles that separated them. And efficiency in all forms became the corporate gospel in the early 1980s.

Efficiency, sometimes called the challenge of productivity, included everything from the use of larger haul trucks and computerized dispatching systems in open-pit mines, beginning at Tyrone in 1980, to automated welding machines and modern leaching and precipitation facilities at Morenci. For a time it appeared that greater efficiency alone—improved technology and good management—would enable Phelps Dodge to weather the runaway inflation of the early 1980s and compete successfully with low-cost mines outside the United States.

The emphasis on achieving greater efficiency through improved technology was not actually new. For decades, Phelps Dodge had pursued research and development programs that sought to modernize mine production and better its manufactured copper products. That enabled the corporation to remain at the forefront as one of the lowest-cost producers in the copper industry. At times, however, it seemed all efforts to achieve greater efficiency meant only that Phelps Dodge ran ever harder just to stay in place.

During the decade of the 1970s, the price of virtually everything Phelps Dodge required to produce copper and copper products escalated. The dramatic rise was spurred in part by the Organization of Petroleum Exporting Countries (OPEC) oil embargo of 1973 and a second oil price "shock" in 1979 that lifted the price above $30 a barrel. While most Americans could only fume about fuel shortages and sharply rising prices, Phelps Dodge early worked to gain a secure energy supply of its own. To that end, in 1974 it formed Phelps Dodge Fuel Development Corporation, a wholly owned subsidiary intended to explore for oil and gas in the continental United States. That first year it participated in twenty-five exploration wells, all located in Texas. During the remainder of the 1970s, Phelps

Dodge Fuel Development explored for oil and gas in various parts of the country, though with only moderate success. By the early 1980s, nonetheless, several of its wells supplied fuel for Western Operations. Beginning in 1982, Phelps Dodge also substituted pulverized coal for much of the fuel oil burned in the Hidalgo smelter.

Unfortunately, not all inflation-related problems were so easily solved. Consider, for example, that the cost of each brake shoe used on railroad dump cars at its Morenci mine jumped 95 percent, a rotary drill bit 131 percent, and a grinding ball, of which it used thousands in its mills, 141 percent. The cost of each refractory brick used in smelters ballooned by an astronomical 979 percent over a ten-year period. Often, it seemed that the more basic the item the more its price jumped. All kinds of similarly inflated numbers could be cited for everything from building lumber and pickup trucks to chemical reagents and explosives.

But that was not all. As Kinneberg explained to readers of *Phelps Dodge Today* in 1980, labor costs—that is, the total Phelps Dodge paid for employees' wages and benefits—had ballooned 171 percent since 1970. Further, back then there were few environmental costs; "yet now, only ten years later, the Company pays tens of millions of dollars every year to comply with a maze of environmental laws and regulations."[10]

The Dismal Science

To repeat economics lesson one in the copper classroom of the early 1980s: when the price of copper was expressed in 1981 dollars it had decreased 34 percent during the previous decade, while Phelps Dodge's total production costs had increased by about 50 percent. The three principal reasons for the corporation's increased production costs, explained George Munroe, were the skyrocketing price of energy, the additional burden imposed by pollution controls, and the impact of automatic cost-of-living adjustments (COLA) on wages in the industry. The question of COLA was something about which Phelps Dodge employees would soon hear a great deal.

In the short run, the corporation emphasized still greater utilization of technology to achieve still greater efficiency to reduce production costs. But greater efficiency alone had its limits. It simply could not offset the financial damage done when copper prices lagged behind inflation—and copper remained the backbone of Phelps Dodge Corporation. In 1981, for instance, when the price of copper dropped by as little as a single cent, it reduced the corporation's annual earnings by as much as $5 million. But as important as red metal was to Phelps Dodge, the corporation remained at the mercy of copper prices because the world, not just the United States, had become its marketplace.

The continuing copper crisis focused attention as never before on how copper was priced, and if people wondered why economics was often called "the dismal science," they certainly didn't wonder after hearing American copper's continuing complaint. "A person unfamiliar with our industry," explained Munroe in early 1982, "might suggest that we merely increase the price we charge for our copper to cover any increases in our labor costs." Actually, supply and demand

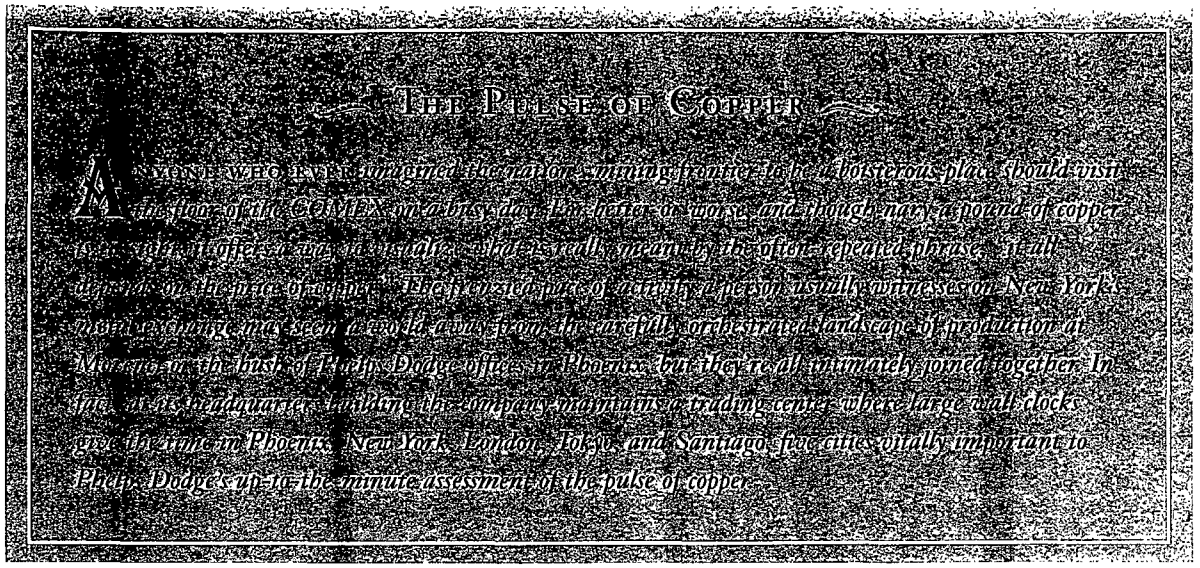
determined the price that Phelps Dodge and other metal producers received for a pound of copper over the long term, and the obvious imbalance of the early 1980s placed the mechanism of copper pricing in the spotlight.[11]

A fundamental axiom of economics is that the more there is of anything the less it is worth. To apply that principle to copper, imagine a pricing mechanism somewhat like the inflow and outflow of water for a common bathtub. If the tap of production was opened full but the drain of demand was closed or partially plugged, the tub would fill up. The water level in the tub was analogous to the world supply of copper, which would likely decline in price as the level, or supply, rose. Around the world, everything from industrial accidents, earthquakes, and floods to wars and rumors of wars influenced the price of copper.

Phelps Dodge typically sold its copper to buyers by setting its own "producer price," but by the early 1980s it had tied that price closely to terminal markets in London and New York, both of which were in turn influenced by supply and demand. Like corn, wheat, and dozens of other commodities, copper was traded on the futures market. The older of the world's two main metal markets is the London Metal Exchange, or LME, which dates back to 1877 when metal traders set up their modest exchange over a hat shop in Lombard Court. Its influence diminished temporarily after the outbreak of war in 1939, at which time it closed its doors and kept them locked to copper traders for the next fourteen years. The other was the Commodity Exchange, or COMEX, in New York. Established in 1933, it is today located in the World Financial Center near the landmark twin towers of the World Trade Center. In contrast to an atmosphere of British formality that prevails on the London Metal Exchange, life at the COMEX mirrors the more raucous demeanor typical in the United States, as a circle of leather-lunged buyers and sellers bellow orders at one another and litter the trading floor with scraps of paper. These clamorous exchanges are called, appropriately enough, open outcry sessions.

Activity at the Commodity Exchange or the London Metal Exchange also illustrates how in the real world the relationship between copper's supply and demand is complicated by speculators and floor traders who have no direct interest in production or consumption of copper. They have no intention of taking physical possession of any of the copper they buy or sell, but nonetheless they can create rapid change or movement in prices and cause difficulty for Phelps Dodge as it seeks to establish a fair and consistent price for its copper customers. Finally, the availability of scrap copper further affects the price of newly mined metal.

As has already been noted, copper is a commodity subject to substitution. If its price per pound climbs too high, users might replace it with other metals or plastics in the manufacture of certain products. For example, plastic pipes might replace copper ones if they became too expensive. All that was old news by the early 1980s, but a reminder of the lurking threat of substitution was near at hand in the form of the common "copper" penny, which in recent years evolved into a slug of zinc electroplated with a thin outer layer of copper. It was clear that Phelps Dodge fared best when copper was priced low enough to discourage substitution but high



enough to provide the corporation a reasonable annual profit.

Forbes magazine observed as early as 1958 that the copper mines of the world could not "legally regulate or practically rationalize production among themselves. Yet if the world's formidable array of producers mine so much as 4% more copper than the market needs, the price can plummet by nearly 50%." That, incidentally, was at a time when private enterprise dominated world copper production, but things became vastly more complex during the early 1980s. The problem that Phelps Dodge faced at that time was that recently expropriated copper companies in developing nations seemed determined to leave the tap of production fully open in defiance of world demand. Thereby they overflowed the tub and left the world awash in low-cost copper. All of this, of course, translated into depressed prices for everyone. Perhaps nothing more effectively illustrated how different the world of copper had become since World War II or how major political or social changes affected the price of red metal.[12]

With each passing month, Phelps Dodge executives saw ever more clearly how radically their industry had evolved during just the past ten or fifteen years. In former times, companies in the United States produced about one-quarter of the western world's newly mined copper. Likewise, private enterprise owned and operated all major foreign mines. In fact, until the late 1960s just six companies basically controlled world copper production. Those giants were Anaconda, Kennecott, and Phelps Dodge in the Americas, and Anglo American, Rhodesian Selection Trust, and Union Minière du Haut Katanga in Africa. Their managements typically responded to market surpluses by cutting production and thereby kept supply and demand in reasonable balance.

The pricing mechanism went haywire during the late 1960s and early 1970s because expropriation of big mines in Chile, Zambia,

Zaire, and other countries effectively jammed open the tap of production. By the end of the 1970s more than 42 percent of all copper coming from the non-Communist world originated in mines owned or controlled by governments of developing nations. Chile, often aptly described as the Saudi Arabia of copper, annually produced a whopping 17 percent of the world's supply; Zambia 9 percent; Zaire 8 percent; Peru 5 percent; and Mexico 4 percent.

Overproduction during the recession years of 1982 and 1983 forced extra copper into a market where it found few buyers. As inventories built up, the price fell still farther, to seventy-four cents in 1982, a figure that when expressed in constant dollars just about equaled the fourteen cents that copper sold for in 1946. Normally, a price decline such as Phelps Dodge experienced in the early 1980s resulted in reduced copper output. But those were not normal times—at least not in the old sense of normal. Where privately owned copper companies had once responded to market forces, state-owned companies continued to produce all the red metal they could, apparently in the mistaken belief that flat-out production would result in maximum foreign exchange for their countries and full employment for their people. Because of social policy they did not cut production.

Government-controlled Third World copper producers competed in markets with copper coming from Phelps Dodge and its counterparts in the private sector, who were forced to bear the entire burden of trimming production to meet demand. Because copper was an international commodity—that is, a pound sold in Brazil was the same as a pound sold in Bangladesh or Boston—Phelps Dodge was wholly dependent on world economic events, not just those taking place in the United States where only about 25 percent of the world's copper was consumed. No wonder *Forbes* magazine as early as 1978 labeled the American copper industry "sick."

During the recession of 1982, United States producers reduced output by 25 percent and laid off nearly 40 percent of the nation's copper miners. That same year, Chile's state-owned CODELCO *increased* production by 15 percent to an all-time high and maintained full employment in its mines. CODELCO, in Munroe's words, was the "King Kong of Copper." When newly expropriated mines did not reduce production, they thus transferred the burden for doing so onto the private sector, specifically the United States copper industry, and that meant big production cuts, layoffs, and personal hardship.[13]

For nearly a century, from 1883 until 1980, the United States remained the world's leading copper-producing nation—except for 1934, when depressed economic conditions curtailed production—but beginning in 1980, and especially after 1982, the United States lagged steadily behind Chile, and over time the gap widened. In Chile, where copper was expropriated in the late 1960s and early 1970s, output increasingly reflected the wishes of politicians who wanted their country's mines to produce copper in great quantities and thus provide steady jobs in defiance of all known laws of economics. Chile's red metal production continued to increase each year between 1980 and 1984, as did the amount of copper it exported to the United States. As a result, in the early 1980s both the United States and world

markets found themselves drowning in a sea of low-priced metal. When the copper glut combined with global recession and runaway inflation, Phelps Dodge found itself groping through the darkest days in its long history.

Because Phelps Dodge could not effectively fix its own price for copper, if it hoped to earn a profit during times of low prices it needed to reduce its costs of production, and by 1982 it had already embarked on a quest for greater efficiency. The corporation might also turn to Uncle Sam for short-term protection from low-cost imported copper. To that end, copper producers participated in a successful lobbying campaign mounted by the nation's smokestack industries, all of which suffered from the prevailing high interest rates, a strong dollar, and economic recession, to persuade Congress and members of the Ronald Reagan administration to grant them special tax credits needed to weather the economic storm. At the same time, however, Phelps Dodge and its American competitors failed to persuade Uncle Sam to impose tariffs or import quotas, at least during periods of recession, to protect them from extreme market distortions caused by the subsidized actions of state-owned mines. By 1983 imports had taken 26 percent of the domestic market for refined copper, up from only 10 percent as recently as 1979.

Failure to obtain tariff relief seemed particularly unjust because in the early 1980s, overproduction by expropriated or government-controlled copper mines in Chile and other developing countries continued to be underwritten by financing agencies like the World Bank and the International Monetary Fund to which United States taxpayers were the largest contributors. In short, and as bizarre and unjust as it seemed to American producers, Uncle Sam indirectly provided financial assistance to compensate Chile for losses it sustained while maximizing production at the expense of its American competitors. Not only that, financing agencies also granted loans at very low interest rates to permit further expansion of foreign copper production facilities.

On one occasion, Chile applied for and received $32 million from the International Monetary Fund to offset a "loss" in export revenues primarily attributed to low copper prices, prices driven down, ironically, by Chile's own overproduction! "It is discouraging to see U.S. dollars going overseas to underwrite the expansion of competitors whose predatory market behavior is the largest single cause of our copper industry's difficulties," observed Kinneberg in March 1984. Even worse, money for those baleful loans came from the pockets of American taxpayers, including Phelps Dodge's own copper miners in Arizona and New Mexico who lost jobs because of United States–subsidized copper imports. "The cure for this intolerable situation" fumed the normally mild-mannered Munroe, "is to get the international financing institutions to better understand the dynamics of supply and demand in a free commodity market and to apply that knowledge to their financing decisions."[1]

That was not all. In addition to using dollars from American taxpayers to bolster the overproduction that was flooding world copper markets, those same developing nations generally had richer ore bodies to mine and less stringent and hence less costly environmental regulations

to meet than their United States competitors, and they paid their workers less. That was one major reason the ABC television program "20/20" spoke in July 1984 of a "once proud industry brought to its knees" by foreign copper.

No End of Challenges

From the 1920s until the early 1980s, Phelps Dodge did not change significantly the way it produced its copper or managed its far-flung operations. It was a remarkable record of stability disrupted only when the price of copper nose-dived and the corporation lost money on every pound it sold. The ensuing distress lasted four years and unleashed a tidal wave of structural and personnel changes.

A shuffle in top Phelps Dodge management in 1982 only heightened public concerns for the future of the corporation. *Business Week* observed in midyear that L. William Seidman, the man Munroe brought in to modernize management and accounting procedures, was leaving that September, and the impending retirement too of Edward H. Michaelsen, who at age sixty-five became managing director of New York's Carnegie Hall, "will mean that Richard T. Moolick, the remaining vice chairman and a tough and abrasive mining engineer, is likely to be named president." The question was, would he be too tough and abrasive given the patrician image cultivated in recent years by the corporation's top management in New York?[15]

Moolick, who served as vice-chairman for mining operations from 1980 until 1982, the year he became president of Phelps Dodge, did implement a variety of programs intended, in his words, to make the company "lean and tough." Earlier, he himself had acquired a reputation for toughness, an attribute he greatly relished because he saw himself as embodying the American frontier spirit. His grandfather was a miner and his father an oil driller. To friend and foe alike, he seemed to have the tenacity of a prickly pear cactus and sometimes needed to be approached with the same degree of wariness the cactus required. Moolick and Munroe were studies in contrast: whereas the chairman was cerebral and inclined to work through difficult matters with a willingness to compromise, the president was visceral and inclined to give no quarter. Their differences in style became most apparent during the great copper strike of 1983 when Moolick locked horns with nearly three dozen unions long entrenched at Morenci and other Western Operations properties.

Back in the mid-1970s, after he went to Phelps Dodge's New York headquarters as a vice-president, Moolick made a lengthy firsthand study of Western Nuclear that caused him to worry that the pace of the uranium company's mining activity and its metal reserves bore no relationship to its sales; and it was he who set in motion a process that led Robert Adams to resign as president of Western Nuclear. That gained the parent company direct control over its ailing subsidiary, especially after Fenzi appointed Moolick president of Western Nuclear.

As the Western Nuclear episode illustrated, Moolick saw himself as a man of action. Take the Metcalf mine as another example. Originally estimated at $100 million, the cost ballooned because of inflation to twice that amount by the

time the mine came into production in the mid-1970s. After that it was plagued by large amounts of overburden, especially when copper prices were low, and the solution extraction–electrowinning technology had not yet been embraced by Phelps Dodge. In 1980, the mine produced only 11,400 tons of copper, yet it had to move 7.6 million tons of overburden to get to 2.4 million tons of ore, an unsatisfactory ratio of over three to one. "My first action as vice chairman," recalled Moolick, who assumed that position in 1980, "was to shut down the Metcalf Mine, and to feed the Metcalf Mill from the Morenci Pit. That resulted in a saving of approximately $25 million a year."[16]

By 1982, belt tightening all down the line was the order of the day at Phelps Dodge, but the history of the corporation during the early 1980s is not entirely a story of retrenchment. Phelps Dodge Copper Products Company opened a continuous-cast rod mill in Connecticut in July 1981 and another in Texas a year later. Each of those plants covered an area bigger than a football field, and together they secured Phelps Dodge's position as the world's leading producer of copper rod. Those facilities, furthermore, represented vital connecting links between Phelps Dodge Mining Company and its customers, which included several manufacturing plants of its sister Phelps Dodge Industries.

Also on an upbeat note, late in 1982, Phelps Dodge opened a precious metals recovery plant at the El Paso refinery. At about the same time the newest unit of Phelps Dodge Industries—the recently formed (1978) Phelps Dodge Solar Enterprises—moved into spacious new quarters in California. Well attuned to the energy-conscious decade, it produced copper solar panels for domestic hot-water installations, such as for swimming pools and spas, a market that was big in the Southwest. Branching out into that area marked a "dramatic departure from Phelps Dodge's past attitude toward manufacturing," which was just to move copper. Previously, the company didn't want to worry about small-volume, high-margin products.[17]

Moolick as president did not simply close mines and trim away perks. He sought to lessen the company's dependency on massive open-pit copper mines by fostering the Small Mines Division to exploit the kind of precious metals deposit that Phelps Dodge had previously snubbed. Dating from 1981 and based at Safford, Arizona, the Small Mines Division developed an operating silver property in southeastern Arizona and recovered precious metal ores from its underground copper mines in Bisbee, which by 1982 had been officially idled for seven years. It even hoped to use its small stakes in oil and



LOCATED INSIDE *the El Paso complex at the aptly named intersection of Slimes Alley and Gold Drive is the precious metals recovery plant opened in 1982. It is from slimes created as a by-product of the electrolytic refining of copper anodes that Phelps Dodge recovers gold, silver, and other valuable metals at this high-security facility.*

Where Mining Meets the Market

For years, plants in Bayway, Fort Wayne, and El Paso had made Phelps Dodge a leading supplier of hot-rolled copper rod, the basic feed material for drawing copper wire. The technology's main drawback was that, in order to produce the longer lengths desired by wire and cable manufacturers, workers had to weld several shorter rods together, and each weld carried a risk of breaking when machines drew the rod into wire. The surface of hot-rolled copper rod also tended to oxidize, and this impurity had to be shaved off mechanically. Continuous-cast rods, a technology born in Europe during the 1970s, overcame both problems, but Phelps Dodge already had a huge investment in traditional rod-making equipment, and so it held back until 1979, when the new technology had at last matured. When Phelps Dodge engineers gave their approval, the corporation announced plans to spend $65 million to install two state-of-the-art continuous-cast rod mills, one in Norwich, Connecticut, to serve the eastern market, and another next to its refinery in El Paso. This spelled the end of rolling mills at Bayway and Fort Wayne.

Because industrial Connecticut had for years suffered from an exodus of cotton mills and other manufactories to the South, the word mill *was anathema, so Phelps Dodge purposely named its new facility the Norwich Rod and Wire Plant. When the Norwich plant opened, the corporation announced that it had come home. Indeed it had. Not only were two of its founders, Anson Phelps and William E. Dodge, Connecticut Yankees, but Dodge had as a teenager worked in a cotton mill his father ran in Bozrahville, a village located just down the road from Norwich Rod and Wire.*

uranium to expand further in energy production. However, the Small Mines Division was never able to surmount low metal prices that caused it to close in 1984, though not before it acquired a small mine in Chile called Ojos del Salado, an unassuming property that unexpectedly led exploration personnel to Candelaria, one of the great mining success stories in the corporation's modern history (see chapter 16).

Back in the 1950s and 1960s, when Phelps Dodge was the most integrated of America's Big Three copper producers, most of its metal production not sold on the open market went to its own wire, tube, and cable subsidiaries. By comparison, Anaconda consumed only about one-quarter of its mine output. One result was that whenever demand for red metal dropped, Phelps Dodge had a captive market for its copper. By the 1980s, alas, the gears of production no longer meshed so well, and the earnings of several of its fabricating units declined.

As it entered the 1980s, Phelps Dodge began to divest itself of underperforming assets. In 1980, following a three-month study by Douglas

Yearley, then president of Phelps Dodge Sales Company, and to avoid investing additional capital and realize cash, Phelps Dodge sold its 40 percent stake in CONALCO to Swiss Aluminium for $125 million. Nearly two decades later, Yearley, then chairman, recalled that the corporation had a difficult partner in the Swiss aluminum producers: "Never be a minority partner in a large venture if you want to control your destiny." In all, Phelps Dodge basically broke even on its 1960s and 1970s venture into aluminum—and that was welcome news.[18]

Through the early 1980s, Phelps Dodge made the classic moves a business normally does during a major crisis. It reduced the cost of producing copper by reevaluating and revising engineering and mining plans at each mine and processing facility, tightening control on inventories and receivables, and limiting capital expenditures to projects that offered clear and substantial cost savings. It sold off assets and properties not essential to its core copper business in order to raise the cash it needed to contain its debt and interest costs. In 1982 it also skipped the first of several quarterly dividend payments to its thirty-eight thousand shareholders. It reduced the number of employees, both salaried and hourly paid, and it finally halted production altogether. The lengthy shutdown that began in mid-April 1982 hit production workers especially hard, but no one was exempt from painful cuts. On April 1, 1982, in what was certainly no April Fool's joke, company management announced that beginning the following month it would trim salaries for all nonunion personnel by 4 percent up to $40,000 and by 8 percent for any in excess of that amount and eliminate cost-of-living allowances.

By all those measures and a host of smaller ones, Phelps Dodge achieved major cost reductions and cash savings. Still the corporation lost money until it seemed that there was nothing left to trim but wages and benefits received by its union-represented workers. *Business Week* noted in 1982 that, after contending with the Environmental Protection Agency, "Munroe's next biggest challenge will be to cut labor costs, which now represent more than 40% of production outlays." The magazine predicted that obtaining relief from unions "will be no easy task." That was a classic understatement. Phelps Dodge dealt with some of the toughest, most militant unions in the United States, and trimming even the least of their hard-won gains would likely precipitate a bitter labor-management conflict.[19]

In any public discussion of the ongoing copper crisis, management increasingly took note of the escalating cost of labor during the early 1980s. After all, wages and benefits constituted the largest single operating cost at Phelps Dodge copper mining and processing facilities. The corporation often reminded production workers that between the late 1940s and 1982 the average hourly wage of copper miners in the southwestern United States had increased almost nine times, from slightly less than $1.50 to $13.00 an hour. That was when Chilean mine laborers earned less than one-tenth that amount, yet their products competed head to head with America's in world markets.

It soon became clear that for both sides the flash point was the cost-of-living adjustment (COLA). Unionized workers in the American copper industry first gained COLA during

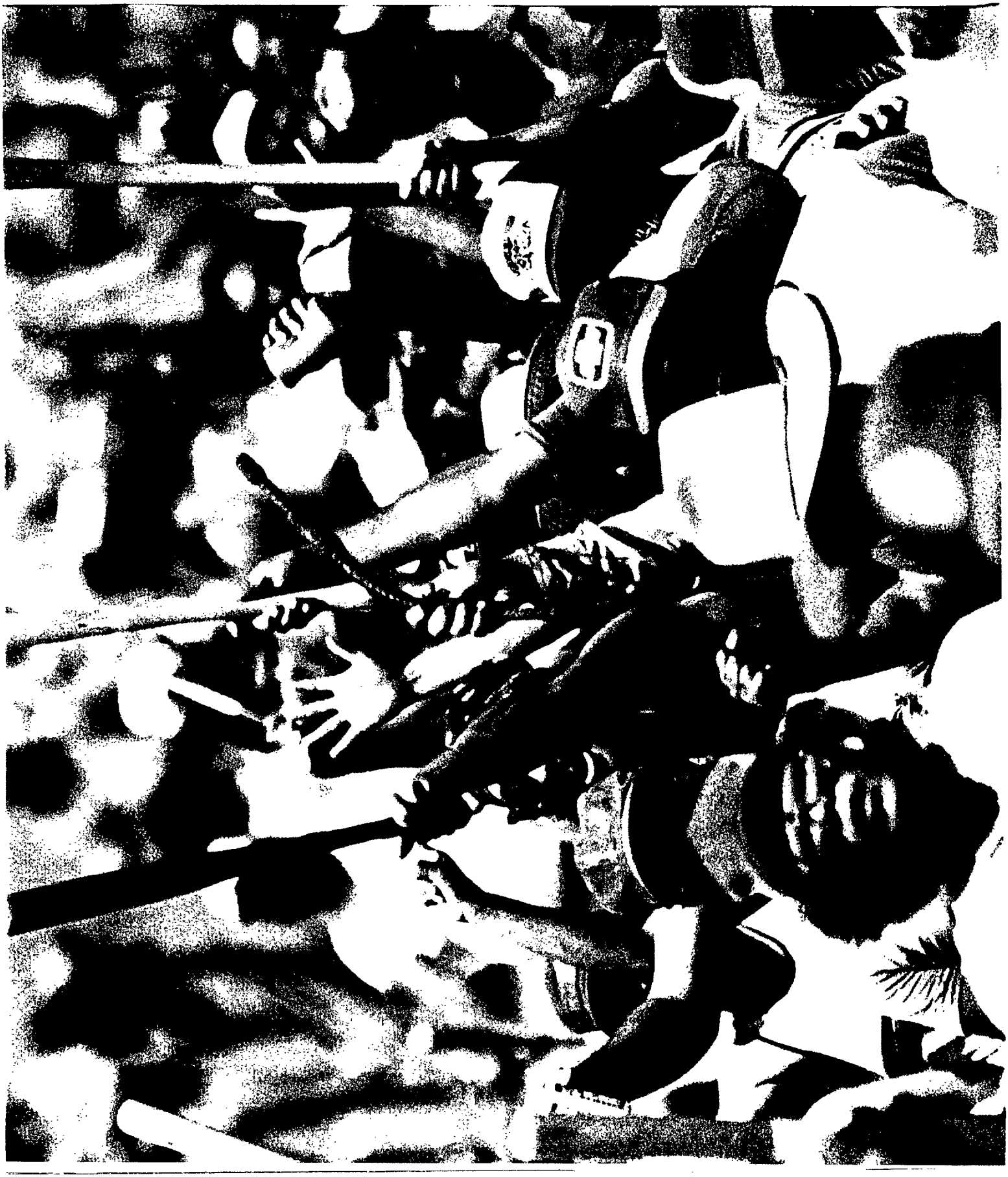
bargaining in 1971. After it went into effect on July 1, 1972, the controversial provision automatically bumped up the basic (non-overtime) wage every three months. Thus in the early 1970s, in addition to the recently acquired encumbrance of long-term debt, Phelps Dodge Corporation shouldered the heavy financial burden of automatic cost-of-living adjustments.

During the runaway inflation of the late 1970s and early 1980s, company managers recognized that the ever-escalating cost of COLA added greatly to the cost of producing copper. Wage rates increased an average of 12 percent a year, while copper prices climbed only an average of 3.5 percent a year. Even worse, when converted into 1982 dollars, copper prices had actually dropped 34 percent since COLA went into effect, but for unions COLA had already become a sacrosanct benefit. Perhaps if the price of copper had risen modestly with the tide of inflation, COLA might have remained a low-profile issue, but in 1982 when the price of copper slumped to a level below what it cost to produce, Phelps Dodge believed that COLA contributed mightily to the economic one-two punch that staggered the corporation. "This kind of relationship simply cannot continue indefinitely," warned Munroe.[20]

One thing that made COLA irksome to Phelps Dodge management was that quarterly adjustments were tied to the Consumer Price Index, two components of which (accounting for more than 25 percent) were medical expenses and home ownership. But a substantial number of Phelps Dodge employees lived in low-rent company housing; the company also provided them with good hospitals and with few exceptions paid the medical bills of employees and their dependents. Yet the program pushed wages higher and higher in every quarter but one. And not just higher: wages escalated at a compounding rate.

To explain to workers Phelps Dodge's growing concern about COLA as well as other matters that contributed to the copper crisis, Munroe, Kinneberg, and Jack Ladd, head of labor relations, visited each major production facility in Arizona and New Mexico during May 1982 when all the mines were shut down. The message was one they would hammer home repeatedly in the year to come. As Kinneberg phrased it: Phelps Dodge wanted to compensate its Western Operations employees well and to "provide the job security we would all like. But we cannot do this if it costs us more to produce our copper than we can sell it for. One of our principal cost problems is that increases in wage rates and COLA have far outpaced increases in our productivity." He warned that an adjustment had to be made, but all attempts to persuade union leaders that COLA presented a problem were unsuccessful. That did not bode well for contract negotiations in 1983.[21]

DURING THE EARLY 1980S, not many things seemed to go right for Phelps Dodge. But punctuating everything and leaving by far the most indelible mark on those who recall the grim times was the bitter strike that erupted in July 1983, mainly over the contentious issue of COLA. Long after many other unhappy events of the early 1980s are forgotten, people will remember the great strike of 1983, often with tears welling up in their eyes.





Chapter Thirteen



HAMMERED *on the* ANVIL *of* ADVERSITY

EARLY ON THE morning of August 19, 1983, residents of Clifton, Arizona, awoke to the sound of helicopters in the dark skies above and of heavy trucks winding down the canyon road that led into their secluded town. A seemingly endless convoy of eighty-seven military vehicles, including armored personnel carriers and one tank retriever, and thirty-three Department of Public Safety vehicles took up positions in the troubled Clifton-Morenci district. The dawning light revealed state police officers dressed in blue helmets and riot gear and specially trained sharpshooters silhouetted on nearby hills. Governor Bruce Babbitt went on statewide television to make clear that he would "do whatever is necessary to prevent violence and uphold the law." He feared that Arizona tottered on the brink of a great tragedy because of rapidly escalating tensions between labor and management at Morenci.[1]

As if the ongoing copper crisis had not already pummeled Phelps Dodge enough, in 1983 it suffered the most bitter strike in its 150-year history, one that a future chairman, Douglas C. Yearley, labeled "a defining event in the corporation's history. No doubt about that." The 1983 strike also ranks

PHOTOGRAPHER MICHAEL GING *captured the angry scene in Morenci on August 9, 1983, that caused Phelps Dodge to agree to a ten-day cooling off period.*

among the biggest and most significant labor disputes in Arizona history. In fact, it is no exaggeration to say that it reshaped the course of labor relations across the entire United States.[2]

The ongoing copper crisis of the 1980s and the 1983 strike were closely related events. Understanding why labor and management ended up confronting one another in a showdown reminiscent of the frontier West requires understanding both the financial troubles of the corporation (discussed in the previous chapter) and several decades of Phelps Dodge labor relations in copper mining and manufacturing. Key individuals are important too. As always, the story of Phelps Dodge Corporation is that of its people, in this case Chairman George Munroe, President Richard Moolick, and the senior vice-president and Western Operations general manager Arthur Kinneberg, three critical players along with several others in the unfolding drama. For them, no less than for Phelps Dodge's production workers, the 1983 strike meant being hammered on the anvil of adversity.

Television and newspaper coverage of events tended to focus public attention on Phelps Dodge spokesmen in Arizona, notably Kinneberg. Rarely did the New York–based leaders Munroe or Moolick appear on the evening news or in print. Throughout the conflict, Moolick remained only a shadowy figure in public consciousness, and that suited him just fine. He much preferred to work behind the scenes. Let protesters march along Park Avenue chanting with their bullhorns, "Hey, hey, ho, ho; George Munroe has got to go," it was Moolick who probably did more than anyone else to define the company's hard-line position. In fact, adamant that Phelps Dodge must not yield to striking unions on the cost-of-living adjustments, he yet feared at times that even his own chairman might compromise on the issue. "I didn't have any anti-union feeling," recalled Munroe, "and I had a lot of sympathy for the strikers, particularly the Mexican-Americans. The union had done a lot for them." He added, "We had to do what we did, but I didn't relish it." As for his assessment of Moolick: "Dick is very bright . . . and strong minded."[3]

Events of 1983 do not suggest any power struggle among top Phelps Dodge executives, but they do highlight, as perhaps nothing else could, fundamental differences in their management styles and personal outlooks. They offer insight into the human dimension that is a fascinating part of any large corporation's history. Moolick, a navy combat pilot in the Central Pacific during World War II, was ready—even eager—to confront organized labor in a knock-down, drag-out fight, to produce copper in defiance of striking unions, to defend a financially ailing Phelps Dodge. Munroe, also a navy combat veteran of the war in the Pacific, was temperamentally less inclined to confrontation and more to promoting collegiality and building consensus. He had no passion to challenge the unions and expose the company and its employees to the inevitable risks that would follow, but in the circumstances Phelps Dodge faced in 1983, he saw no realistic alternative. So, despite differing temperaments and management



ATTIRED IN HARD HATS *are Richard T. Moolick (left), president, and George B. Munroe, chairman of Phelps Dodge Corporation during the savage strike of 1983. Moolick recalled of his experience in the Marshall Islands during World War II: "As a Navy combat pilot you thought you were damn good. You had to have a feeling of immortality." He needed that kind of nerve during the contentious walkout.*

styles, Monroe and Moolick were in agreement on the course Phelps Dodge had to follow.

Kinneberg, a 1945 graduate of the Naval Academy at Annapolis and a solid, handsome man who oversaw Phelps Dodge's Western Operations for the New York–based chairman and president, was effectively caught in the middle. A seasoned executive, he needed to work successfully with both Moolick and Munroe and with top Phelps Dodge personnel in the Southwest, all in addition to responding to spokesmen for organized labor.

Moolick was single-minded in his resolve, so much so that, in early August 1983 when he learned that two Phelps Dodge executives in Arizona agreed to temporarily shut down facilities in strife-torn Morenci and thus appeared to compromise with organized labor, he boarded a flight from New York swearing to "fire all those bastards." His language was rough, the product of a career path that led to New York's Park Avenue by way of the corporation's big mines in Arizona and New Mexico. After graduation from the University of Arizona's School of Mines, Moolick began his career at Phelps Dodge in 1949 at the Morenci Branch. Starting as a junior geologist, he gradually climbed the management ladder. Following a two-year stint in Douglas as assistant general manager of Western Operations, he went to Phelps Dodge headquarters in New York in 1975 as a vice-president.

Moolick was in the East, but certainly not of it. Even in the heart of Manhattan, he made a point "to saunter" along the city's busy streets "like a good westerner" in conscious defiance of New York's never-stop-moving mentality. That strong streak of stubbornness branded him a tough-minded man in an industry known for its rugged ways. He sincerely believed that only his kind of strong medicine could save Phelps Dodge.[4]

Moolick's concerns for the future of the enterprise were well founded. *Business Week* had observed in mid-1982 that Phelps Dodge Corporation had suffered through a "wave of shutdowns, pay cuts, and firings in the last nine months—all reactions to the continuing losses that are anticipated." It added that the entire copper industry "is in dire straits today, because prices have dropped to their lowest level in real terms since the 1920s. But most of the major producers have found shelter in the arms of rich oil companies and can ride out the current storm protected." Independent Phelps Dodge, it

emphasized, "has no security blanket." In Moolick's mind as he flew from New York to Phoenix in August 1983, it was Phelps Dodge against the world—and he was ready to do battle.[5]

Highway to "Heaven in '67"

Relations between Phelps Dodge and its workers had been relatively benign from the end of World War I until the later New Deal years of the 1930s. The corporation's mines, mills, and smelters continued to be nonunionized. Tensions between labor and management surfaced mainly in the fabricating plants of Phelps Dodge Copper Products Corporation, that portion of the enterprise added at the onset of the Great Depression and led for many years by no-nonsense Wylie Brown, a man wholly unafraid to battle tough unions of the greater New York area.

Uncle Sam clamped a lid on labor-management squabbles for the duration of World War II, but the stresses of round-the-clock wartime production when combined with the patriotic desire of Phelps Dodge to avoid a slowdown in production of vital copper and copper products fostered union activity at several of its mine, mill, and smelter facilities. By the time the war ended, Phelps Dodge bargained regularly with many different labor organizations, though the dominant one was the International Union of Mine, Mill and Smelter Workers. That, of course, did not insulate the corporation from the wave of postwar labor unrest that swept through basic industries of the United States, notably coal and steel, during the second half of the 1940s. Most work stoppages at Phelps Dodge were neither particularly lengthy nor especially bitter, except at the Bayway fabricating facility in northern New Jersey, where disputes during the post–World War II years sometimes flashed into violence. One bloody strike there lasted more than seven months.

The 1950s were generally prosperous years for the copper industry, and Phelps Dodge shared what it regarded as a reasonable portion of its prosperity with its unionized workers, not only in the form of wage increases but also in fringe benefits. In 1956, a year of record earnings, the highlight of the era of good feelings was the three-year agreement Phelps Dodge reached with the Mine-Mill union several months before the contract in place was scheduled to expire. Beneath the surface calm, however, significant rumblings were occurring within organized labor. First of all, at contract time all major United States copper producers dealt not just with one union, but with many. Mine-Mill usually got the headlines. As the self-proclaimed successor to the former Western Federation of Miners, it was militant and highly vocal. Both during and after World War II, Mine-Mill had profited from huge gains in membership.

Despite that, the union was not as all-powerful as either its numbers or combative language suggested. Indeed, at Phelps Dodge several smaller but nonetheless robust craft unions affiliated with the conservative American Federation of Labor held representation rights in job areas relating to construction, maintenance, and operation of large mine equipment. In addition, several separate railway brotherhoods

represented employees who hauled the ore by trains in the open-pit mines in Arizona. Mine-Mill leaders recognized that this type of fragmentation diminished the bargaining power of all unions. Accordingly, at Mine-Mill's 1946 annual convention in Denver, union leaders put in place the first part of an ambitious, step-by-step, long-range strategy to negotiate contracts for the entire nonferrous metals industry through a single united labor group, which they hoped the Mine-Mill union would lead.

The road to realization of the union's ambitious 1946 plan, so filled with obstacles in the best of times, grew far more difficult after the Congress of Industrial Organizations (CIO) expelled the Mine-Mill union in February 1950 because of its "consistent, unswerving support of the policies of the Communist Party." To replace the discredited left-wingers, the big labor congress invited the United Steelworkers of America to organize the copper industry. That union, despite its undeniable power, at first attracted few members among mine workers, who remained fiercely loyal to the Mine-Mill union. On the other hand, in the brass mills and other fabricating plants, where the CIO granted the United Auto Workers jurisdiction, raids on Mine-Mill were more successful. With the exception of Kennecott, whose president, Charles R. Cox, had come from the steel business and thus was comfortable dealing with the Steelworkers union, copper management tended to fear United Steelworkers' apparent strength. It thus favored the Mine-Mill union as the lesser of two evils, despite its political tilt to the Left. In any case, through the 1950s, most strikes that resulted from disagreements in the mines were both peaceable and relatively short, at least in comparison with what happened in 1983.

Before labor-management relations reached that historic impasse, however, several other milestones marked the course of organized labor at Phelps Dodge. In early 1967, the old Mine-Mill union was merged into the United Steelworkers of America. The expanded Steelworkers union was eager to flex its newfound muscle by forging a coalition of twenty-six separate unions that by functioning as a single unit would greatly enhance union power in dealing with the copper companies.

In pursuit of that goal the Steelworkers union early in 1967 assembled the National Nonferrous Industry Coordinating Committee, comprising representatives from all unions involved in that year's bargaining with the major copper producers. The unions hungrily eyed the companies' record profits in 1966, when America's four largest copper producers piled up earnings that exceeded $400 million after taxes, and they formulated their bargaining goals accordingly. Included in those goals was a demand for industrywide bargaining, patterned after the arrangement in the steel industry. The unions defined *industrywide* to mean not only copper mines, smelters, and refineries, but also copper fabricating plants and lead and zinc mines and smelters owned by the copper-producing companies. That may have been one reason industry negotiators labeled labor's demands a quest for "Heaven in '67."

Business Week reported in May of 1967 that "the strongest massed force" of unions that had ever confronted the nonferrous employers was warning that "strikes will occur" if the industry

didn't "settle big" in the midyear bargaining. Negotiations stalled as the June 30 contract expiration deadline approached. Workers remained on the job and bargaining continued for two weeks after the contracts expired, but on July 15 some forty-five thousand nonferrous workers from California to New Jersey walked out. For the next eight months, a coalition of twenty-six unions ("a union of unions") shut down most of the nation's copper mines, smelters, and refineries in what was perhaps the longest industrywide strike in United States history and certainly the longest for the copper industry. Yet none of the big copper companies went into the red in 1967, even though their mammoth electric shovels and rotary drills remained silent during almost the entire second half of the year.[6]

Profits at Phelps Dodge plunged 39 percent, from $82 million to $50 million. The lengthy work stoppage idled nearly all of the corporation's mines and related facilities, except for one refinery. There was no violence, however, and at its company stores in Arizona, Phelps Dodge continued to extend credit to striking workers. It even provided them a big Christmas surprise early in December when it announced that it would distribute nearly a million dollars in 1967 accrued vacation pay. The corporation's several fabricating plants, most of them represented by unions other than United Steelworkers, continued business as usual until their contracts expired in early February. As for the ongoing miners' strike, James Beizer, metals analyst for *Iron Age*, an industry trade journal, concluded that Phelps Dodge probably suffered the greatest "shellacking" of the four major producers because, unlike the others, it had no foreign copper production to offset losses in the United States.[7]

The protracted walkout hit local economies hard, but the nation at large scarcely seemed to notice, much to the disappointment of the union coalition. The main reason the extended shutdown had little significant impact was that manufacturers had earlier stockpiled copper in anticipation of a long strike. Only in mid-March 1968, after President Lyndon Johnson and other federal officials increased pressure on copper companies and striking unions to resolve their eight-month dispute, did Phelps Dodge reach a settlement for all its struck properties. It agreed to raise wages of its Arizona mining employees an average of 5.2 percent a year over the life of the new three-year contract. Given the rate of inflation at the time and the high cost to workers of a strike that had dragged on for so long, the union coalition had not won an impressive victory. One publication concluded that the workers involved had forfeited an average of $5,200 apiece in wage income, a sum that, because of the settlement's modest gains, would take them more than twenty years to recover.

After failing in their grand quest for industrywide negotiations and settlements, unions retreated during the next round in 1971 to much narrower goals limited to copper mining, smelting, and refining. United Steelworkers was used to dealing with the steel industry, but American copper companies were much more subject to the ups and downs of the world commodity market than were steel companies. Further, in the copper industry, unlike the steel industry, each company negotiated with its

unions separately because each had substantially different costs and operating circumstances.

Thus, union strategy as it evolved during and after the 1967 bargaining was for the union coalition to hammer out a settlement with the company it regarded as being willing to come closest to meeting labor's terms. Once it had that first agreement in hand, the union coalition would then demand that other copper companies agree to settlements incorporating all the major features of the initial "pattern" settlement. The coalition would strike any holdout company. Displaying little flexibility in tailoring settlements to conditions peculiar to an individual producer, the unions would hold firm until all the companies eventually fell into line.

That was one major cycle of behavior, but there were others that developed in America's copper industry as well. Every three years from 1968 to 1983, negotiations resulted in an impasse followed by a strike. "A strike is never pleasant and I personally wish that we at Phelps Dodge never had to experience such interruptions of our normal routine," lamented Kinneberg in late 1980, a year marred by another long strike at the corporation's Arizona properties.[8]

By then, something of a ritual had developed between labor and management. Union workers treated the work stoppages as extra vacation time; they were confident that their jobs would be waiting for them when negotiators finally resolved the dispute. In fact, the corporation invariably sustained strikers through the lean days of the strike by continuing to extend them credit at Phelps Dodge Mercantile stores and by deferring rent on company-owned housing. During down times, Phelps Dodge routinely hired outside construction workers to make major repairs to its facilities, and at the El Paso refinery it was often the strikers themselves who did routine maintenance work to ensure that the plant would be ready to resume production once they signed a new contract. After the 1983 strike, one man in El Paso remembered negotiations in years past when the price of copper was good: "You could ask for anything and they would give it to you." At one point the unions gained a holiday celebrating the birthday of Lee Trevino, the acclaimed Texas-born, Mexican American professional golfer, because they already had off all popularly recognized holidays.[9]

Though the basic mode of contract negotiations followed by strikes had not changed since 1967, something that influenced corporate attitudes had. Back when strikers idled America's copper industry for more than eight months—from July 15, 1967, to March 19, 1968, at Phelps Dodge—most of the companies had little or no long-term debt. Phelps Dodge could easily afford to let its copper-producing facilities sit idle and hope that curtailed production would push up the market price for copper. The corporation also continued to pay dividends. But by the late 1970s, America's largest copper producers had heavy debts that required payments, and hence they needed regular cash flow. If workers struck and halted production for long periods of time, the companies still had to pay the interest on their debts. Factor into that simple equation the multimillion-dollar losses that Phelps Dodge suffered in 1982 and early 1983, and it is not surprising that the strike of 1983 did not follow the long-established ritual.

No longer was Phelps Dodge willing or able to wait out a lengthy strike. Yet given the troubled times in America's copper industry and Phelps Dodge's new gospel of efficiency, there was greater need than ever before for speedy and peaceable resolution. At issue for Phelps Dodge management was nothing less than the long-term survival of the corporation—not to mention the thousands of jobs it provided.

Hard Times and Hardening Positions

From the time Phelps Dodge temporarily suspended copper production in April 1982 until the end of June 1983, when labor contracts at its Arizona mines and El Paso refinery expired, the corporation's campaign for greater efficiency had resulted in a reduction of more than 10 percent in the cost of producing copper. But Phelps Dodge had to leave untouched the largest single element of its production costs, the wages and benefits of its union-represented employees, because those items were established by the existing labor agreements and could not be changed until those contracts expired. Nonetheless, in their public presentations during the preceding two years, Munroe and his lieutenants had left no doubt that the company was determined to address the issue of wages and benefits in the 1983 bargaining.

The typical Phelps Dodge miner in 1983 earned more than $26,000 a year, received another $10,500 in benefits, and lived in a three-bedroom house rented from the company for as low as $50 a month. For more than half a century, residents of the company's mining towns had regarded Phelps Dodge as something of a Santa Claus. Besides providing them high-paying jobs, it supplied carpenters and painters to maintain their low-rent company houses. Even disregarding the benefit of subsidized housing, a Phelps Dodge miner earned about 50 percent more than the average manufacturing worker in the United States.

Early in 1983, President Moolick met with top officials of other American copper companies to discuss their respective views of the forthcoming negotiations. While all the industry leaders agreed about the need for labor cost relief, there was no consensus on whether they might look to the unions for help. Divisions of opinion ran unusually deep on the issue of negotiating changes in the cost-of-living adjustment (COLA). Moolick declared that future COLA increases must be ended, and he urged copper producers to achieve that goal by standing united on the issue. However, many of his fellow executives were concerned that any attempt to eliminate or modify COLA would surely cause a bruising confrontation with the unions, one that the companies might well lose in the end.

In mid-April 1983, a full ten weeks prior to the scheduled expiration of the labor contracts of the major producers, and before Phelps Dodge had held its first bargaining meeting with the unions, Kennecott and its unions announced that they had reached a settlement. The agreement called for wages to be frozen for the three-year term of the contracts and provided Kennecott a modicum of additional relief in areas where its benefits exceeded those of the other copper companies. Significantly, Kennecott's settlement

provided for continuation of COLA unchanged in any respect.

Because of the prevailing ritual of labor relations in nonferrous metals—and because Phelps Dodge did not have access to the money-laden pockets of a major oil company, as Kennecott did with Standard of Ohio, Anaconda with Atlantic Richfield, Cyprus with Standard of Indiana, and Duval Corporation with Pennzoil—Phelps Dodge executives concluded after analyzing the Kennecott settlement that they had only three choices in 1983. First, they could avoid a strike by accepting the pattern settlement, including continuation of COLA. Second, they could decline to duplicate the so-called pattern, take a strike, and shut down mining and related operations until the dispute ended. That was what Phelps Dodge had done previously. From the perspective of Munroe, Moolick, and other top executives, for them to agree to a Kennecott-style settlement meant "slow death" for Phelps Dodge, while to shut down because of a strike meant "rapid death."

A third option was to take a strike and continue to produce copper. Exactly where that road might lead was anybody's guess. There was no modern precedent for it within the copper industry. Recalled Kinneberg: "It was a difficult decision, but one that Phelps Dodge had to make. To close down on the heels of a $78 million loss over the previous 18 months would have been suicidal. It also would have been devastating to agree to another imprudent labor settlement that would have added tens of millions of dollars to Phelps Dodge's cost of producing copper over the next three years."[10]

Prestrike negotiations for Phelps Dodge's Arizona mining operations began in Phoenix in early May. From the outset the union spokesmen took the position that the Kennecott settlement had established the pattern that Phelps Dodge and all of the other companies would be required to duplicate without meaningful variance. For its part, Phelps Dodge repeatedly pointed out to the union negotiators that in order for the company to have a chance of surviving in the intensely competitive world copper industry it needed to contain, or even reduce, the labor component of the cost of producing copper. Jack Ladd, Phelps Dodge's director of labor relations and chief spokesman in the negotiations, said that part of that goal might be accomplished by improving worker efficiency, such as by combining jobs and removing arbitrary barriers to the use of employees. But he made it clear that such measures would not be sufficient. In particular, he stressed that the inexorable increase in wage costs caused by COLA had to be halted. Ladd informed his union counterparts, "This year it's going to be different. We're going to keep working." They dismissed the warning.[11]

On June 13, two and a half weeks before the old contract expired, Ladd suffered a serious accident, and vice president Matthew P. ("Pat") Scanlon took his place at the bargaining table. "Pat had all the 'fun' at Morenci," recalled Ladd, tongue in cheek, of the tense confrontation that erupted there the following August after a month of relative calm. As the deadline approached, Scanlon gave the union negotiating committee Phelps Dodge's "final" economic offer. It called for no wage reductions for employees already on the payroll, and only a few cutbacks in benefits, such as transferring to employees some of the

costs of medical care. It also called for rolling existing COLA into wages and making the increase permanent. In return, Phelps Dodge proposed that there be no future cost-of-living adjustments and that a schedule of lower wage rates be applicable to new hires.[12]

The two sides stood miles apart. From the unions' perspective, Phelps Dodge's proposal struck at the hard-won principle of pattern bargaining. As a consequence they gave it little serious consideration, though management repeatedly warned that the corporation intended to work through any strike. Perhaps the unions thought Phelps Dodge was bluffing. Besides, the union coalition was supremely confident: Since its formation in 1967, it had used its hard-line strategy five times without a single defeat. In Phelps Dodge's eyes, on the contrary, the company's offer was a fair one under the circumstances, but union leaders had locked themselves into pattern bargaining; further, labor's behavior seemed to be dictated in part by internal union politics, by a contest for the presidency of the Steelworkers union.

As the end of June approached, three of the major American copper producers—Magma Copper Company, American Smelting and Refining (ASARCO), and Phelps Dodge—were still refusing to match the Kennecott settlement. Magma agreed to meet the pattern on June 29. Late the following day the Federal Mediation Service arranged a meeting between Frank McKee and Robert Petris, representing the union coalition, and John F. Boland, Jr. (a senior partner of the Evans, Kitchel and Jenckes law firm in Phoenix), and Scanlon, for Phelps Dodge. Neither side budged from its prior position. Once again, Phelps Dodge insisted that it intended to operate its facilities during any strike. That night, just half an hour before the midnight deadline, one more producer, ASARCO, capitulated. Now Phelps Dodge stood alone.

The Great Strike of 1983

When July 1 began, the midnight shift failed to appear, and picket lines went up as some twenty-five hundred members of thirteen separate unions struck Phelps Dodge facilities at El Paso, Morenci, Douglas, Ajo, and Bisbee. Tyrone's employees were on a different contract cycle and thus they remained at work, as did Hidalgo smelter workers, who had never unionized. Coincidentally, that same day the *Wall Street Journal* reported that employees at the United Steelworkers of America's headquarters in Pittsburgh went on strike to demand a 10 percent wage increase.

Moolick was in Phoenix, and after consulting with Kinneberg he ordered immediate implementation of Phelps Dodge's previously formulated plans to work despite the walkout—and despite the unions' reputation for invincibility. At its five struck properties, the corporation put into place the wage-and-benefit package it earlier had offered the union committee, and it continued producing copper as best it could. About fifty union-represented workers crossed picket lines that first day.

In operating its plants in defiance of union strikers, Phelps Dodge employed a tactic used infrequently by the managements of large American companies during the decades after

World War II, although it gained respectability in business circles after President Ronald Reagan replaced unionized air traffic controllers who went on strike in 1981. To say the least, what Phelps Dodge did was highly controversial and generated much criticism, and not from union spokesmen alone. "I was ridiculed by the industry for even trying to buck [the unions]—they said it couldn't be done," recalled Moolick.[13]

One opinion voiced by some outside observers was that the 1983 strike represented a failure of communication, but that claim was groundless because Phelps Dodge repeatedly stated exactly what it intended to do in the event of a strike. Another claim made both during and after the strike was that the corporation's underlying purpose was not to seek a settlement, or even relief from labor costs, but to engage in old-fashioned union busting. There prevailed a "warlike atmosphere," observed Alex Q. Lopez, the chief union negotiator. "Every time the company does something, we suspect there must be a dark and devious reason for it."[14]

Contrary to labor's assertions, neither Moolick nor any other Phelps Dodge leader set out to break the unions, as a close reading of unfolding events will prove. Besides, the nation's copper industry was virtually 100 percent unionized, and every facility of Phelps Dodge was unionized except for the Hidalgo smelter in New Mexico and the Norwich Rod and Wire Plant in Connecticut.

Munroe emphasized back in 1982 that "our battle is not with the principle of unionism" but with socialized foreign competition subsidized by international lending agencies. For most people that was a fairly esoteric distinction. It was hard for Phelps Dodge's cold economic logic to counter fiery gut-level passions stirred by the unions' campaign of intimidation and misinformation. "I went to each of the operations in the West last spring," Munroe later recalled in the *Arizona Republic*. "I held open meetings there with our employees. I tried to explain why we had to take certain steps." But he came away disappointed. "The turnouts were smaller than I had hoped for. One reason for that was the unions. They told the workers that the union leaders would go to the meetings and listen for them."[15]

Midway through the first half of 1983, about when Munroe sought to explain Phelps Dodge's position to its employees, Moolick instructed Kinneberg to have the managers of branch operations prepare to keep producing copper should their unionized workers walk out. With that goal in mind they carefully estimated their available workforces and worked out production schedules, they trained supervisors and other nonunion personnel to operate production equipment, and they made security arrangements to control entry to the plants. They also prepared for the grim possibility of union violence to lives and property, and they had applications for temporary restraining orders drafted in case the pickets got out of hand and threatened to destroy civil order.[16]

Back in late 1980, Kinneberg had stated that "the 'union' and the 'company' are not objects—they are people." Certainly that was never more vividly illustrated than in the grim confrontation of 1983, when "the company" was personified by Munroe, Moolick, and Kinneberg, but not just those three alone. There was, for example, Pat

Scanlon, who was in Palo Alto, California, attending his daughter's graduation from Stanford when he received a telephone call from Kinneberg, who said, "Ladd just fell off his windmill and broke his back. You've got to take over negotiations." Though he had not been actively involved at the bargaining table for more than ten years, when he was chief negotiator for Western Operations, Scanlon caught a flight to Phoenix the next day. A corporation vice-president at that time, he took over until Ladd returned to work in early August in a wheelchair.[17]

Moolick's counterpart in the Steelworkers union was Frank S. McKee, who had served as chief negotiator for the labor coalition since 1974. When it came to personifying such words as *tough*, *abrasive*, *irascible*, and *confrontational*, McKee and Moolick were more alike than either man would admit, both having been early graduates of the school of hard knocks. Moolick recalled three meetings with McKee: "One was in Phoenix at the insistence of federal mediators. In that meeting we discussed golf, because Frank had recently been on the famous Saint Andrews links in Scotland." They held two more meetings in secrecy at a small French restaurant on 57th Street in New York City. "They were arranged by a prominent New York City lawyer—and guess what we discussed—golf." Moolick recalled that "I never even asked him what his handicap was." All three face-to-face encounters were unproductive because neither man budged, but added Moolick with no hint of guile, "I liked the guy."[18]

McKee's union activities dated from 1940 when he was hired at the same Bethlehem Steel plant in Seattle where his father had worked for thirty years. In time the younger McKee became director of District 38 of United Steelworkers on the Pacific Slope. Still later he advanced to secretary-treasurer of the national organization, while continuing to serve as chief negotiator in copper. As a bargainer, McKee early won a reputation as intelligent, resolute, and unyielding, three traits that produced handsome returns for unions during the first years of his tenure but resulted in disaster in 1983.

Of course McKee and his associates were fully aware of the economic distress of the copper industry, for they had watched a long procession of layoffs and closures during the preceding two years. But they saw absolutely no benefit to their members from union concessions to the copper employers. They felt that any special favors for struggling companies would only undermine the entire wage structure of the industry without benefit to overall employment. Why sacrifice a uniform system of wages and benefits that had been built up brick by brick through a series of hard strikes over a long period of time? To Scanlon, on the other hand, the union's bargaining position was primarily political, while Phelps Dodge's was primarily economic. He believed it would have been impossible for McKee to allow Phelps Dodge a more favorable settlement than Kennecott had signed earlier because McKee was in effect campaigning as a tough-as-nails candidate to succeed Lloyd McBride as head of the Steelworkers union.

When the strike began, Phelps Dodge continued to produce copper by scheduling two twelve-hour shifts per day to operate the mines and plants around the clock, seven days a week. The corporation initially cobbled together crews

composed of supervisors and other nonunion employees from the struck locations, and union-represented employees who either had been on layoff or who refused to go on strike. Management personnel recruited from Phelps Dodge's nonmining operations and from its headquarters in New York augmented those crews. Secretaries drove huge haulage trucks at Morenci, and New York executives stored their stylish suits and donned work clothes suitable to the heat and grit of the smelters and the El Paso refinery. Two women from the refinery office worked on the loading dock stacking heavy copper cathodes aboard boxcars. Despite the activity in the plant, union spokesmen claimed that the refinery was not actually producing any copper but rather was running the same loaded train around and around to create the illusion of production.

One Park Avenue executive who helped maintain production at Morenci was young Steve Whisler, then age twenty-eight, who earlier had come east to Phelps Dodge headquarters from Western Nuclear in Denver. At the start of 1983 he was serving as assistant corporate secretary and legal counsel to the exploration division. In response to Moolick's call he volunteered for duty in Morenci, a place he had never seen before, but where he remained from early July until the end of September. For twelve hours each day he did a variety of jobs, including changing tires on haulage trucks and pulling hot slabs of copper off the anode wheel. That was a tense time, and having to run the picket-line gauntlet at each shift change "wasn't a very pleasant experience," recalled the future president of Phelps Dodge Corporation with a generous measure of understatement. Another New Yorker who went west to help produce copper was Renny D. Warren, the corporation's treasurer, who worked in the El Paso refinery as a "hot sheet" man.[19]

Also coming temporarily to the Southwest was Jack Coulter, a Phelps Dodge vice-president. He was a former special agent for the Federal Bureau of Investigation who had learned labor relations as an attorney for Phelps Dodge Copper Products Company. Coulter was a ubiquitous presence whom some Phelps Dodge officials in Western Operations feared as "Moolick's Mole," a man sent out from New York to spy on them. Although Coulter did report directly and usually daily to Moolick, he was one of numerous executives who headed west to help during a very difficult time.

In the early days of the strike, Phelps Dodge sought repeatedly to persuade its regular employees to come back to work. During the first five weeks of the strike it sent out sixteen appeals, some of them written by Chairman Munroe himself. Union leaders were just as assiduous in trying to rally their members to stand firm. "Picket Lines Solid as PD's Back to Work *Fizzles*" read one headline in the *Phelps Dodge Workers Strike Bulletin 1983* at Morenci for July 6. "Eastern copper barons are once again trying to force their will on working people." McKee claimed that Phelps Dodge had hired "1983-Pinkertons" in an attempt to "bust the unions and impose its will on the workers." The same issue of the union paper contained a sidebar headlined "66th Anniversary of Bisbee Deportation." It included the words, "Historians agree that the Bisbee deportation that affected innocent men stemmed from the demand of the

copper companies for greater profits." The *Strike Bulletin* also called the Bisbee deportation "clearly a lesson that must not be forgotten." But just as clearly the union had forgotten its highly charged World War I context.[20]

The *Strike Bulletin* for July 18, 1983, featured a poem attributed to the popular American author Jack London. Its opening words were, "After God had finished the rattlesnake, the toad, the vampire, He had some awful substance left with which He made a scab." When Phelps Dodge offered a $25,000 reward for information on damage caused at the Mercantile in Ajo, each company poster was matched by an anonymous reprint of the full London diatribe under a banner headline that purported to offer "A $25,000.00 Reward for the Disappearance of a Scab." Police investigated but never made any arrests.[21]

The unions' heavy-handed tactics and uncompromising stance alienated some of their own members and split the ranks of strikers. Eventually, about two-fifths of the union members returned to work. The bitter tug-of-war was especially hard on the many Hispanic employees of Phelps Dodge. In remote mining towns in Arizona, the meaning of union was associated with family heritage, ethnic pride, and years of struggle. Some unions, although not all, had fought

One of a series of *advertisements that Phelps Dodge published in newspapers throughout Arizona to help the public better understand the facts underlying the 1983 strike and the package of wages and benefits the corporation offered its workers. Phelps Dodge believed that the advertisements had an important positive influence on public opinion.*

WOULD YOU LIKE THIS JOB?

Average Annual Wage	$26,200
Benefits	
Medical	
Vacation	
Paid Holidays	
Pension	10,500
Compensation Insurance	
Group Insurance	
Dental	
Vision Care	
Disability and other benefits	
Total Wage & Benefits	$36,700

A Phelps Dodge job is one of the best around. A Phelps Dodge miner in Arizona earns more than most teachers, construction workers, policemen, firemen, government workers, transportation and utility employees, farm workers, nurses and service industry workers. In fact, the wage rate of the average Phelps Dodge miner is more than 50 percent higher than that of the average worker in the manufacturing industry in the United States.

We are offering our present employees one of the best wage and benefits packages around. But we must discontinue automatic cost-of-living adjustments, make modest reductions in our generous benefits package and offer somewhat lower wages to new employees. The more than 800 union-represented employees who have been working since the strike began agree that a Phelps Dodge job is one worth keeping. We urge all of our employees to join us in building a sound and secure future.

PHELPS DODGE – MEETING TODAY THE CHALLENGE FOR A BETTER TOMORROW

phelps dodge Corporation

various forms of racial and ethnic discrimination since their inception, and that was a primary reason Mexican Americans in mining had signed up. Many were very loyal to organized labor because they believed their unions had made them first-class citizens. The 1983 strike thus sharply divided the mining and smelting communities involved, often pitting brother against brother and neighbor against neighbor.

Many second- and third-generation Phelps Dodge employees had never worked for anyone else, and some of them considered subsidized housing, medical care, and numerous other fringe benefits to be entitlements. Without question, employment in a Phelps Dodge town meant more than a job. "It was a way of life," emphasized Leonard R. Judd, a onetime member of the hod carriers union, who served as president and chief operating officer of Phelps Dodge Corporation from 1989 to 1991. "If you lose a job in Morenci, you lose a company house, you will move, your whole lifestyle changes. A move to the city meant no more hunting and fishing."[22]

"The unions led them into an unrealistic position that was damaging to people once they were not working for Phelps Dodge," added Munroe. Of course, unions will dispute any assertion by management to that effect, but there was simply no arguing the fact that some of the workers who eventually crossed picket lines had formerly been loyal union members who concluded that labor intransigence would cost them their jobs. That was one reason tensions mounted with each passing day. Said one worker who crossed the picket line to feed his three children, "I'm happy—except at 6 o'clock when they yell at me." And yell the pickets did, lining both sides of the highway as one caravan of cars headed in the plant gates as another one drove out. Their message was always the same: "Scab, scab, —— you, scabby-boy! You're a ——ing scab!" With stony faces staring straight ahead, non-striking workers had to listen as a protester publicly announced their names with a bullhorn. Deputy sheriffs and Department of Public Safety officers silently watched the twice-daily ordeal from positions nearby.[23]

In response to the ongoing harassment, Phelps Dodge issued "Procedures for Crossing a Picket Line" that advised non-striking employees to approach and cross cautiously in an automobile, at a slow rate of speed, with windows rolled up and doors locked, and to avoid any conversation with pickets. Above all, "Do not carry anything in the vehicle which may be perceived to be a weapon."[24]

Phelps Dodge obtained court orders, which were routinely ignored, limiting the number of pickets outside each of its Arizona facilities. Further, the state highway department built a berm along roads leading into the Morenci complex in an unsuccessful attempt to prevent anyone from parking near Phelps Dodge property. Greenlee County supervisors imposed a 9 P.M.–to–6 A.M. curfew, but members of the Clifton City Council, which was pro-striker, instructed city police not to enforce it. At first most pickets seemed satisfied simply to vent their rage on nonstriking workers by denouncing them as scabs or by making obscene gestures, even the women and children. One striker's wife displayed her babe in arms with its middle fingers specially taped to form an obscene gesture. Moolick assigned men to preserve everything on video, as

had been company policy from the time the new technology came into vogue in the early 1970s. Phelps Dodge security people didn't carry firearms, only cameras, which in later legal proceedings proved far more effective than any weapons.

Along with mass picketing came growing resort to illegal activity by hard-core strikers, their families, and outside agitators. Since it was against the law for strikers to threaten publicly those who chose to work (although many of them did so anyway), apparently some of them did it anonymously over the phone. Six thugs with baseball bats beat in one worker's car and broke his house windows. A striker surreptitiously scattered roofing nails along the road taken by buses that ferried employees to work at Morenci. Sheriff's deputies, after picking up the nails, went to the local hardware store to ask the proprietor if he remembered anyone making a large purchase of roofing nails. "Yes, just yesterday," he replied. Did he know the purchaser? "No, I don't. But wait—he paid for them with his credit card!" At about that time Governor Bruce Babbitt ordered extra Department of Public Safety officers to the Clifton area to maintain order, though strikers claimed that the officers acted like Phelps Dodge guards and seemed more interested in protecting strikebreakers than in keeping the peace.[25]

At the El Paso refinery, city police maintained order and prevented most picket-line violence. Early public support for strikers diminished after local newspapers reported how much more strikers earned than the typical worker in that border metropolis and after a feature story detailed how strikers in mid-August viciously attacked a police dog named JoJo with steel rebar, two-by-fours, and baseball bats. So severely injured was the six-year-old German shepherd that he was never able to return to work. One striker who beat JoJo was fined $200, the maximum penalty for injury to a police dog.

In remote Ajo on the night of July 27 someone fired a gun at the home of Keith Tallant. The .22-caliber bullet passed through two walls and a fragment lodged in the brain of Tallant's sleeping three-year-old daughter, Chandra. Her father had been among the first workers to cross the picket line, and thereafter his family suffered incessant public harassment and threatening phone calls. The unions denied all responsibility, but in the wake of Chandra's shooting, Arizona's major daily newspapers published vehement antiunion editorials, and most of them blamed the tragedy on the inhumanity of the strikers. Phelps Dodge offered a $100,000 reward for the apprehension and conviction of the person or persons who shot Chandra Tallant.

There was growing concern that violence would continue to escalate in the isolated mining communities where there was no substantial law force apart from local sheriff's deputies and scattered officers of Arizona's Department of Public Safety. Said one replacement worker, "It's hard to sleep—I wake up at every noise. I have to leave my wife there; I taught her to shoot the gun, and that's all I can do." No one was quite certain how the strike would end.[26]

The shooting of little Chandra Tallant gave Governor Babbitt the rationale he needed to step up civil protection in strife-torn areas. After visiting the convalescing child at her hospital bed in Phoenix, he promised her mother that he

would take action to prevent additional injuries or death, a point he made clear also to AFL-CIO officials who later questioned his response. Chandra survived, although her 25-year-old father died a short time later in an automobile accident when his car mysteriously ran off the road. Even as Tallant's coffin left the church, a noisy group of strikers kept yelling "scab!" Police investigators concluded that the young man was not the victim of foul play.

From the beginning of the strike, people on both sides of the dispute wondered whether Phelps Dodge's salaried personnel, its assorted supervisors, engineers, geologists, metallurgists, clerks, and typists, working together with a small but ever-growing cadre of union employees, could actually produce significant quantities of copper. The company reported that Ajo output for the month of July was 10 percent above the normal, nonstrike budgeted goal; Morenci mine production was 88 percent of capacity; and combined production in July for all Phelps Dodge copper smelters was 72 percent of projection.

The unions charged that Phelps Dodge was running Morenci without proper maintenance, but the corporation claimed it could train anybody to do two-thirds of the jobs in an open-pit mine in two weeks. What it could not do was keep its workers from growing tired. By early August the demanding production schedule left its Morenci force of some nine hundred men and women close to exhaustion. That was one reason Phelps Dodge stepped up its appeals to striking workers to return to their jobs.

Simon Peru, a shovel-and-drill repairman and crane operator at Morenci, stayed out five weeks. It was only when union officials advised him that he was ineligible to receive strike benefits because he had some money in the bank that he got angry and returned to work. He concluded that the Machinists union had been quick to take his dues but slow to provide benefits, even a few dollars to pay his utility bills. He joined the rising chorus of those who concluded that "we were wrong" to strike.[27]

On August 5, about five weeks after the strike began, Phelps Dodge announced that it intended to hire new employees to fill out its complement of workers at the struck facilities. The decision to replace permanently all strikers who chose not to return to work proved to be a major turning point in the dispute. The potential for a truly bloody confrontation, which had been present from the start of the walkout, now began to escalate ominously. Pickets used bullhorns to shout their threats and obscenities. There were open threats to kill nonstrikers and their families, to seize the plants, and to evict or kill those working inside. At the same time it appeared increasingly obvious to Phelps Dodge that sheriff's deputies and local courts were either unable or unwilling to maintain civil order in Morenci, Douglas, and Ajo.

Stepping Back from the Precipice of Violence

Intimidation and acts of violence increased alarmingly in the Morenci area. An automobile caravan of more than a hundred militants threw rocks through the windows of non-striking workers' homes in the adjoining

town of Clifton. On Monday, August 8, the Greenlee County sheriff, Robert Gomez, asked Governor Babbitt for a contingent of National Guard troops because of the mounting commotion and highly vocal threats of violence outside the entrance to the Morenci mine and plant. Later that afternoon, the intimations of disaster caused Babbitt to fly to Clifton. He landed in a thunderstorm both literally and figuratively. In the county courthouse he shuttled back and forth between labor representatives in one room and management in another. His message to each side was to take one step back from the "precipice of violence."

After several hours of discussion, Scanlon for Phelps Dodge agreed to a ten-day freeze on hiring replacement workers; the union leaders committed to attempting to control the mobs at the mine and plant gates and to secure free and safe access to persons working therein; and both sides promised to return to the bargaining table under the auspices of the Federal Mediation Service. Early the following morning Babbitt flew back to Phoenix, where later that day he reported the substance of the agreement to television viewers. The governor stressed to listeners that Phelps Dodge was "a company that by any measure is up against the wall," and he deplored the "continuing violence and intimidation" by strikers in Morenci.[28]

On Tuesday morning, August 9, almost as Governor Babbitt spoke, Scanlon, the Morenci Branch manager, John Bolles, and a few other Phelps Dodge representatives were in the administration building a quarter mile from the main plant gates at Morenci. From inside the building they could hear the roar of an angry crowd composed of as many as two thousand strikers and supporters who had massed outside the gates. Many carried baseball bats, clubs, chains, and similar weapons. Guns could be seen in a number of the vehicles parked alongside U.S. Route 666. At approximately 9:30 A.M. the top Department of Public Safety officers on site came to the administration building and advised the company representatives that an assault by the mob appeared imminent. Major Ernie Johnson, in command of the force of approximately 130 Department of Public Safety officers guarding the company's property, said that he doubted that his men could repulse a charge by the armed mob. "We'll take a lot of them with us," he said, "but eventually they'll get us and they'll get through."[29]

At about 10:00 A.M., international and local



The 1983 strike was perceived by many nonunion observers as anything but a David and Goliath contest between powerful Phelps Dodge and weak organized labor, as this Steve Benson cartoon illustrates. The image from Phoenix's Arizona Republic *captures well the problems replacement workers faced when they crossed union picket lines. In all, from the end of June 1983 until the end of April 1984, Phelps Dodge's "Log of Incidents Reported" detailed more than a thousand cases of harassment and vandalism in the Morenci area alone.*

union representatives arrived to warn Scanlon, Bolles, and the others that they had lost control of their own people, some of whom had remained up all night drinking. The union leaders stated that they spoke not on behalf of the unions but only as bearers of a message from the mob leaders. The message was that if Phelps Dodge didn't shut its Morenci facilities down by that noon for a period of ten days, "they will go into the plant, mine, and administration building and drag everyone out and if that means killing them, they will kill them." Armed strikers in automobiles were keeping in radio contact with mob leaders, the spokesmen warned; if the mob stormed the gates the automobile squads would go to the homes of employees who were working and kill their spouses and children. People on both sides talked of a "blood bath."[10]

Scanlon, who graduated from high school in the old coal camp of Dawson, where his father was office manager of the local Phelps Dodge Mercantile, and who attended Harvard University on a scholarship, later recalled that moment with unusual clarity—and he chose his words carefully: "I was scared shitless." He knew all too well that the mob was perfectly capable of carrying out its death threats, that many lives might be lost that day.[11]

Neither Scanlon nor Bolles had any previous experience with a situation this desperate, and they did not want to risk causing the loss of lives. Scanlon sought to reach Moolick in New York by telephone but was unable to do so. He then called Kinneberg in Phoenix, who at that moment was on his way to a meeting with Governor Babbitt, who had returned earlier that morning from his mediation efforts in Clifton.

Kinneberg, like Moolick, had worked up the ranks of the mining industry and along the way gained considerable practical experience. Starting in 1948 at Kennecott's open-pit copper mine in McGill, Nevada, he moved on to Chile, where he spent seven years working in smelter operations. As an executive at Phelps Dodge, he was tough, as was the popular reputation of mining men, but without being abrasive. That was one asset in his favor when he met with Governor Babbitt. But before they could talk together, Kinneberg received an urgent message to return immediately to his office.

Scanlon and Bolles were on the phone from Morenci, and both men urged a shutdown of operations there at noon—or people would be killed. Kinneberg could tell over the phone that tensions were rapidly rising in Morenci, a fact Jack Coulter listening in on the speaker phone in Phoenix confirmed. Kinneberg asked for a few minutes' time. With Moolick still out of his office, apparently Kinneberg and Scanlon reached Munroe in New York at nearly the same moment, about 10:30 A.M. Arizona time. When Scanlon described the circumstances to him, Munroe said, "You're there, you can best judge the situation, you make the decision." To Kinneberg a few moments later, Munroe responded to the idea of a shutdown in the face of threatened mob violence with the words, "You've got to do it."[12]

Scanlon, with support from Kinneberg, hastily typed a memo stating that the facility would be shut down for a ten-day "cooling-off period." At approximately fifteen minutes before noon the union representatives left the administration building with copies of the memo to be distributed to the mob and read to them

over a bullhorn. Workers inside began shutting down the plant. Strikers thought they had won a big victory.[33]

When Moolick learned of the ten-day suspension of operations at Morenci he was enraged, and the next morning when he boarded a plane for Arizona he fully intended to fire Scanlon, Bolles, and even Kinneberg "if he stuck his head around the door." The latter threat was probably pure bluster, but it showed how angry Moolick was. Scanlon's hands visibly shook and his voice quavered when he met him at Phoenix's Sky Harbor Airport, as both men recollected. "He was convinced that people would have been killed without the shutdown," observed Moolick. "I told him he was frightened by Steelworker rhetoric." It wasn't the rhetoric that scared Scanlon, he later recalled, but what he knew had nearly happened—or what might yet happen—in Morenci. He was scared too for managers who would bear the brunt of Moolick's wrath.[34]

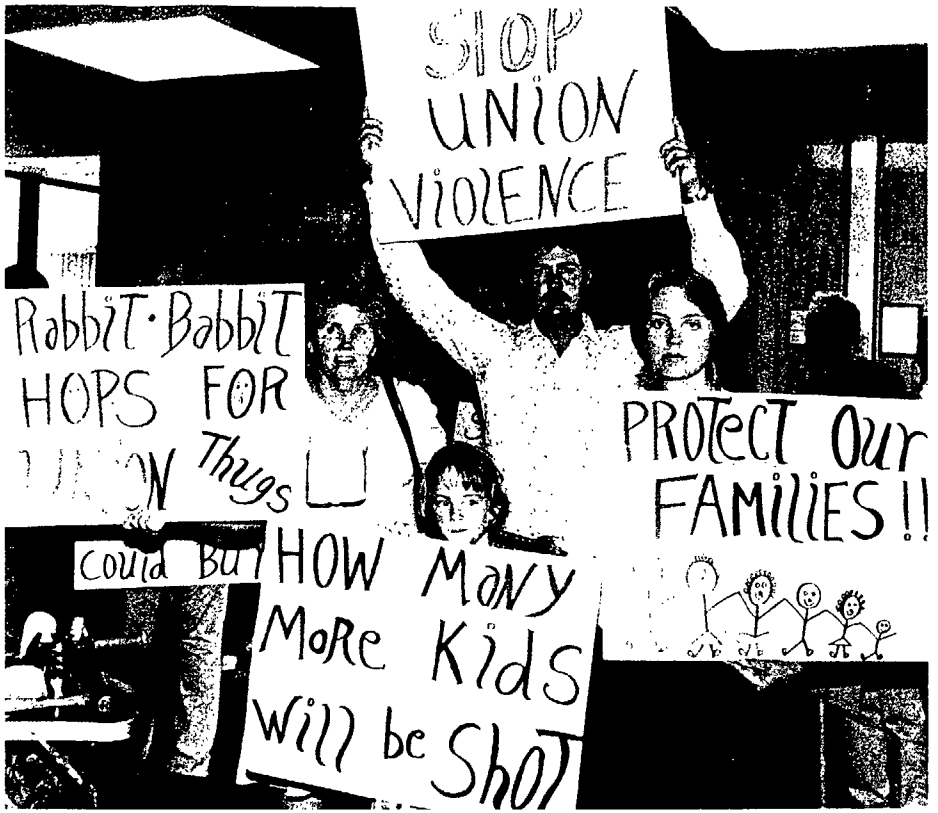
The last thing Scanlon said to Moolick before the Phelps Dodge president and the vice-president Jack Coulter boarded a chartered plane for the hour's flight from Phoenix to Clifton was, "Dick, please do not jump to any conclusions until you talk to the people who were actually there. You can't know how bad it was unless you were actually there."[35]

Moolick did not fire Scanlon or anyone else that Wednesday. He had changed his mind about halfway to Arizona, concluding to himself, "That's stupid. It doesn't make sense." Later he admitted that Scanlon did the right thing: "I was lucky I wasn't in" when he called New York. Scanlon "is a very bright guy." In retrospect, mused Moolick, "it worked out beautifully." The unions during the cooling-off period redirected their anger from Phelps Dodge to Governor Babbitt.[36]

That same day, August 10, when the Phelps Dodge president reached Clifton, Sheriff Gomez, an old acquaintance, picked him up at the airport. "Nobody will ever shut down Morenci again unless it's me," declared Moolick, a point he reemphasized when he met with his Morenci staff a short time later. "For the most part they were a strong crowd, although some were obviously frightened. We had no sooner started our meeting than we received a bomb threat—a bomb set to go off in fifteen minutes. I told the group we had twelve minutes to talk before we had to vacate the building."[37]

Phelps Dodge pledged to compensate all Morenci employees who were unable to work because of the ten-day shutdown. But Moolick, meeting with Scanlon and the governor later that day, declared that when the cooling-off period ended, operations would resume. Scanlon, still distraught by the near bloodshed in Morenci, had tears in his eyes as he pleaded with Babbitt, "Governor, you've got to do something. Declare martial law, send in the National Guard. Because if you don't, a lot of people are going to get killed over there." Babbitt refused to say at the time what, if anything, he would do when the shutdown ended.[38]

On August 15, Phelps Dodge mailed eviction notices to Morenci strikers fired for misconduct on the picket lines and gave them ten days to vacate company-owned housing. Two hundred replacement workers marched on the Arizona Capitol that same day to urge the governor to send National Guard troops to protect them after



DISPLAYING SIGNS *that speak to the tenseness of the times, families of Phelps Dodge workers petitioned Arizona's Governor Bruce Babbitt to provide them protection from "union thugs."*

work resumed. A nonunion boilermaker from the Morenci plant dramatized their plea by dumping baseball bats, a logging chain, and a sledge hammer on the capitol floor, all items pickets had supposedly used to threaten replacement workers. At the same time, Phelps Dodge again made it clear to Babbitt that it intended to resume operations as soon as the truce expired.

ON AUGUST 17, as the end of the ten-day cooling-off period neared and as pressure mounted for him to maintain order in Clifton and Morenci, Arizona's governor activated seven National Guard units to provide logistical and tactical support to state police and local law enforcement officials in the troubled area. The massive show of military muscle two days later was almost without precedent in the state's history. In fact, except for a strike in 1916 when Governor George W. P. Hunt dispatched 450 National Guard troops to Clifton, it was the largest deployment of state military personnel in all Arizona history. In total, some 325 national guardsmen traveled to the Clifton-Morenci area to back up 425 Department of Public Safety officers, a number that included over one-half of Arizona's state police force. Some Clifton residents felt as if their town had been invaded. One news commentator likened the scene to the war in Vietnam but, referring to the badly divided community, observed that Americans used to be on the same side.

From that day on, the unions directed a large part of their anger toward the Department of Public Safety and Governor Babbitt. Because he appeared to the unions to have sided with Phelps Dodge, they denounced the once-rising star in the Democratic party as "Governor Scabbitt," a term of opprobrium apparently first coined by the head union negotiator McKee. Union spokesmen claimed that Phelps Dodge had "just knighted another Arizona governor to their order of the copper collar." But when they accused Babbitt of being in the company's back pocket, he retorted, "I'm in the back pocket of the American judicial system." Actually, on several occasions Babbitt sharply criticized Phelps Dodge management for its uncompromising stand during negotiations.[9]

This much seems clear: the ten-day cooling-off period ending with the governor's show of

force turned the tide in favor of Phelps Dodge. "It swayed public opinion back to the side of the company," recalled James L. Madson, general superintendent, operations, at Morenci during the strike. Thus protected by Arizona national guardsmen and Department of Public Safety officers, Phelps Dodge reopened the main gates at Morenci shortly before 6 A.M. on August 20 and resumed production as promised and without incident. Smoke rising from the tall stack signified to all that work was under way again.[10]

Phelps Dodge estimated that 35 percent of its normal workforce returned. Immediately after the resumption of operations the corporation again began hiring additional replacement workers. It gave each new employee a written statement, signed by a Phelps Dodge representative, affirming that he or she was a permanent replacement and would not be laid off in order to make a place for a striker who wished to return to work. By this and other means, Phelps Dodge quickly bulked up its workforce to the desired level.

At the time it should have been clear to all but the most diehard union members that they had lost the struggle. Officially the strike lasted

Painful Memories

[illegible] during an [illegible] in 1997. Family members [illegible] exchange of insults and high school classes split into contending [illegible] "scab daughters" [illegible] remembered. "I dreaded going to [illegible]" Union officials supposedly stalked former [illegible] "I don't wish this on anybody," [illegible] stressed.

[illegible] most precious belongings in a suitcase and left it standing just [illegible] James Madson, former [illegible]

[illegible]

twenty months, but in the eyes of Phelps Dodge management the walkout was effectively over by the end of August 1983. That was when Arizona guardsmen, who had set up a tent city near the struck plant in Morenci, considered the area calm enough for them to move out and return home.

Management and labor held occasional but always fruitless talks during the remainder of 1983, but by the time the dispute dragged into the next year it consisted mainly of a legacy of bitterness and sporadic violence. In the end, the amazing thing was that no one was killed in any of the several outbursts of violence that attended the 1983 strike and its aftermath. Phelps Dodge assumed the cost of repairing striker damage to employees' cars. As for the unions, said one former member who decided to return to work in defiance of labor leadership, "They're obsolete."[41]

Within a year after the strike began, Phelps Dodge's Arizona labor force was composed of twenty-two hundred hourly paid workers, of whom 58 percent had been employees before the strike and 42 percent were new hires. The corporation placed all strikers, except for the 208 it discharged for strike-related misconduct, on preferential rehiring lists in accordance with the rules of the National Labor Relations Board, to be offered reemployment as vacancies occurred. Any striker who was rehired reacquired his or her prestrike seniority. But many would never again work for Phelps Dodge.

Picket lines remained in place, for the walkout officially continued for two more years, but after July 1, 1984 (copper production having returned to normal levels), non-striking workers began circulating petitions calling for decertification of all unions at Phelps Dodge's Arizona and Texas properties. The unions lost every one of the elections that eventually took place. The result was the largest decertification of labor unions in United States history (thirty-five locals of thirteen international unions in Arizona, New Mexico, and Texas). At its copper facilities across the Southwest, Phelps Dodge became a nonunion company for the first time since World War II.

Upset by the losses, United Steelworkers urged other unions to continue the fight against Phelps Dodge by withdrawing pension funds from banks that had backed the company. Another way the union coalition sought to undermine Phelps Dodge was by badgering it on environmental issues. A prime example of that tactic took place at the Douglas Reduction Works. At a public hearing held in 1982, the Steelworkers union had voiced strong support for granting legislative waivers to extend the life of the smelter, but organized labor changed its mind after the strike. Seeking to cause economic harm to the corporation and its non-union workers at Douglas, the United Steelworkers joined environmentalists to pressure the Environmental Protection Agency to close the smelter earlier than mandated.

In retrospect, note the authors of *Capital and Labor in American Copper*, various factors explain the unions' failure. Once government intervention had restored order and thus ended most illegal activities, it became obvious the strike lacked popular backing, and labor's cause could not be sustained by peaceful persuasion

alone. Only recently, many Phelps Dodge employees had been on layoff for months because of low copper prices. Having been recalled to work just weeks before the strike began, few of them, apart from union militants, had any real interest in being idle once more.

Coalition leaders expected that their past history of lengthy but ultimately successful strikes would be repeated. In 1983 they gambled and lost everything—and not just at Phelps Dodge. The nation's other big copper producers took note of labor's weakness. They realized that if Phelps Dodge could break a strike in prounion Clifton and Morenci other companies could break one anywhere, and that realization further weakened organized labor in the copper industry. That was an ominous trend for unions, which claimed thirty thousand other dues-paying copper workers. In fact, Arizona has experienced no major copper strikes since 1983. Over in New Mexico, the labor contracts at Tyrone were slated for renewal in 1984. In the wake of the 1983 strike, Phelps Dodge abolished cost-of-living adjustments and adopted a two-tier wage system at Tyrone, and unions there had no will to fight back.

In mid-1984 the Steelworkers union held a presidential election to pick a successor to the late Lloyd McBride. Frank McKee waged a bitter contest with Lynn Williams, but when all the votes were counted, Williams emerged the winner. McKee stepped down from his union offices, including chairmanship of the copper coalition, the following November. To succeed him, Williams selected Edgar H. Ball, Jr., the international secretary of the union, who had originally achieved prominence in 1967 as the union's negotiator at the Phelps Dodge telephone cable plant in Fordyce, Arkansas.

Long retired from Phelps Dodge, Moolick fifteen years after the big strike was chairman of the National Mining Hall of Fame and Museum, which he helped launch in Leadville, Colorado. During our visit together in the fall of 1997 he was by turns amiable and combative on the subject of organized labor and Phelps Dodge. "Time was, big unions were considered invincible," he reflected. "We demonstrated that nobody was invincible." Or indispensable. Moolick himself "chose" to retire at the end of 1984. The main reasons for his abruptly stepping down as president of Phelps Dodge are part of the corporation-saving drama discussed at length in the following chapter.[42]

Suffice it to say here that Moolick became a controversial figure around the corporation, and there are many different opinions of his role in the strike. "I made Phelps Dodge lean and mean, having to break the unions to accomplish this, and getting very little help from New York in getting the job done," he now claims. Many former colleagues wince at such tough talk, which a few dismiss as just another "Moolickism." They much prefer to speak of all the teamwork that contributed to Phelps Dodge's successes back in the dark days of 1983 and 1984. Yet, looking back from his own unique perspective, the current corporation president, Steve Whisler, who participated in the daily struggle at Morenci during the summer of 1983, gives Moolick his due. "Dick provided the backbone that was necessary in those kinds of situations."

L. William Seidman, once Moolick's fellow vice-chairman, describes the fate of his colleague as "a human tragedy because he had saved the company, in my view." The leadership controversy surrounding Moolick will probably never be resolved.[41]

When the walkout began on July 1, 1983, some financial analysts doubted that Phelps Dodge could survive—at least not for long—because of financial troubles that began with the onset of the copper crisis. By late August, rumors circulated up and down Wall Street that the corporation was edging toward bankruptcy. That scenario is a bit too dramatic, claims the retired chairman George Munroe, who notes with more than a hint of pride that Phelps Dodge rallied to confound all the hand-wringing prognosticators. True, it contained its labor costs by winning the bitter strike, but that is only one part of the full story of how Phelps Dodge battled back from the brink.





Chapter Fourteen



"FIX IT, SELL IT, *or* SHOOT IT"

In 1981 and 1982, well before the worst of the copper crisis, Phelps Dodge relocated some of its Arizona office personnel to Phoenix. Three and one-half floors of leased space in a twin-towered, twenty-story skyscraper provided a much more visible and centralized location for Western Operations than had the buildings in Douglas, where it had been headquartered since 1916. Further, the move to the state's main metropolis offered good airline connections to the rest of the United States and an opportunity for Phelps Dodge to respond positively to Arizona's rapidly changing political and demographic landscape.

As population increasingly gravitated to Phoenix and Tucson after World War II, the Phelps Dodge mine, mill, and smelter facilities located in remote and sparsely populated counties lost political influence, though not until after the Supreme Court's *Baker v. Carr* ("one man, one vote") decision in 1962 began shifting power to the cities was that fact fully clear. Environmental issues grew so politicized during the 1970s that Phelps Dodge realized it needed a bigger presence in Phoenix and Maricopa County, location of nearly 60 percent of Arizona's population in 1980 and center of the

Phelps Dodge Corporation's *high-rise headquarters in Phoenix. In the early 1980s the building was intended to house only its western regional offices, but in 1987 the main administrative offices were relocated to Phoenix after 150 years in New York City. A wide-angle lens tilted back gives the building a soaring appearance.*

state's government. At times it seemed that the senior vice-president and general manager John Lentz spent half his time commuting between Douglas and Phoenix to attend to political matters.

From the beginning the Phoenix offices contained a "Board of Directors' Meeting Room," although in the early 1980s no one in Arizona could expect that 2600 North Central would become the corporation's home address after a century and a half in New York City. But with relocation of Phelps Dodge headquarters in 1987, the copper-trimmed high-rise soaring above Phoenix, a metropolis named for the bird in Greek mythology that rose from its ashes, seemed to symbolize the return of the company to robust health after a near-death experience in the early part of the decade.

"Simply Going through a Meat Grinder"

The years 1983 and 1984 saw the American economy rebound from recession, but for the nation's copper producers, the times remained exceedingly tough. Phelps Dodge suffered a net loss of $63.5 million in 1983—only a slight improvement over the flood of red ink the previous year—and reported a net loss of $5 million for the first quarter of 1984 as copper prices dipped even lower than a year earlier, from 73.9 cents to 64.8 cents a pound on the New York Commodity Exchange. One thing that kept the 1984 shortfall from being even worse was $25 million that Phelps Dodge gained from the Washington Public Power Supply System early that year to settle a dispute over a terminated uranium contract.

Approximately every fifty years since its founding, Phelps Dodge had undergone a period of fundamental structural change. Each time it emerged a stronger, more energized company. The most astonishing restructuring and turnaround since Anson Phelps launched the company 150 years earlier took place during the first half of the 1980s. The difficult work of reinventing Phelps Dodge began in earnest in mid-1983 when executives began pruning underperforming subsidiaries among its several fabricating businesses, some of which it had acquired back in the early 1930s.

The work of negotiating asset sales became the responsibility of G. Robert Durham, at that time a senior vice-president. He worked closely with the New York law firm of Debevoise, Plimpton, Lyons and Gates to dispose of the corporation's interest in CONALCO, the aluminum firm, in 1980. That turned out to be only a warm-up for the sale three years later of several major businesses in its copper-fabricating sector. During the twelve-month interval between its 1983 and 1984 annual meetings, the corporation gained some $144 million from sales of Phelps Dodge Brass Company, Phelps Dodge Cable and Wire Company, Phelps Dodge Communications Company, and Phelps Dodge Solar Enterprises (the latter for slightly more than $1 million). Since those operations were making little or no profit at the time, their sale had no significant impact on corporate earnings, but gone from the familiar landscapes of production were numerous fabricating facilities, including big telephone cable plants located in



PHELPS DODGE'S 37-acre *Laurel Hill Refinery fronted the busy waterway of Newtown Creek. Bracketed by smokestacks, the big plant was located in Queens (in the foreground); in Manhattan in the distance stand the twin towers of the World Trade Center. In 1984 Phelps Dodge permanently closed its New York refinery after a century of production there.*

Elizabethtown, Kentucky, and Fordyce, Arkansas; antenna and broadcast products plants in New Jersey and Arizona; a high-voltage research laboratory in Yonkers; and a small laboratory in Elmsford, New York, devoted to fiber-optic telecommunications research. For a time, all that remained of Phelps Dodge Industries were the International and Magnet Wire subsidiaries. That was because Magnet Wire was a leader in its industry, a good copper user, and most important of all, a solid money-maker.

The corporation still had many good assets, but it could not continue indefinitely to sell them off one after another just to fund current operations. That would be like burning the superstructure of a steamship one board at a time to maintain fire in the boiler and just enough pressure to keep the vessel idling along. "We'd bring in this $60 million or that $100 million," Durham later recalled, but red ink continued to stain the corporation's ledgers. Phelps Dodge also raised $72.5 million through sale of 2.5 million

shares of stock in a public offering, and some of that infusion of new money went toward reducing Phelps Dodge's burden of debt. But it grew increasingly clear that neither stock sales nor the restructuring done to date would address the fundamental problem the corporation faced during the early 1980s.[1]

Primarily, that was the continuing low price of copper. The most aggravating thing, according to the chairman, George B. Munroe, was not the flux and flow of copper prices, to which Phelps Dodge had long ago learned to adjust. "The problem has been the ignoring of market forces during recessionary periods by the relative newcomers to our industry—the socialized mines of the less-developed countries overseas—and their abuse of our markets to unload their excess production."[2]

That was why in January 1984, Phelps Dodge joined with other domestic copper producers to seek temporary tariff protection from foreign imports. The United States Tariff Commission strongly recommended relief for the industry, but President Ronald Reagan rejected the proposal. The corporation also lobbied Congress and federal policy makers to advise them that loans by the World Bank and the International Monetary Fund to copper-producing nations in South America and Africa inflicted great damage on Phelps Dodge and the domestic industry.

Meanwhile, on July 25 the corporation reported a net loss of $25.7 million for the first half of 1984. If that ominous trend continued for the rest of the year, it would represent at best only a slight improvement over the multimillion-dollar losses of the previous two years. At the time the corporation continued to derive nearly 90 percent of its annual revenues from copper and copper products, a far higher percentage than any of its major American competitors, and though world copper inventories declined rapidly during 1984, the all-important price of copper still showed no sign of a sustained upturn.

It gradually grew evident that a fundamental change had overtaken the industry: once familiar cycles were no longer predictable, and once familiar indicators of future trends had become obscured. For example, consumers resumed purchases of big-ticket items that utilized significant amounts of copper, and that should have been good news for Phelps Dodge, but in 1984 something unusual happened to the price of copper. Typically it followed the general upswing in business activity, but this time it remained low despite renewed prosperity and near record world consumption of copper. Could anyone say with real confidence when the price of copper would bounce back? In the long run it was certain to rise. The question was, how much longer could Phelps Dodge wait? During 1984 the corporation lost money virtually every business day.

Munroe himself may have been confident that Phelps Dodge was not on the brink of bankruptcy, but many of his lieutenants were not so certain. On one occasion Edson L. Foster, vice-president and former corporation controller, confided to Richard Pendleton, Jr., a senior vice-president, that at the present rate he felt certain the corporation would go under. Such dire forebodings filtered through the ranks of employees. "I remember every day coming to

work and wondering if that was the day it was going to fall," reflected Richard Rice, then a top-level engineer at Western Operations.[3]

"It was a very gloomy period," recalled Durham. It got even gloomier when Douglas Yearley, shortly before he became part of the senior management team, presented the results of his careful analysis of copper prices. Yearley, then a vice-president, at his own expense and on his own initiative (but with Munroe's blessing) had rented an apartment in Manhattan during the summer of 1984 and spent his after-work hours immersed in study. Only rarely did he go home to New Jersey for the weekends. What inspired such intense commitment? "Self preservation," he now states without a moment's hesitation. "Twenty-five years with a corporation that's about to disappear. My instincts were telling me that it was bad, but I didn't have hard data."[4]

Personal experience and the long hours he spent in study at the New York Public Library shaped what Yearley wrote. "Beyond 1985, the outlook for the copper price is murky and troubled. It is hard to be optimistic," he observed in the confidential report he gave to Munroe in August. Phelps Dodge "must attempt to further reduce both variable operating costs and fixed costs to lower the break-even point. All costs not essential to copper must be cut. All assets not essential to copper and not producing cash flow must be sold with the funds generated going to reduce debt."[5]

Yearley's dismal forecast, correct as it turned out, projected that for three more years the price of copper would average sixty-five cents per pound, and that was at a time when Phelps Dodge's cost of production averaged seventy cents and more. Munroe, who registered no outward sign of emotion about the findings of the report, said to Yearley a short time later, "I want you to present this to the board" at its September meeting. Later Yearley recalled thinking that somebody had "died in the boardroom when I finished." According to his arithmetic, Phelps Dodge would lose money for every pound of copper it sold. Unless something was done, the corporation would simply bleed to death. Executives used many different metaphors, including a fatal hemorrhage and a sinking ship, to dramatize the peril.[6]

Given that observers both inside and outside the corporation thought Phelps Dodge stood at the edge of bankruptcy, it is vitally important to understand Munroe's perception of unfolding events—and especially the reasons for his long-range optimism. Although hindsight suggests that the trend in copper prices was down, "in living through the period, it was not that simple," asserts Munroe. "The large loss in 1982 was a shock, but the price increased and we essentially broke even for the first half of 1983." Phelps Dodge common stock held steady at around $28 a share. "We have a chance to be in the black in 1983," he reported to the *Wall Street Journal* in midyear. Unfortunately, "the second half of 1983 was heavily impacted by both the strike disruptions and declining prices," he later recalled. He nonetheless derived some comfort from the fact that at the end of the year, despite the large losses reported in 1982 and 1983, the corporation's long-term debt was 10 percent lower than it had been at the end of 1980.[7]

Munroe was a very thoughtful though somewhat reserved leader. He worked hard and often remained busy at his desk until late in the evening, and he was confident that an upturn was imminent—at least until he saw Yearley's report in August 1984, which Munroe later described as "awfully good." And awfully frightening, he might have added. Until then he had been certain that Phelps Dodge had not yet approached the edge of the abyss. He expected that sales of its underperforming assets and new money raised by stock offerings would help sustain the corporation until the price of copper finally rebounded. He also hoped for some form of tariff relief from Uncle Sam. "However, by August it was clear we could wait no longer."[8]

In fairness to Munroe, it should be noted that each of the half dozen men who chaired Phelps Dodge during the twentieth century faced problems unique to his time; yet not one of his predecessors confronted more fundamental structural changes in the world copper industry. Most notably these were the rise of environmentalism and the nationalization of foreign copper mines, which together during the late 1970s and early 1980s had a "devastating effect on the whole industry," recalled Munroe. Yet, in terms of what had always happened in the past, he had every right to believe that copper prices would improve at almost any time. "Prices continued low in 1984, but worldwide inventories of copper were declining at a record pace," and that again gave him cause for hope.[9]

Some of his more pessimistic lieutenants—those who had access only to the corporation's published reports and not to intimate details of its bank relationships—thought the chairman required a serious crisis to show him why the future survival of Phelps Dodge seemed so doubtful to them. Certainly during the summer of 1984 they believed the crisis was at hand. Until then, it seemed to some of the more impatient executives almost as if "an element of paralysis" had set in. "We were simply going through a meat grinder," recalled Durham. Munroe may not have agreed that the corporation was "hovering on the edge of bankruptcy," but he did later describe the situation he and Phelps Dodge faced as "damned uncomfortable." Was the corporation in truly serious trouble? "You bet!" responded Munroe without a moment's hesitation.[10]

What to do? As recently as February 1984 copper had sold for sixty-five cents per pound, but by midyear it had dropped nearly five cents more on the New York Commodity Exchange. Copper priced at approximately sixty cents per pound, adjusted for inflation, meant that it neared its lowest levels of the twentieth century. Even if Phelps Dodge shut down every mine and processing facility to await a price rebound, it would still lose money because of the cost of maintaining a closed plant. Also it would have had to buy copper in the open market to fulfill its contracts. Indeed, what to do? "Easy decisions get made fast," observed Munroe. "Things that you'd really rather not do, but are forced to do, come later."[11]

"The Famous Five Plan"

MUNROE AND DURHAM became close. Unlike most Phelps Dodge employees,

both resided in Manhattan and had no long commutes. They could thus linger in the office to unwind with after-hours chats. Durham recalled that by August 1984 even Munroe was beset by momentary doubts and that the chairman, gentle and relentlessly composed, once confided that he could not bear to think that he might be standing at the helm if the corporation slid into receivership. One day when Munroe seemed uncharacteristically glum, Durham emphasized that there was still a chance to save Phelps Dodge if "total objectivity" prevailed in the painful decisions that needed to be made. Durham told Munroe that he believed a committee of four or five executives should study the corporation in detail and recommend ways to turn things around (something Durham himself had done six years earlier at Phelps Dodge International). It was Munroe alone who had to decide how to proceed.

Just a year or so earlier, the chairman had set up two temporary committees, one headed by Richard Pendleton, Jr., and another by Frederick DeTurk, president of Phelps Dodge Industries, and challenged each to develop a list of suggestions detailing how the corporation ought to proceed. Pendleton's group huddled for three or four days on a Chesapeake Bay plantation, while DeTurk's group met in a hotel in suburban Westchester County. It was probably the first time that middle-level executives from both the mining and the manufacturing sides of the corporation had joined together to talk strategy. Each team produced a written report, but many of the suggestions—including one calling for forming strategic alliances with Japanese companies—seemed too drastic at the time. Munroe quietly set them aside. But that was then. Now he was ready to take the next step.

Munroe concluded that the best way—indeed, the only way—to stanch the continuing hemorrhage of red ink was to undertake drastic self-medication that went far beyond anything done to date. That was why on August 23, 1984, even before Yearley shared his gloomy forecast with the members of the board of directors, but after Munroe saw it, the chairman sent a "highly confidential" memo to his top managers explaining the plight of the corporation and designating five senior executives, Durham, Yearley, Richard Pendleton, Edson Foster, and Leonard Judd, "as a committee to consider and recommend to the Senior Management Committee for its review one or more plans for reorganizing and downsizing the company to permit it to remain viable if copper prices continue near present levels for an extended further period." It was more of a challenge than a command.

Munroe's memo emphasized that members of the special committee "should assume that the copper price realized by Phelps Dodge is 65 cents (in 1984 dollars) through 1987." Emphasizing the breadth of the committee's mandate, the memo continued: "Consideration should be given to discontinuing any operation that generates a cash drain. Administrative functions should be tailored to fit the minimum needs of the reorganized company, without regard to present office locations or staffing, other than leases or other existing obligations and provision for fair treatment of employees affected by downsizing." Potentially ominous for the corporation's future as an independent producer of copper was Munroe's request that "the value of the

company's large tax loss carry forward to a possible merger partner should also be considered." He assigned Durham to "coordinate times and places of meetings of the committee."

Munroe's charge required the Committee of Five to have a report ready for consideration by October 2. He fully understood that drastic measures had to be taken sooner rather than later. The Gang of Five, as these vice-presidents were sometimes called, had to work quickly to develop a strategic plan to save Phelps Dodge. About low copper prices they could do nothing, but they could suggest ways to reinvent Phelps Dodge as a low-cost copper producer.

Their closed-door meetings began after Labor Day 1984. Through most of the next month, committee members huddled in secret in the corporation's boardroom on the sixteenth floor of the Colgate Palmolive Building on Park Avenue. Each session typically began at eight in the morning and sometimes lasted far into the night. Noon lunches often consisted of sandwiches and provided a touch of austerity that spoke to the seriousness of the search for ways to save Phelps Dodge. One of the five members, Judd, spent nearly every evening at his computer carefully examining statistics for each mine to calculate which could turn a profit.

All through the summer of 1984 (and well before formation of the Committee of Five), Judd had periodically called Ramiro Peru in Phoenix, where he was supervisor, Financial Analysis, to request that he "analyze Morenci's costs, or take a look at Douglas." Eventually the two men conferred by phone almost every day as Peru supplied Judd with reams of data for him to analyze at home on his computer after work. "It was all very hush hush," recalled Judd, who felt under great pressure to reduce all costs associated with the mines, mills, and smelters of Western Operations. His analysis, incidentally, went on independently of the copper-price study that Yearley was doing at much the same time. On one occasion when Peru flew from Phoenix to New York, he remained up virtually all night "crunching" numbers for a meeting the next morning. It was demanding work, recalled Peru, later a Phelps Dodge senior vice-president and chief financial officer, but "I learned a ton about the company." In an informal sense, Judd also served as his business mentor.[12]

Durham recalled the dynamic that developed in the Committee of Five meetings. Foster understood finances well and knew what it would take to turn Phelps Dodge around. He did much of the number analysis. Having formerly worked for Anaconda, he had as an added incentive the specter of that celebrated corporate collapse. Pendleton, a Yale-educated lawyer, did most of the administrative writing. Yearley "was so valuable because he knew the copper industry. He was 'Mr. Phelps Dodge' to the merchants and manufacturing people." Judd, who was the only one of the five committee members to have a master's degree in business administration, was "a perfect combination of a mining guy and a good businessman." His careful study of mining properties was a real contribution. "We had to get the mines competitive," Durham emphasized as he explained Judd's crucial role. "If we didn't do that, we were still just 'bandaiding' the company." Durham, a "great catalyst" in Judd's words, later described the atmosphere within the group as a "good collegial environment." That



Phelps Dodge power cable and building wire photographed at Phelps Dodge Corporation's open-pit copper mine, Morenci, Arizona. At Morenci, up to 300,000 tons of material are moved daily by 9- to 23-cubic-yard shovels into trains and 100-ton trucks.

You're looking at one of the great resources for America's copper power cable.

You may never have seen a high-voltage power cable like the one on the large reel. But electrical contractors for new industrial plants have. And so have engineers at your electric utility.

It's called extruded solid dielectric cable—and has up to seven pounds of copper per foot. This type cable can be made flame retardant—meeting 70,000 and 210,000 BTU flame tests.

Our Phelps Dodge Cable & Wire Company produces wire and cable like this: from 600 volts through 138,000 volts. And oil-impregnated paper cable through 550,000 volts.

And it all starts here. Each year our U.S. mining operations produce on an average about 600 million pounds of copper—about 20% of all U.S. production. And our U.S. manufacturing divisions transform about a billion pounds into a wide variety of products—from copper rod to condenser tube, from magnet wire to broadcast antennas.

We go to the source. So that people who depend on copper can depend on us.

Phelps Dodge
300 Park Avenue
New York, New York 10022

phelps dodge

The copper people from Phelps Dodge.

Over the years, Phelps Dodge advertising has ranged from newspaper advertisements and posters to products catalogs and brochures. The Morenci mine during the railroad era formed the backdrop for this 1976 advertisement for copper power cable.



Phelps Dodge solar absorber plates photographed at Phelps Dodge Corporation's open-pit copper mine, Morenci, Arizona. Phelps Dodge first invested in these mountains in 1881 and will still be mining here well into the next century.

Deep in this copper mine is the key to harnessing the sun's energy more efficiently.

You can probably guess what these are just by their shape: solar absorber plates. When the sun's rays strike their surfaces, they heat circulating fluids that will, in turn, heat your household water or your home.

Simple? Not entirely. Under extreme conditions, temperatures within a collector can soar to 400°F during the day, then drop to freezing at night. It takes a tough plate to withstand this kind of stress. And using all copper, our Solar Enterprises unit builds solar absorber plates that meet the test.

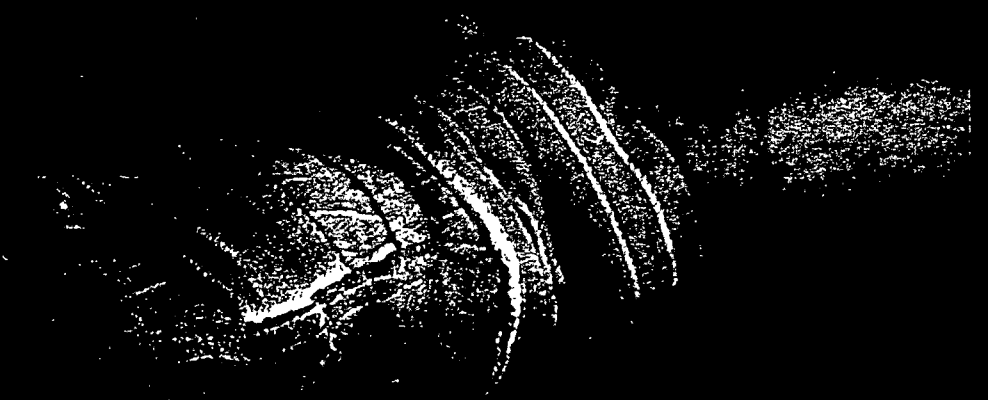
No other practical material can match copper's heat conductivity. That's one reason our U.S. mining operations produce on average about 600 million pounds of it each year—about 20% of all U.S. production. And our U.S. manufacturing divisions transform about a billion pounds of copper into everything from copper rod to condenser tube, from magnet wire to mobile antennas.

If you depend on copper, you can depend on us. Phelps Dodge, 300 Park Avenue, New York, New York 10022.

phelps dodge

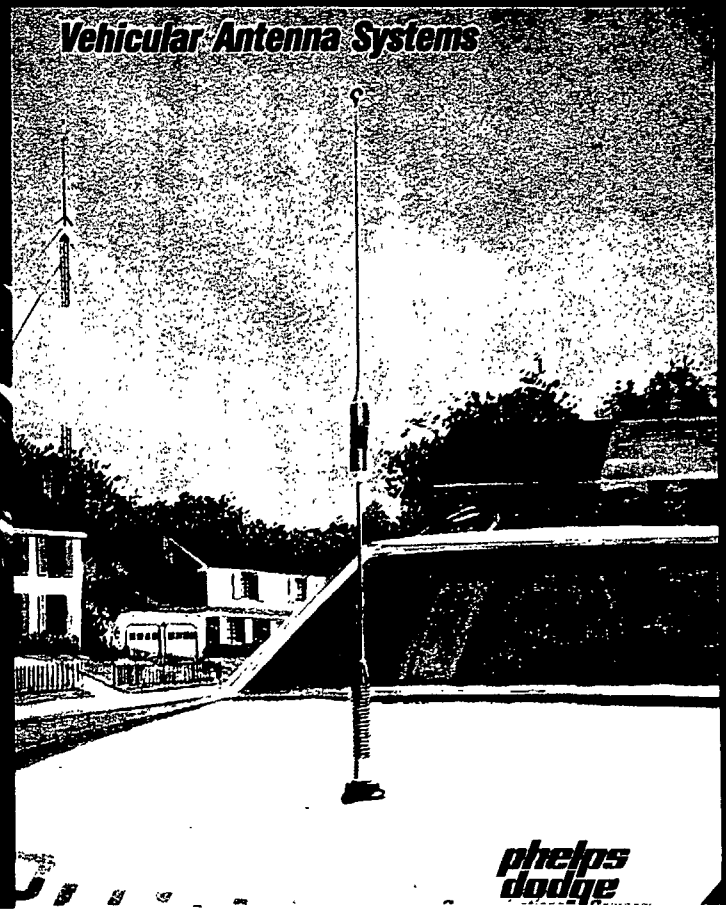
The copper people from Phelps Dodge.

... The Morenci Mine and Phelps Dodge Solar Enterprises addressed issues important to Americans during the energy anxious 1970s.



— Condenser tubes
as advertised by the Los Angeles Tube Mill of Phelps Dodge Brass Company. Financed by the federal government, the West Coast fabricating plant of Phelps Dodge Copper Products Corporation launched production in 1942. It was sold in 1983.

Phelps Dodge copper and copper alloy condenser tubes. For better performance... a better source.



— Phelps Dodge Communications Company
manufactured vehicular antenna systems in addition to FM broadcast antennas, marine antennas, and many other related products. It was one of several properties that Phelps Dodge said during 1983 as part of a corporate restructuring of assets



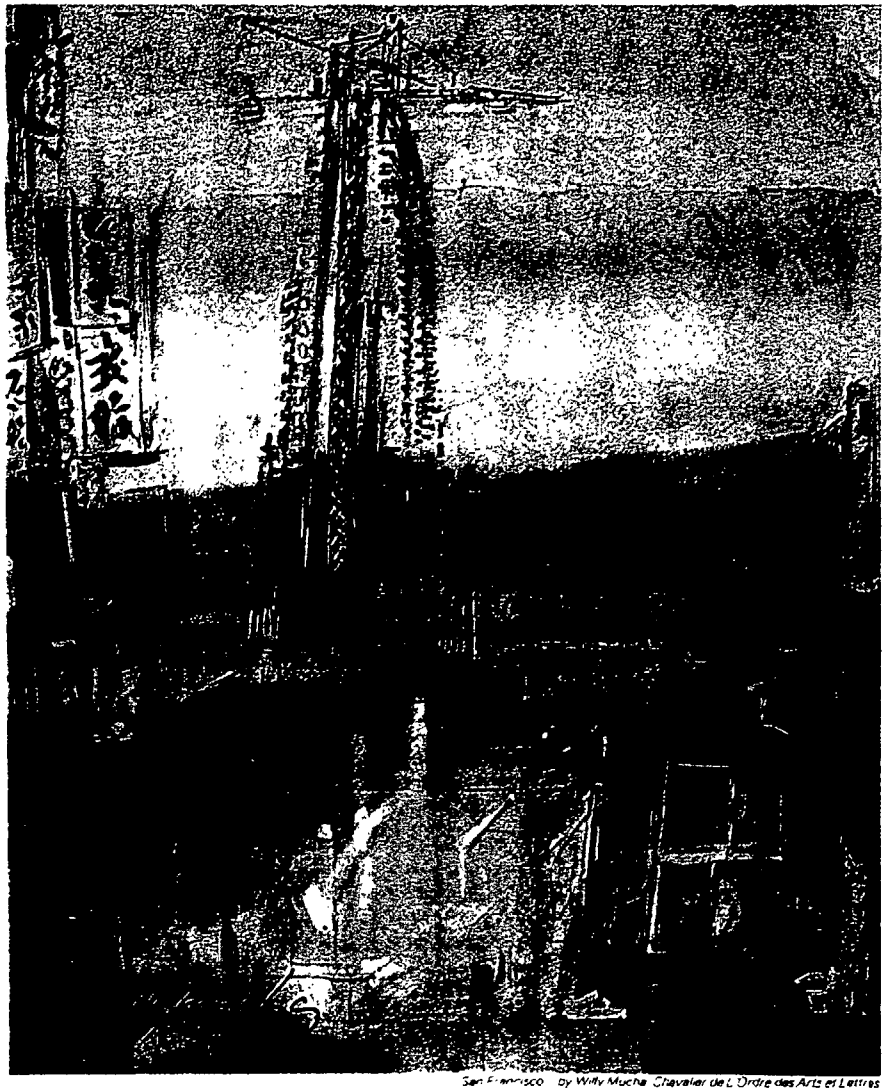
The firm bond that can be obtained between motor windings using Bondeze-M magnet wire is shown highly magnified on a TV screen.

Phelps Dodge
300 Park Avenue, New York, New York 10022

The copper people from Phelps Dodge

This advertisement *emphasized the importance of magnet wire.*

Phelps Dodge published a series of salutes to American cities during the 1970s. Each one emphasized the corporation's contributions to building the vital but often unseen urban infrastructure. This one by Willy Mucha saluting San Francisco appeared in Time and several prominent business publications. Among other cities highlighted in the campaign were Boston, Detroit, Pittsburgh and New Orleans.



San Francisco by Willy Mucha Chevalier de L'Ordre des Arts et Lettres

San Francisco... jewel of the West.
Gateway to the Pacific. Grandeur built on a proud heritage. A Phelps Dodge city where it's all happening.

Look closely, all round the Bay, you'll find Phelps Dodge everywhere. Our copper pipe and tubing transporting gas and water...our coaxial cable carrying radio and TV signals ...our copper-nickel condenser tubes helping to generate steam at local power plants. .our high-voltage cables distributing electricity downtown and to outlying towns. Telephone wire and cable, communications antennas, magnet wire, bronze valves and fittings, copper mill products... wherever you look, you'll find Phelps Dodge products at work.

While you can't always see us, our experience and imagination are at work everywhere across the land.

phelps dodge
Copper, Aluminum & Alloy Products

CABLES

PARA LA INDUSTRIA PETROLERA Y PETROQUÍMICA



phelps dodge iconel

PHELPS DODGE VENEZUELA

el líder en cables

todo una organización de servicios detrás de cada cable

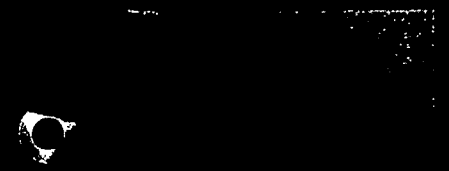
This brochure cover advertises submarine cable made by ICONEL, Phelps Dodge Venezuela, during the 1990s.

A BROCHURE COVER for Phelps Dodge copper electrode wire, a product the Campbell Soup Company and other food processors use to seal their cans. For photographers, the never-ending challenge was to portray cable and wire products in dramatic new ways.

Phelps Dodge Copper Electrode Wire

The difference is the quality.





Raven
Carbon Blacks

A Family Of Quality Carbon Blacks For All Applications

As Advertised In... **Modern Paint and Coatings**

A POSTER FOR *the Columbian Chemicals Company advertises its Raven® Carbon Blacks family of coatings.*

was especially important to Allbrook, who recalled that "I left off the committee anyone who should have been left off as unable to work collegially."[13]

Phelps Dodge had little maneuvering room. Those five people had a mandate to propose anything they wanted. "There were no sacred cows," Durham recollected. The committee mantra, Yearley stated, was "fix it, sell it, or shoot it, in that order." Members asked, "What is underperforming and what can we do about it?" When Judd was later asked whether he found it hard to sleep at night after each day's intense work, he smiled and quipped, "All during this time I slept like a baby: I woke up every two hours crying." Turning serious, he quickly added, "It was hell."[14]

After weighing every conceivable alternative, members of the Committee of Five drew up a plan that enunciated three basic goals. First and foremost was to reduce the cost of producing copper to less than sixty cents per pound (the prudent planning price based on the corporation's view of the market at that time). Second was to reduce the burden of long-term debt. The third and perhaps most radical goal was for Phelps Dodge to expand into noncopper businesses to help it better weather low points in the copper cycle. That meant a historic departure from business as usual. Production of copper would remain central to everything it did, but henceforth the corporation would diversify into enterprises on which variations in the price of red metal had no impact.

The Committee of Five's strategic plan suggested numerous ways that Phelps Dodge could trim costs. Because the company's mining and processing operations were losing money, it suggested operating the Morenci and Tyrone facilities on a more efficient continuous basis, together with the Douglas and Hidalgo smelters, the refinery, rod mills, and Phelps Dodge Magnet Wire, and it urged closing the old, inefficient smelter at Morenci, as well as the Ajo mine and mill, which had closed the previous August for an indefinite period. The New Cornelia Branch, which at the time was the company's high-cost producer, permanently shut its smelter at the same time. Changes occurring at Ajo that summer, or anticipated in the strategic plan, were necessary but painful. Jack Ladd, Phelps Dodge's director of labor relations, found it heartrending to see the vice-president and general manager Arthur Kinneberg have to go to Ajo in 1984 to tell employees who had faithfully braved the harassment of pickets that they were out of work after the smelter poured its last copper anode on August 12.

Further, the plan called for immediate sale of Western Nuclear, Phelps Dodge Fuel Development Corporation, the South African mine at Black Mountain, the Australian mine at Woodlawn, the Far East properties of Phelps Dodge International, and the Laurel Hill Refinery, which had closed earlier in the year. It proposed to sell as much as a 40 percent stake of the Morenci operation, a radical suggestion that evoked gasps among some people. Sell its crown jewel? But that was not all. The plan also suggested selling a minority position in Phelps Dodge Magnet Wire and for disposing of Phelps Dodge's 16 percent interest in Southern Peru Copper "at the earliest date when timing would indicate proper values could be realized." Finally, among the other properties Phelps Dodge

considered for sale were the Mercantile, the Dawson Ranch, various townsite facilities, and its interest in the Apache Powder Company, a manufacturer of explosives.

Committee members suggested consolidating a downsized Western Operations staff in the vacant Phelps Dodge Mercantile building in Tyrone, "which can be converted for that use with relatively modest expenditures for partitions, etc.," and they urged moving corporate headquarters on Park Avenue to a less expensive location within New York City. "With lean staffs at all locations, direct communications between the operations, the Western offices and the corporate office should improve." Neither proposal was ever implemented, however. In retrospect, notes Judd, the proposed move of Western Operations to the Silver City area was "too severe," though the later move of corporate headquarters to 2600 North Central Avenue in Phoenix saved Phelps Dodge an estimated $3.5 million a year. Some people fretted that relocation from New York to Arizona might cost the corporation access to important financial circles, but that never happened. The relocation had a far greater impact on personnel. In the end, Phelps Dodge offered only about fifteen employees the chance to make the transfer, and almost all chose to do so.[15]

Members of the Committee of Five explained their restructuring plan to Munroe on September 27, only shortly after the chairman returned to New York from the annual American Mining Congress meeting in Phoenix. The "hunker down" plan, as Judd liked to characterize it, elicited no visible show of emotion from Munroe. The committee of vice-presidents could only guess what he might do next. As for President Richard T. Moolick, he was one day behind Munroe in flying back from Phoenix—although the timing of his return to New York would not have made any difference in what happened a few days later.[16]

"Bull" Durham Takes Charge

DURING SEPTEMBER 1984, as members of the Committee of Five met behind closed doors to deliberate what measures to forward to Munroe and the Phelps Dodge directors, the corporation learned that the Reagan administration rejected American copper's request for quotas or tariffs on imports. It received more bad news the following month. As Phelps Dodge closed its books on 1984's third quarter, the largest independent copper producer in the United States faced the inevitability of having to report multimillion-dollar losses for the third consecutive year. That was a stretch of hard times unmatched even during the Great Depression. Did the corporation have a future, at least as an independent producer without recourse to the deep and money-filled pockets of an oil company? A year earlier an analyst for Salomon Brothers investment firm had claimed that "independent copper producers were going the way of dinosaurs and flying reptiles."[17]

It was in their meeting of October 3, 1984, against this backdrop of bad news, that the corporation's directors approved the harsh assets-restructuring plan proposed by the Committee of

Five. Board members placed only two constraints on the proposed cost-reduction projects. Each one had to be sound for long-term management of the resource, and each capital project for which funding was sought had to demonstrate both a substantial internal rate of return and a prompt payback.

A short time later, Munroe entrusted implementation of the Committee of Five Plan to Durham, who in January 1985 at age fifty-five became the corporation's new president and chief operating officer. "I guess I'm considered a kind of turn-around guy," he later reminisced. Another veteran member of the Committee of Five, 45-year-old Len Judd, took charge of Western Operations as senior vice-president after Kinneberg retired and Arthur Himebaugh replaced him as general manager. "With a new management team in place, Phelps Dodge is clearing the decks to mount with the beginning of the new year an all-out, no-holds-barred final drive to reduce production costs to an absolute minimum," observed Bill Epler, editor of the mining publication *Pay Dirt*. Emphasized Munroe, "Survival is the name of the game—and we intend to survive."[18]

One management casualty of those tense weeks was President Moolick. Not being named to the Gang of Five, he later said with acerbity, did not trouble him at the time. However, he regarded the finished document with unprintable contempt and scorned certain sections as wholly unworkable. In anticipation of his dissenting reaction, some committee members grew concerned that their capable but occasionally irascible president would be forced to carry out a restructuring plan in which he had no personal interest or that he would actively oppose.

That was why, when they handed Munroe the finished version of their plan, they added a sealed envelope containing a "highly confidential" memorandum dealing with future leadership. "We ducked this issue in our report, because we did not want it to distract from or impair speedy implementation of its other components. But we did not feel we could fairly duck it entirely; hence, this separate memorandum to you." In the one-page document committee members carefully broached the idea of early retirement for both Moolick and Kinneberg effective January 1, 1985. They reasoned that a person not already on the verge of retirement must have "long-term responsibility" for carrying out their restructuring plan. However, they were concerned that neither Moolick nor Kinneberg "could sit on the sidelines, remaining as senior management, and give the new man the free hand he must have to move quickly. We concede that mistakes may be made without their overview, but feel that the risks are much greater with three men, each with strong views, trying to run one job." There followed the leadership shuffle that William Seidman later called an unprecedented "internal takeover." But "nothing could be more natural," Munroe insisted, than for the authors of the Committee of Five Plan to implement it.[19]

Following the directors' discussion and approval of the asset-restructuring plan, it was Munroe's unenviable task to relay word of the change of presidents to Moolick, who he knew would be enraged. Moolick recalled, "When George came into my office on October 3rd

about 2:30 P.M. I was not aware of any meeting. So, when George told me that the board wanted me to move to vice chairman [a resurrected position the short-fused Moolick regarded as largely honorific], I told him, 'I quit.' His face turned red, and he finally asked me, 'When?' I looked at my watch and said, 'Well, it's 2:32.'"[20]

Moolick finally agreed to continue through January 1, 1985, as special consultant, though he vented his frustration at the directors' November 1984 meeting. Kinneberg, the other executive mentioned in the committee's secret memo, was happy to retire. "I didn't have anything to quarrel with," he later recalled. "I'd about had enough." Having wrestled with numerous and seemingly intractable problems in recent years, Kinneberg was ready for a well-deserved rest. But Moolick left Phelps Dodge after more than thirty-five years of service a bitter man: he believed that members of the Gang of Five claimed credit for reforms he had already suggested or initiated.[21]

Ironically, only two months after the Committee of Five presented its report to the Phelps Dodge board, *Business Week* pronounced the corporation dead—or nearly so. The magazine printed an obituary of sorts in its December 17 issue headlined "The Death of Mining." No question mark followed the statement, and the magazine's cover illustration consisted of an ingot of metal with handles added to make it look like a closed coffin. "Analysts contend that Phelps Dodge Corp., the second-largest U.S. copper producer, is especially vulnerable because it relies on copper for almost all its revenues." It was difficult to see how Phelps Dodge could survive, lamented an analyst for the brokerage firm Smith Barney, Harris, Upham and Company who was quoted in *Business Week*.

"The Death of Mining" appraisal was premature, and as it turned out, Phelps Dodge management had the last laugh. Looking back, Munroe called the article silly, but to his employees at the time it was certainly frightening. "I must admit that the facts in 1984 supported *Business Week*'s gloomy conclusion about Phelps Dodge," added Yearley at the publication's "President's Forum" in 1993, a far more prosperous time for copper and Phelps Dodge than in early 1985, when the corporation unexpectedly rallied to confound the analysts. It was a far different enterprise by the late 1980s too.

Another major change of leadership came in early 1987 when chairman Munroe at age sixty-five followed his lieutenants Kinneberg and Moolick into retirement after nearly thirty years of service at Phelps Dodge. The most recent decade had been especially trying for him, fraught as it was with daunting challenges posed by environmental and labor issues, serious inflation, and subsidized competition from newly nationalized foreign copper companies. Yet under Munroe, Phelps Dodge had moved ahead, most notably by risking its resources to build a clean-burning but enormously expensive flash smelter at Hidalgo and by committing to the solution extraction–electrowinning process it first implemented at Tyrone in 1983–84 to produce low-cost copper.

Kinneberg, who maintained a "great deal of respect" for Munroe over the years, recalled that if the chairman "had any faults it was because he wanted to be very sure" before he committed

technologically advanced projects, "and he did move fast on some of those things. He knew what he was doing." Like no Phelps Dodge chairman since the 1920s, Munroe left the company for an active retirement. He served on the boards of directors of several large corporations, including the New York Times Company, as chairman of the board of trustees of Dartmouth College, and as chairman of the finance committee of the Metropolitan Museum of Art.[22]

Durham, the man who succeeded Moolick as president in 1985 and Munroe as chairman in early 1987, was the person who most visibly led the corporation's turnaround. He was always quick, however, to acknowledge the valuable spadework done earlier by his colleagues. "When we put our plan together in the fall of 1984, we were able to build on much good cost-reduction work already done by my predecessor, Richard T. Moolick, and by senior vice-president Arthur H. Kinneberg—both now retired—particularly in the stabilization of labor costs and development of a highly motivated and productive workforce," Durham reported to the American Mining Congress on October 8, 1986.[23]

There were others too who deserved credit. Patrick J. Ryan, a senior vice-president who had charge of exploration and international mining operations, received a "nice basket of projects to fix," as he recalled with his usual understatement. Every one of them was a money loser; still, closing companies was difficult for the amiable South African because of the jobs it cost employees. Ryan, however, had little choice but to shut down Western Nuclear because the Phelps Dodge uranium company possessed only wholly owned subsidiary, Phelps Dodge Zeolite Corporation (formed just two years earlier) to Tenneco, Inc., in 1985. He likewise sold all assets of Phelps Dodge Fuel Development Corporation and closed down the recently formed (1981) Small Mines Division. In total, all funds that Ryan and his colleagues generated by sale of a mixed group of mining assets added up to approximately $90 million, which Phelps Dodge Corporation reinvested in productive capital programs or used for debt reduction.

The man who decided what steps to take next was the stocky, personable Durham. He was often known to his colleagues simply as "Bull"—a nickname he acquired as a teenager from the Bull Durham brand of tobacco once sold in cloth pouches, which was an apt description of his determination to shove aside hallowed traditions at Phelps Dodge and bulldoze a new path to profitability. If the strategic plan failed, the corporation would probably go bankrupt. Fortunately, added his colleague Ryan, "'Bull' Durham was a very strong-minded guy."[24]

Durham was the latest in a line of Phelps Dodge leaders who hailed from America's heartland. Robert Page came from Ohio, Munroe and Durham were both from Illinois, as was Durham's successor, Yearley. Durham was quick to emphasize that he was from southern Illinois while the others were from the greater Chicago area—and his roots were distinctly blue collar. He was the son and grandson of coal miners. In the Durham home in the gritty town of West Frankfort a family hero was John L. Lewis, the legendary leader of the United Mine Workers Union. The Durhams were familiar with

casualties, and for such reasons the father urged his sons to get out of the mines. Born in 1929, Durham graduated from Purdue University in neighboring Indiana in 1951 where he studied economics and "the business side" of labor law. It was there that he acquired his nickname. "I've known people who think I have no other name."[25]

Durham came to Phelps Dodge twice. The first was back in 1967 when the copper producer acquired the Ashby Corporation, where Durham was president, as part of its entry into the business of aluminum fabrication. Building on previous expertise, he helped develop Phelps Dodge Aluminum Products Corporation and served as its executive vice-president until that short-lived subsidiary was merged with Consolidated Aluminum Corporation (CONALCO) in 1971. A short time later, Durham became president and chief executive officer of CONALCO, in which Phelps Dodge retained a large minority stake.

Between 1967 and 1973 everything seemed to go right for the rising young business executive, but then, without warning, Durham's world collapsed. Physicians told him he had cancer, and their prognosis was "not all that good initially." In July 1973 surgeons removed a kidney. Durham retired from CONALCO while still in his early forties and sought to enjoy life while he still could. "When you go through a major operation you start seeing things differently."[26]

Amazingly, Durham beat the odds and recovered fully. He was financially well off, "never intending to work again," but later in the 1970s he received a discreet inquiry from Ted



Durham *(left) and Chairman George B. Munroe in Phelps Dodge's New York headquarters at 300 Park Avenue.*

Michaelsen, the suave president of Phelps Dodge Industries, asking if he was bored. Durham wasn't, but he agreed to return to Phelps Dodge briefly as an outside consultant to suggest ways to turn around its financially ailing subsidiary, Phelps Dodge International Corporation. In short order, Durham presented his strategic plan to Michaelsen, who invited him to implement it in 1978 as chairman of International. Subsequently, Durham was elected a vice-president of Phelps Dodge Corporation in 1980 and a senior vice-president two years later. The events of late 1984 and early 1985, and most notably the need to reorganize Phelps Dodge, offered a variation on his previous assignment at Phelps Dodge International.

Overall, the news for 1985 was good. Despite no real movement in the price of copper, Phelps Dodge Corporation's losses dropped to $7

million in January, down from $10 million per month in late 1984. The earlier pruning of underperforming assets and the recently approved Committee of Five Plan seemed to be working. The following month the company appeared to have earned a million dollars' profit, its first in many months. *Appeared* was indeed the operative word because before Durham had time to celebrate, William Tubman, now retired vice-president and corporate secretary, recalled how he delivered information that spoiled everything. It was Tubman's unenviable job to explain to Durham that Phelps Dodge had just settled a lawsuit out of court for a million dollars. There was no profit after all. "'Bull' got so mad I thought he was going to slug me," Tubman later recalled with a touch of nervousness in his laughter. "I remember the incident," confirms Durham a bit sheepishly. "But that's life."[27]

IN THE END, there was news worth celebrating. When Phelps Dodge returned to profitability during the first quarter of 1985, it was the only major copper producer in the United States to do so. Things had improved enough that in April 1985 the corporation raised $50 million by selling 2.5 million shares of common stock. Further, during all four quarters the corporation earned $29.5 million and enjoyed its first profitable year since 1981. The positive financial tidings of 1985 probably resulted more from changes made in 1983 and 1984 than from the Committee of Five Plan—the "flow of red ink was basically on its way out before the committee met," Munroe still insists—but their taking the long-range view ensured that the recovery would continue well past 1985 and even with no significant increase in the price of copper.[28]

The 1984 write-offs, which in addition to sale of assets included shutting down high-cost production at inefficient operations, reduced Phelps Dodge's costs by eliminating depreciation previously charged, and lowering costs gave an immediate and significant boost to earnings. By 1986 the corporation had whittled down its long-term debt to $423 million, the lowest level in a dozen years. Likewise, it downsized its work-force by slightly more than half, to sixty-four hundred people, mainly through selling off underperforming assets. Phelps Dodge common stock recovered from a low of $12.88 a share in 1984 to reach $20.75 in the fall of 1985. Incredibly, all of the rebound occurred without any boost from the price of copper, which continued to languish until 1987. Then, finally, during a single month the price rose from just over sixty-one cents a pound to more than sixty-nine cents.

That was very good news for Phelps Dodge, which through its aggressive campaign to fix, sell, or shut down underperforming properties had repositioned itself to become the nation's premier low-cost copper producer. It was a positive initial step toward realizing a major financial payoff from the corporate strategy first enunciated in the Committee of Five Plan. When the dust of the copper crisis of the 1980s finally settled, it was Phelps Dodge alone that stood tall.



Chapter Fifteen



TURNAROUND TIME

"THE TURNAROUND HAS been gritty, not glamorous," observed *Fortune* magazine of Phelps Dodge Corporation in October 1985. Regardless of how outsiders characterized it, managers who oversaw the toilsome process of recovery usually credit employees "in the trenches" for showing "real passion" in their commitment to the Committee of Five Plan. Leonard R. Judd, a member of that committee who returned to Arizona to lead a critical part of the turnaround, recalls how the employees of Western Operations battled hard to save their corporation and return it to profitability. "Our plan was very complicated," Judd now explains with a twinkle in his eyes and a hint of irony in his voice: "We took bad mines and shut them down, and we took good mines and expanded them."[1]

In addition, after Judd, a senior vice-president, took charge of Western Operations, he shrank the size of the Phoenix office staff from around 170 to 63 members. Nothing that saved money was too small to be overlooked, and that included getting rid of all decorative plants in the Phoenix offices, along with the person who watered them.

Judd recalls that the key to successfully "reinventing the West" was speedy implementation of the Committee of Five Plan. Everyone was "running and gunning," as he describes the furious pace of

CHIEF ARCHITECTS OF *Phelps Dodge's astonishing turnaround were (left to right) Patrick J. Ryan, J. Steven Whisler, G. Robert Durham, Douglas C. Yearley, and Leonard R. Judd (see color image following page 208).*

activity that developed early in 1985 after the board of directors formally approved the radical restructuring program. Keeping the momentum up were Judd's lieutenants—a coterie of diligent individuals including Arthur E. Himebaugh, general manager of Western Operations; Dushan P. ("Duke") Milovich, general superintendent of the Tyrone Branch; Richard Rice, manager of engineering services; Carl Forstrom, manager at Morenci; and Nicholas S. Balich, controller, Western Operations—who together with their employees tackled all kinds of demanding work assignments with "enthusiasm and energy," recalled Ramiro Peru, because of their newfound sense of purpose. He explained that, until the team of westerners had the Committee of Five Plan in hand and a distinct sense of direction and purpose, morale in the mines, mills, and smelters "was horrible." Judd, who clearly does not share the former chairman George Munroe's rosy assessment that a corporate recovery was already observable by late 1984 or early 1985, insists that "this company didn't turn around until we put that plan in place."[2]

No matter how the about-face may be described, or what or who was responsible, the resurgence of Phelps Dodge during the second half of the 1980s and early 1990s was one of the most dramatic chapters in its long history. It is a story of how, in response to fundamental and long-term changes in the American copper industry, Phelps Dodge aggressively implemented cost-cutting technology and successfully diversified into businesses outside its familiar terrain of metal mining.

The initial payoff for the difficult work of revitalization came during five fabulous years from 1988 to 1993, when shareholders who had faith enough in Phelps Dodge to reinvest their quarterly dividends enjoyed annual increases averaging a whopping 33 percent of the total value of their investment. In 1995, in fact, Phelps Dodge ranked a very respectable twelfth among Fortune 500 enterprises providing the highest total return to investors between 1984 and 1994, just ahead of Coca-Cola and a little behind Walt Disney. This was fitting recognition of how restructuring helped Phelps Dodge thrive once again following the corporate cliff-hanger caused by the copper crisis of the early 1980s. "In most cases, it's been more successful than our wildest dreams," observed the chairman Douglas C. Yearley. "We feel good about the copper industry."[3]

Seeking Salvation through New Technology

USING THE BASIC blueprint provided by the Committee of Five Plan in late 1984, President and later Chairman G. Robert Durham maneuvered the company through a period of cost cutting even more drastic than in 1982, all the while continuing the creative methods of financing new technologies begun back in 1983, when Phelps Dodge launched construction of its first solution extraction–electrowinning (SX/EW) plant. Given the corporation's financial plight at the time, the decision to embrace the new technology was an act of courage by the then chairman, George Munroe, who displayed similar

THE EVOLUTION OF copper production continues as the solution extraction–electrowinning process creates its own landscape of production. Looking very much like the familiar sprinklers used to irrigate lawns and golf courses, these at Morenci use water and highly diluted acid to work SX/EW's magic.


phelps
dodge

The "Magic" of SX/EW

"Any sufficiently advanced technology is indistinguishable from magic," the scientist and author Arthur C. Clark once wrote. In that sense, the term magic *is certainly appropriate to describe solution extraction–electrowinning technology. It was unquestionably different from the traditional way of processing copper ore, which was mainly a "blacksmith" business that required crushing, grinding, and heating. For one thing, SX/EW was a much quieter process. A plant was relatively inexpensive to build compared to a smelter, and the new technology required only a third of the labor needed for precipitate or leach copper and about a quarter of the energy needed to smelt and refine it.*

The pyrometallurgical method of smelting used fire. It was successful at removing up to 98 percent of copper from ore, although traditional smelters had been widely criticized since the late 1960s for releasing sulfur dioxide into the air and creating significant sulfuric acid disposal problems. Hydrometallurgical methods, using liquid processes, created virtually no harmful gas emissions or toxic waste. Some people might even pay a backhanded compliment to the Environmental Protection Agency for creating the conditions that made the new process attractive.

To work its magic, SX/EW technology utilized three proven processes to recover copper: dump leaching, solution extraction, and electrowinning. Without going into basic chemistry and physics, you could liken these three to square dancers handing off copper ions to one another in progressively greater concentrations as red metal moved from low-grade ore to two-hundred-pound, 99.99 percent pure cathodes, all from stockpiles once considered only waste. Further, the new technology addressed the problem of too much copper concentrate going to the company's aging smelters and their need for costly environmental retrofitting. Costs climbed somewhat higher when the corporation had to "mine for leach" after it had used up all its old stockpiles, but the process was still a bargain.

For a variety of reasons (depending on the ore type and grade), in the late 1990s Phelps Dodge continues to smelt copper concentrates not easily amenable to SX/EW processing, and it ships heavy anodes to its El Paso electrolytic refinery for further processing. There a different type of technological magic takes place. During electrolytic refining, insoluble impurities from anodes settle to the bottom of the tanks in the form of a fine black mud, also known as slimes. From this impurity the El Paso refinery recovers gold, silver, selenium, and tellurium at its slimes treatment plant. Income received by Phelps Dodge Sales Company from those precious metals constitutes a bonus that effectively reduces costs of copper production by traditional smelting and refining methods.

audacity when he committed Phelps Dodge to flash smelting at Hidalgo. It could be claimed, in fact, that implementation of flash smelting in the 1970s and of SX/EW in the 1980s represents two of the most significant technological advances at Phelps Dodge since World War II.

Many people will credit the innovative SX/EW technology with having saved the firm during its darkest hour. Reality is a bit more complex. Phelps Dodge, true to its conservative character, was actually among the last big American copper companies to conclude that SX/EW was a good deal—and that was fortunate for several reasons. The process initially had numerous problems to overcome. Its roots extended far back to Uncle Sam's supersecret Manhattan Project, which sought an efficient way to extract a uranium isotope it needed to build atomic bombs during World War II. Following various improvements, the world's first commercial SX/EW plant for copper began working production miracles in March 1968 near Miami, Arizona, at the Bluebird Mine of the Ranchers Exploration and Development Company. At first, though, the selectivity of the reagents for copper was very low.

Phelps Dodge embraced SX/EW technology only after its own research department had studied it thoroughly and only after the technicians and scientists had solved many of its early problems. "Phelps Dodge seldom, if ever, claims 'a first' on anything," noted Richard Rice, the corporation's retired vice-president for engineering. "Our conservatism makes us do that." However, after technologies have proven themselves, "we'll do them better than anyone else." That was certainly the case with SX/EW, in which Phelps Dodge became a world leader after its first such plant (and also the first of its kind in New Mexico) commenced production at Tyrone in April 1984 as the Burro Chief Copper Company.[4]

The main problem in the early 1980s was to interest members of senior management and the Phelps Dodge board of directors in an exotic process that to many of them seemed more like science fiction than fact, recalled Timothy R. Snider, the young chemist who headed the analytical laboratory at Tyrone. Later, after he became president of Phelps Dodge Mining Company in 1998, Snider recalled that as long as the corporation made money selling copper as usual he did not gain anyone's attention. The attitude changed after the onset of the copper crisis in 1981, and especially after goading from Len Judd, the first top-ranked executive to realize the unbelievable cost-saving potential of SX/EW.

In old western movies, when prospectors found gold they shouted "Eureka!" Though the metal this time was copper, initial SX/EW success at Tyrone was a "Eureka moment" for Phelps Dodge. After members of the board of directors gave their approval in 1982 to proceed with a full-scale plant, the corporation still had to raise the needed capital; and therein lay the reason for setting up the Burro Chief Copper Company as a subsidiary operation. Len Judd successfully coaxed the prime contractor for the facility, Brown and Root, Inc., into financing $7 million of the project by forming Burro Chief to protect its investment should cash-starved Phelps Dodge run into further difficulty. Phelps Dodge later bought out Brown and Root's stake, but the Burro Chief Copper Company continues to operate SX/EW facilities.

Brown and Root broke ground in March 1983. A little over a year later, on April 6, 1984, the $35 million plant extracted its first copper from solution and in just three days more had plated the metal onto starter sheets in the tank house. The initial shipment of cathodes left for Phelps Dodge's continuous-cast rod mill in El Paso on April 17. At Tyrone, Phelps Dodge had accumulated numerous dumps that never before had been leached—ore of the type that lent itself easily to the new SX/EW method—and that was a main reason its early cathodes cost less than thirty cents a pound to produce. The cost of actually mining leach material had already been charged against prior copper production. For the same reason, Morenci profited when the SX/EW technology was implemented there too. Together, they helped Phelps Dodge to achieve its goal of becoming a world leader in low-cost copper production.

In sum, SX/EW did not save Phelps Dodge, but the technology resulted in bonanza years once the price of copper improved and money at last flowed in. For about four years in the mid-1980s, a special Phelps Dodge crew worked with Brown and Root to do nothing but build SX/EW plants, and all those facilities originally did was to leach valuable copper from old "waste" dumps. Within a decade, Phelps Dodge produced almost half its copper by SX/EW technology, and that was the single most important reason for its production costs dropping from approximately eighty cents per pound to about fifty cents. Ironically, if Phelps Dodge had rushed to embrace the new SX/EW technology in the 1970s, it would not have had the stockpiles of oxide ore available in the mid-1980s when it needed them most.

A New Day at the Chino Mines Company

Between 1981 and 1987, Phelps Dodge dramatically reshuffled its landscape of production in Arizona and New Mexico. In 1982 the company relocated its western regional headquarters from Douglas to Phoenix; two years later it closed its New Cornelia Mine, then its Ajo smelter in 1985, eliminating nearly six hundred jobs. At that time the town of Ajo lost its hospital and nearly half its population. Phelps Dodge also closed its Morenci smelter in January 1985, idling about 450 workers, some of them permanently. The shutdown was necessary because the corporation had spent $91 million in an ultimately unsuccessful effort to comply with government sulfur dioxide emission standards.

Next, in January 1987 Phelps Dodge shut down its aging Douglas smelter, once again because of the impossibly high cost of complying with government emission mandates. The community thus lost a $9 million annual payroll, by far the largest source of income in the border trading center of fourteen thousand people. After early 1987, the corporation operated no smelters at all in Arizona and only one major mine in the state, the open-pit complex at Morenci. There, in general accordance with the 1984 Committee of Five Plan, the work of mining and milling continued around the clock, every day of the year, and was aided by computers that ran equipment

Historic Chino

Years before Phelps Dodge produced low-cost copper at Chino using the solution extraction–electrowinning method, the process of technology transfer had once linked the Chino and Bisbee operations. That was back in 1917, when Phelps Dodge launched its first open-pit mine. To provide guidance as it moved through unfamiliar technological terrain toward successful operation of its Sacramento Pit, Phelps Dodge hired an adviser from the Chino Copper Company.

Chino's history actually dates back to some of the oldest copper mines in North America. In the early 1800s, the mine on the Santa Rita del Cobre Grant served as the principal source of copper for the Mexican mint in Mexico City. One estimate suggested that Santa Rita produced as much as forty-one million pounds of copper prior to 1845, the year northern Michigan began to yield large quantities of red metal. The New Mexico deposit produced another 124 million pounds of copper between 1845 and 1910, the year Chino became the first open-pit facility in the territory.

The Santa Rita Mining Company, as it was named in the late nineteenth century, actually ran out of high-grade ore in the early 1900s. A young mining engineer named John Murchison Sully, a recent graduate of the Massachusetts Institute of Technology, spent almost a year evaluating the New Mexico property for General Electric, directing a drilling program and delineating a large deposit of low-grade copper amenable to open-pit mining methods then being perfected at Bingham Canyon in Utah. But General Electric, which already owned a productive copper mine, was unimpressed by any ore deposit that assayed only 2.73 percent copper.

Others, however, did have the necessary faith. In June 1909 the Chino Copper Company was born; Sully was its general manager, and Daniel C. Jackling its vice-president and managing director. Its first steam shovel bit into the ground in September 1910, a date that places Chino among the American pioneers of open-pit technology. In fact, only famous Bingham in 1907; Ely, Nevada, in 1908; and Miami, Arizona, in 1910 antedated it. That same year, 1910, Chino Copper erected a concentrator ten miles south of the mine at a Santa Fe Railway siding known as Hurley, where it had good water and a place to dispose of tailings.

From 1914 until the end of World War II, the big Santa Rita mine accounted for more than 90 percent of all copper mined in New Mexico. As for ownership, in 1924 the Chino Copper Company and Ray Consolidated Copper Company merged. Two years later, they joined Nevada Consolidated Company to form a mammoth outfit called Nevada Consolidated, which the newly formed Kennecott Copper Corporation acquired in 1933.



and kept track of every shovel, locomotive, and truck in the mine. In its quest for efficiency, Morenci switched to trucks, instead of trains, to haul rock or muck out of its pits.

During the same time, big changes came to Phelps Dodge operations located eighty miles east of Morenci and over the mountains in New Mexico. In 1986 when Standard Oil of Ohio announced its willingness to sell various Arizona and New Mexico properties belonging to its Kennecott subsidiary, Phelps Dodge paid approximately $88 million for a two-thirds interest in the Chino Mines Company complex located southeast of Silver City. Besides an immense open-pit copper mine, the property included a newly renovated smelter, which along with the Hidalgo smelter gave Phelps Dodge two reduction works in New Mexico to offset loss of production caused by the imminent closing of its Douglas Reduction Works. The corporation subsequently inaugurated an SX/EW facility at Chino on October 31, 1988, shortly after it introduced the new technology at Morenci.

Seemingly secure in its status as one of the Big Three copper producers in the United States, Kennecott enjoyed many good years until the 1960s and 1970s. That was when it experienced one financial setback after another. It unsuccessfully battled an antitrust suit all the way to the United States Supreme Court, waged another lengthy court fight to recover $68 million for assets expropriated by Chile, and spent millions more to implement pollution controls. A series of proxy fights further drained Kennecott's corporate revenues and left it strapped for cash.

At its Chino facility, the decade of the 1980s brought monumental changes not seen since the open-pit mine complex began almost seventy years earlier. First, Standard Oil of Ohio, or SOHIO, paid $1.8 billion to acquire struggling Kennecott, which issued its final annual report in 1980. Prior to that date, Kennecott had made its most recent major expenditure on the Chino smelter during 1973–74, when it built a $30 million acid plant to capture about 60 percent of the sulfur dioxide gases produced during the smelting process. To help raise funds to further modernize the Chino complex—its smelter at Hurley, constructed in 1939 and unable to meet environmental regulations, operated only under a special permit—Kennecott sold a one-third interest in the facility to the Mitsubishi Corporation of Japan in 1981.

Mitsubishi agreed to pay about $116 million for its one-third ownership and one-third of all costs of modernization. In all, the two partners spent about $405 million to upgrade mine, concentrator, and smelter facilities at Chino, and that included adding a state-of-the-art flash smelter. Directors of SOHIO gave their approval on September 24, 1982, for Chino to launch a $128 million smelter modification program that included a Canadian INCO flash furnace, new-fashioned technology that increased the smelter's capacity and met New Mexico's environmental standards by recovering at least 90 percent of all sulfur entering the plant. But profits remained elusive, and even after Kennecott spent bundles of money and lowered production costs, copper prices stayed depressed. That was frustrating for SOHIO, which had problems of its own with declining oil prices.

A shake-up at Standard Oil of Ohio made

AN AERIAL VIEW *of the Chino Mines Company property, part of the New Mexico operation in which Phelps Dodge acquired a two-thirds interest in 1986. Back in 1914 the assets of the Chino Copper Company included 16,700 acres of land, 10 steam shovels, 21 locomotives, a fleet of 124 ore cars of various sizes, more than 20 miles of standard gauge track, a machine shop, mill, company homes, and boarding- and rooming houses.*

British Petroleum, formerly a 49 percent owner, the new operator of SOHIO and its Kennecott properties. In March 1985, Phelps Dodge's first break-even month for its Western Operations, Len Judd happened to notice in the *Wall Street Journal* that British Petroleum had grown irritated with SOHIO and Kennecott. Only four years earlier, marriages between oil and copper had been the rage—so much so that by mid-1981 oil companies controlled more than half of all American copper producers—but by the mid-1980s the romance had faded, and several celebrated industrial divorces were in the works. The independent copper producer had not been such a dinosaur after all. Both Judd and President Durham simultaneously recognized a great opportunity for Phelps Dodge to pick up valuable new properties. Durham told Judd that "we need to go to Cleveland" and talk to Standard Oil about Kennecott acquisitions.'

On the basis of a handshake at SOHIO headquarters, Judd thought that Phelps Dodge had acquired both Chino and Ray, a large open-pit mine complex in Arizona, but over the weekend British Petroleum agreed to sell Ray to ASARCO. It was all part of the intense horse trading, but Judd was himself certainly no amateur when it came to the art of deal making. Chino, for example, had a refining contract with ASARCO that proved a real blessing to Phelps Dodge because ASARCO charged only three cents per pound to refine ore that cost Phelps Dodge an additional two cents to refine. Judd, however, feigned opposition to the ASARCO refining contract and thereby forced Kennecott to throw in its Lone Star ore body at Safford ostensibly to make the deal palatable to Phelps Dodge.

On September 11, SOHIO announced the sale of Kennecott's two-thirds ownership of the Chino Mines Company to Phelps Dodge for approximately $88 million, a sum far less than Kennecott had recently spent to modernize the smelter alone. All in all, it was a smart move by Judd, Durham, and Chairman George Munroe. Acquisition of Chino was an obvious bargain, but as Bill Epler, longtime editor of *Pay Dirt*, noted, "there aren't many live prospects out there these days willing or able to buy a large copper operation." The new smelter cost less than half of what Phelps Dodge once anticipated spending to bring its old Morenci reduction works into compliance with government air quality standards. The Chino Mines acquisition was thus both a good fit and a good bargain for Phelps Dodge.

Continued Epler, "Now that Phelps Dodge has added the union contracts at Chino to those at Tyrone, observers are wondering if the Steelworkers union will continue to push its corporate campaign to hurt the company in every way possible in retaliation for the 1983 strike that the unions lost. After all, the continued viability of Phelps Dodge is vital to a large and growing number of union members. Some believe the campaign will now be allowed to quietly expire." For its part, Phelps Dodge agreed to honor the four-year union contracts Kennecott had recently negotiated at Chino, but as Judd warned the new Phelps Dodge employees in January 1987, "We're not a sugar daddy. If this mine is a mistake, I'm history and you're out of a job."[6]

When Phelps Dodge took over responsibility for Chino Mines in January 1987, the acquisition increased the corporation's overall copper

production by about a third. Phelps Dodge personnel also rapidly "PD-ized" Chino to make it more modern and efficient. A few months later, on May 6, 1987, Phelps Dodge announced plans to spend $55 million to construct a new solution extraction–electrowinning plant at Chino capable of producing at least 90 million pounds of copper a year. The SX/EW facility—operated like the Tyrone facility as part of the Burro Chief Copper Company—went on line in October 1988 with a daily capacity of about 120 tons of copper cathodes. Today Phelps Dodge's nonoperating partner at Chino is Heisei Minerals Corporation, jointly owned by Mitsubishi Material Corporation and Mitsubishi Corporation, the Japanese business empire founded in the early 1870s as a shipping company.

Acquisition of Chino was significant to Phelps Dodge in two major respects. First, it reaffirmed management's commitment to the copper business at a time when it was easy to doubt the future profitability of red metal. At the time of the acquisition, the price of copper still hovered around sixty-one cents a pound, and Chino, despite its recent modernization, struggled to break even. Second, the Chino purchase reflected the growing confidence among Phelps Dodge managers and engineers that they could produce low-cost copper. Southwestern New Mexico soon recorded an all-time high in red metal production. Never before had so much copper poured from the mines of Grant County. And there was still more to come. In 1998 Phelps Dodge added another significant copper property in the area when it purchased Cobre Mining Company for approximately $115 million and thus gained the Continental property, which comprised an open-pit copper mine, two underground copper mines, two concentrators, and the surrounding eleven thousand acres of land, all located conveniently close to the Chino Mines complex. Though it temporarily closed Cobre later that year because of low copper prices, it stood ready to expand both facilities to develop their synergy at some future date.

More Than Copper

PERHAPS THE MOST radical part of the Committee of Five Plan that plotted a corporate turnaround in the mid-1980s was its call for diversification outside copper. For the previous century, copper and Phelps Dodge had been virtually synonymous, even if the corporation had in recent years ventured into aluminum, uranium, lead, fluorspar, and other minerals. As part of the new strategy, Phelps Dodge intended to diversify enough to end an almost total dependency on copper and its unpredictable boom-and-bust cycles. It sought to acquire basic industries that would continue to earn profits during down times for copper and thus enable the parent corporation at least to cover its dividend.

The problem for Phelps Dodge was that its previous ventures into aluminum, uranium, and oil and gas had left some industry analysts and stockholders skeptical about all its diversification projects. At the corporation's 1985 annual meeting, one shareholder pointedly asked the new president, G. Robert Durham, "How can you assure stockholders that you will be more successful this time around?" His response was,

"We had some bad luck. We had an aluminum venture; we fortunately made a proper and valid sale of that. We also took a move into uranium, and if you could have predicted the downturn in the uranium market future five, seven years ago, you are smarter than we are. We have had some bad luck. But we have done our best to clean up those disappointments."

Ms. Travis: "Mr. Durham, is that bad luck or poor management?"

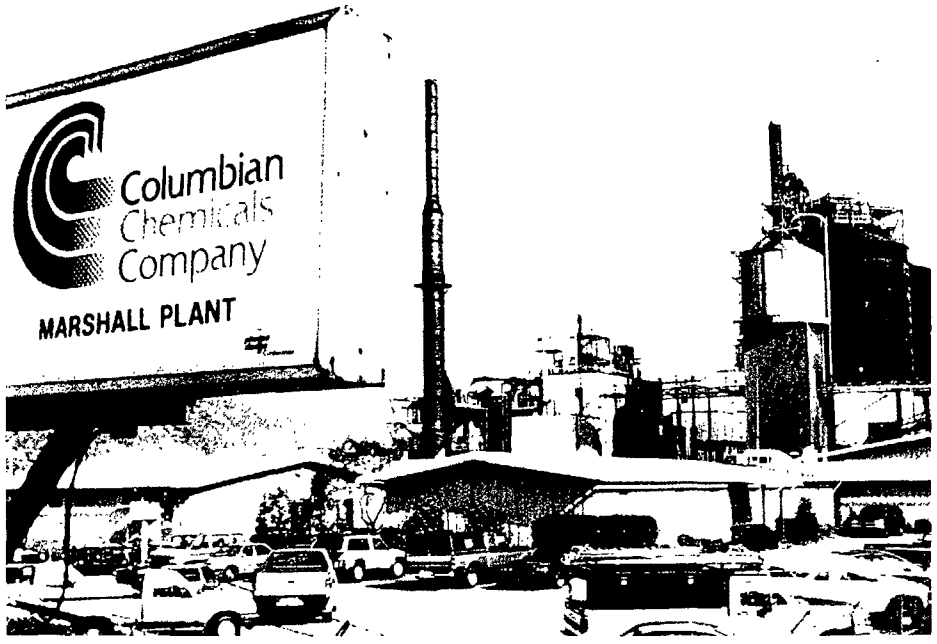
Mr. Durham: "That is a judgmental factor."[7]

In the mid-1980s, Phelps Dodge finally enjoyed a backhanded stroke of good luck. That was after the corporation grew interested in acquiring the Bath Iron Works in Maine, a diversification prospect that greatly appealed to both Durham and Munroe because the firm was America's number one builder of frigates and destroyers for the navy. A long-established enterprise, it had a big backlog of orders that looked like money in the bank. In fact, all during the cold war it had been a highly profitable enterprise, and as an added attraction, the defense-spending cycle typically offset the copper cycle. With those advantages in mind Phelps Dodge bid $500 million for the Bath Iron Works, but came in second. "Thank God we lost it," Douglas Yearley emphasized during an interview in 1997. It turned out that the workforce was angry; further, the end of the cold war and consequently a sharp downturn in defense spending were near at hand. "But for the luck of the draw, our diversification could have been a disaster." Phelps Dodge directors rejected another acquisition prospect, a conglomerate called Standex Corporation, as "too far outside our scope," recalled Durham.[8]

Among other options, Phelps Dodge considered gypsum companies, but Munroe, who served on the board of Manville Corporation, worried about asbestos litigation, and since some major gypsum producers had also once mined asbestos, he warned against acquisition. That proved excellent advice because asbestos litigation soon beset two major American producers and dragged down their earnings.

Another idea was to merge Phelps Dodge and the Cabot Corporation, a big American producer of carbon black. The two enterprises were then roughly the same size, but nothing came of the idea. Nothing, that is, except that as a result of the Cabot contact, Phelps Dodge management grew intrigued by the carbon black industry, and by Columbian Chemicals Company in particular. On November 4, 1986, Phelps Dodge announced that it intended to purchase Columbian. Just one day later, Phelps Dodge again made news when it announced plans to relocate its headquarters from New York to Phoenix. Things were moving fast.

Why Columbian Chemicals Company? Because it offered Phelps Dodge a compatibly sized original manufacturing business that generated good cash flow, ranked among the leaders in its industry, had strong growth potential, and had able management already in place. At the time Phelps Dodge could not spare top executives of its own to turn around another company. Nor, added Durham, did it care to venture into making any consumer goods. On all counts, Columbian Chemicals Company has measured up well. Today, like Phelps Dodge Magnet Wire, it is a process-oriented business and makes a high-quality industrial product. In



ON THE EAST BANK *of the Ohio River near Moundsville, West Virginia, the Marshall plant of Columbian Chemicals Company produces valuable carbon black.*

Columbian's case that product is carbon black, a substance derived from petroleum-based feedstocks that it carefully decomposes under controlled conditions to form various types of special-use carbon particles. Carbon black is essentially pure carbon, like diamonds, but has a different molecular structure.

Most important, Columbian's special carbon blacks greatly improve the tread wear and durability of so-called rubber tires, so-called because they actually contain a substantial amount of carbon black. With its large and active surface area, molecular carbon black bonds easily with molecules of rubber to increase resistance to tearing and abrasion and also to increase the stiffness of rubber compounds. That is why carbon black is essential to all types of mechanical rubber goods, such as gaskets, hoses, conveyor belts, and moving sidewalks. In ancient times, Chinese makers of stick inks burned oils such as tung and sesame and used feathers to collect the carbon residues. Carbon black is still favored for high-quality printing inks as well as for modern electrostatic toners, plastic films, telephone cable jackets, and insulation for high-voltage electrical cables. One of Columbian's customers is Scotland Yard, which uses a specialized form of carbon black for fingerprinting.

From 1986 to 1990, Phelps Dodge invested more than $20 million per year to bring Columbian's manufacturing plants to a level competitive with those of any carbon black producer in the world. Within five years it had earned back its money: "There aren't too many investments where you get payback in less than five years," declared Yearley enthusiastically.[7]

Columbian Chemicals Company was clearly on the move, adding a manufacturing property here and removing another there to strengthen the enterprise. At the end of 1998 it manufactured carbon blacks in twelve plants in nine countries and employed well over a thousand people worldwide. That was when, following acquisition of the carbon black business of Brazil's Copebras, S.A., for $220 million (and the world's largest carbon black plant), Columbian proudly ranked second only to Cabot Corporation in world production. With its major presence in North and South America and Europe, Columbian became a truly global supplier.

After a decade as part of Phelps Dodge, how has Columbian changed? For one thing, emphasis on safety in Columbian's several plants increased noticeably. It also discovered

Highly Engineered Smoke

Columbian Chemicals Company has a lengthy history of its own—one very nearly as old as that of Phelps Dodge itself. It traces its roots back to the mid-nineteenth-century days of lamp black, which artisans made by slowly burning creosote and other oils in cast steel pans by incomplete combustion. They allowed thick smoke to settle out of the air in a confined environment and collected the soot or carbon to make black pigments used mainly for printing inks and to a lesser extent for paints and lacquers.

Prospectors searching for oil beneath the hills of West Virginia and western Pennsylvania discovered that natural gas could be burned under controlled conditions to produce a black pigment, too. The substance, known first as gas black and later as carbon black is about as fine as cigarette smoke. It is part of a family of products that includes graphite, acetylene black, vegetable black, and bone black, the latter made by charring animal bones in ovens or retorts and grinding them to pigment fineness so that they can be used for tints, artists' colors, and artificial leather coatings.

Each of the carbon family siblings possessed distinct characteristics, such as the natural lubrication that made graphite suitable for common "lead" pencils. Among the most recently discovered forms of carbon are fullerenes, named for R. Buckminster Fuller, inventor of geodesic domes, "bucky balls," and Phelps Dodge's own Dymaxion Bathroom of the 1930s (see chapter 8). A bit of early doggerel used to explain members of the carbon family to children contained these words: "Carbon diamond is arranged in a regular array while carbon soot is put together in a helter skelter way."

Further, carbon black, depending on its application, could be engineered to form a very active particle or a rather inert one. The rougher its edges, the more eager it was to bond with other materials. Depending on how it is made, it can be shaped like bunches of grapes or be strung out like beads on a string. "It is incredibly complex material," observes Rodney Taylor, vice-president for technology at Columbian and a fuel scientist who clearly relishes the challenge of digging deeper into the mysteries of carbon black.

Columbian Chemicals today offers more than eighty carbon black grades to satisfy the exacting requirements of users in a variety of different industries. It manufactures each one to meet a specific application, whether that be the finest high-color black for an automobile finish or an inexpensive low-color black for painting iron castings.

At the close of the twentieth century, carbon black in all forms is highly engineered smoke. Like that of magnet wire and numerous

considerable common ground with its parent corporation. Both enterprises maintain a strong work ethic, both utilize the talents of many engineers, and both are technology driven. And, stresses Columbian's President John T. Walsh, "we must religiously pay attention to our costs, and we have been through a series of tough times." One important and valuable difference: Columbian Chemicals Company and its carbon black have much flatter business cycles than copper. Good times or bad, people still buy tires. In fact, by the late 1990s carbon black sales accounted for such a rapidly growing percentage of Phelps Dodge earnings during a time of low

other products we seldom notice though they are vital to modern life, the evolution of carbon black relates to the main currents of American history in surprising ways. Consider automobile tires, for example, which are today the biggest users of carbon black. In 1895 the Michelin Company in France introduced the world's first tires with compressed air for use on a sputtering new invention called the automobile. Pneumatic tires lasted a mere twenty-five hundred miles before they needed to be replaced, if they did not suffer a blowout first. Their natural rubber simply wasn't strong enough. Happily for modern motorists, a chemist discovered by accident in 1904 that when carbon black was mixed with natural rubber it became a significantly more durable product. After that lucky discovery, drivers could go as far as twenty thousand miles on one set of tires, and much farther today. Without carbon black, tires acted like giant erasers and rapidly left all their rubber on the road surface. Carbon black can be engineered to reduce heat buildup in fast-running tires.

The importance of that discovery was not fully appreciated until automobiles began to multiply rapidly after 1910 and extended tread wear grew important to motorists. Introduction of reinforcing cords into tire carcasses was important too, but without carbon black, the cords would easily have outlasted the rubber. Today, the average automobile tire includes about five pounds of carbon black.

The Columbian Carbon Company, formed by a combination of several different manufacturers in 1921, was long allied with the Binney and Smith Company, a firm that specialized in pigments and whose Crayola crayons have become synonymous with American childhood. In 1955 the two firms went their separate ways. Columbian maintained a far lower profile than the Crayola maker, although by the early 1960s it had emerged as a major international producer and distributor of carbon black. From 1962 to 1979 it was part of the Cities Service Company. On its own once again, it adopted the name Columbian Chemicals Company in 1980 to reflect its broad scope of operations. Phelps Dodge bought Columbian Chemicals in December 1986. It was President G. Robert Durham's ideal "smokestack industry," although it was no longer one that released black clouds of smoke or soot into the atmosphere.

(Based on a telephone interview with Rodney Taylor, February 11, 1999, and "The Columbian Chemicals Story," unpublished ms., ca. 1997.)

copper prices that Columbian was the single brightest star within the corporation's universe. That development affirmed the wisdom of the diversification strategy developed by the Committee of Five back in 1984.[10]

A New Manufacturing Landscape

During 1987, Phelps Dodge Corporation assimilated both Columbian Chemicals and Chino Mines companies quickly and smoothly into its family of operations. The two

new acquisitions meant that Phelps Dodge moved into 1988 about a third larger than it had been in 1986. But Phelps Dodge was far from finished refashioning its manufacturing landscape. In March 1988 it obtained Accuride Corporation for $272 million in cash and assumed debt. By gaining control of North America's largest producer of wheels and rims for medium and heavy trucks, truck trailers, and buses, Phelps Dodge further confirmed that it intended to lessen its dependence on copper.

Accuride, which originated in 1905 as Firestone Steel Products, the first subsidiary operation of the Firestone Tire and Rubber Company in Akron, Ohio, took its present name in 1986 when it went independent. Phelps Dodge held the Henderson, Kentucky–based enterprise for a decade until selling 90 percent of its interest for $480 million effective January 1, 1998 (and the remainder later in the year). Proceeds from the sale enabled Phelps Dodge to buy the Cobre Mining Company in New Mexico and the Copebras carbon black plant in Brazil.

Back in the late 1980s, both Accuride and Columbian Chemicals had enlarged the holdings of Phelps Dodge Industries, which as recently as the mid-1980s included only Phelps Dodge Magnet Wire and Phelps Dodge International. Another addition before the end of the 1980s was Hudson International Conductors, a family-owned and -operated specialty wire manufacturer until Phelps Dodge bought it in November 1989. The purchase price was approximately $60 million in cash and assumed debt; annual sales were around $85 million.

In 1910 the Hudson firm (dating from 1902) pioneered a process for plating silver on copper wire for applications in the electrical industry, and it subsequently developed special alloys and complex constructions for stranded conductors. During the years that followed, the company specialized in high-strength, high-reliability, and carefully engineered wire. Especially from the 1960s through the mid-1980s, Hudson prospered along with America's expanding aerospace industry, and its biggest single market became commercial aircraft. With the end of the cold war it continued to produce fine wire to meet aerospace requirements for guided missiles, satellites, and even the Hubble space telescope. In addition, its high-temperature nickel-plated conductors for the automotive and appliance markets turned up in fuel system sensor wiring, waffle irons, and hair dryers; its silver-plated copper wire was used to make computers and printer cables.

In May 1996, Phelps Dodge Corporation acquired yet another family-owned specialty products firm, Nesor Alloy Corporation. The New Jersey–based enterprise was a leading manufacturer of tin-, nickel-, and silver-plated wires, and one of Hudson International's competitors. Phelps Dodge united the firms as Phelps Dodge High Performance Conductors, an operating division of Phelps Dodge Industries. Also part of the union was Phelps Dodge's venerable Bayway facility, transferred in 1990 from Phelps Dodge Magnet Wire to Hudson International, which had for years used an alloy that Bayway supplied. Incidentally, another specialty product from Bayway was trolley wire, and one of its customers was Amtrak, which extended it over electrified parts of its tracks serving New York's Pennsylvania Station.

In all, by the mid-1990s an enlarged and revitalized Phelps Dodge Industries accounted for approximately a third of the corporation's annual income and about 49 percent of its assets. From 1988 through 1997, the operating cash flow of Phelps Dodge Industries averaged almost $150 million annually, and in 1995 it topped $243 million. The strategy to diversify out of copper as outlined by the Committee of Five back in 1984 paid off most brilliantly during 1998, when, as a result of another downturn in the price of copper, annual earnings generated by Phelps Dodge Industries for the first time surpassed those from Phelps Dodge Mining Company.

The Decade's Winners and Losers

The rest of the story for America's Big Three copper producers in the 1980s was one of triumph or tragedy—a time of rebirth or restructuring or shaking out—depending on your perspective. For Phelps Dodge the period was unquestionably one of newfound success and ascendancy, but what happened to its two major competitors was sad and provided a "but for the grace of God go I" perspective on the whole survival struggle. It clearly illustrated the profound and lasting structural changes that overtook America's copper industry.

Phelps Dodge for most of the early twentieth century ranked well behind Anaconda and Kennecott, although by the time of World War I it had pulled ahead of Kennecott in its copper-producing capacity. During the difficult years of the 1920s it dropped back again. Alas for Anaconda, its greatest properties were located in Chile where government expropriation in the early 1970s hurt it and Kennecott, but the former far more than the latter. After that, Phelps Dodge steadily closed the gap to become America's number one producer.

Standard Oil of Ohio acquired Kennecott for $1.8 billion in 1981. The timing couldn't have been worse. SOHIO suffered $59 million in losses during the first six weeks of ownership! Kennecott then reported losses of $189 million in 1982 and $91 million in 1983, much as Phelps Dodge did at that same time. During those same years Kennecott laid off three thousand employees and temporarily suspended its Chino and Ray operations. By the late 1990s, Kennecott's only remaining large copper asset was its venerable Bingham Canyon property, which it closed in 1985, reopened in 1988, and then sold along with what remained of the company to RTZ (Rio Tinto Zinc), the giant British mining company, in 1989.

An even more poignant example of what might have happened to Phelps Dodge during the grim days of the early 1980s was Anaconda, which had grown to become the largest nonferrous mining company in the world, and second only to United States Steel as a metal producer. It seemed powerful, but it was also vulnerable, as Chile's takeover of its copper properties in 1971 illustrated. The loss of the huge Chuquicamata mine staggered Anaconda: Chilean expropriation cost it approximately $450 million; Kennecott lost $150 million. Worse still, Anaconda had borrowed heavily from New York lenders to expand its holdings in Chile and had counted on its Chilean profits to repay those loans. To pay off its bankers, the company shed

assets, including its forest products division that owned and managed more than six hundred thousand acres of prime timberland in western Montana. In nearby Butte, Anaconda had labored to save its onetime crown jewel and even talked of restoring the "Richest Hill on Earth" to its former grandeur and profitability.

Robert O. Anderson, chairman of Atlantic Richfield Company, in the seventies wanted to acquire Phelps Dodge. Turned down earlier by Chairman Robert Page, in late 1976 he closed a deal with Anaconda, and by January 10, 1977, the copper company became an operating subsidiary of Atlantic Richfield (ARCO). At the time ARCO was awash in cash because its Alaska pipeline had just begun production, and the steady flow of black gold from the North Slope gave it plenty of money to invest. Wanting to diversify, it thought the world of rising commodity prices would surely buoy copper as well as oil. ARCO's goal was to restore the Anaconda Company to its former greatness.

For ARCO, as for SOHIO, the venture into copper turned out to be a disaster. A loss of $332 million in 1982 hit Anaconda hard, and it never was able to trim production costs that averaged nearly twice the market price for copper. A few months later the company shut its Berkeley Pit in Butte and allowed water to flood its underground mines. Anaconda was so ill that the best ARCO could do was liquidate the business permanently after a century of operations. By 1986 the oil company had exited hard-rock mining and sold off Anaconda's remaining assets. Once the industry leader, Anaconda ceased to exist (though ARCO had to retain its environmental liabilities).

The marriage of oil and copper during the 1980s proved a debacle, one of many during that decade of wrenching shake-outs for American copper producers. By 1990, the nation's four biggest survivors were Phelps Dodge Corporation, Magma Copper Company, ASARCO, and Cyprus Minerals, all of which made giant strides to modernize their operations. At the time, Phelps Dodge alone produced more than 40 percent of all copper mined in the United States.

The Road Ahead

Chairman Durham implemented yet another mandate of the Committee of Five Plan when he relocated Phelps Dodge's headquarters—and not merely to another address in New York City. A great believer in the Sunbelt, he chose Phoenix. The move consolidated top management in a single location and was logical because recent pruning of New York–area manufacturing plants had shifted the corporation's center of gravity noticeably west toward its mining company properties.

In December 1987, Durham announced that, because of Phelps Dodge's strong financial recovery, he had concluded the 1984 restructuring program and was no longer willing to sell any remaining properties identified in that plan, among them the corporation's share of the Black Mountain Mineral Development Company in South Africa and Southern Peru Copper. Now Durham wanted to streamline Phelps Dodge itself. In September 1988 he divided it into two operating divisions, each with distinct goals and

personalities. One was Phelps Dodge Mining Company, headed by Len Judd, forty-eight, and the other was Phelps Dodge Industries, headed by Doug Yearley, fifty-two. Both men reported to Durham.

One of Durham's great strengths was his ability to fix problems. He seemed bored with everyday management: "If it got quiet, 'Bull' would create a project. We tried not to let it get too quiet," recalled Yearley. Nonetheless, Durham retired early on June 30, 1989, at age sixty. Whether he realized it then, in his future were still more fix-it projects for other corporations. "When I was elected president in 1984 and chairman in 1987," Durham said of his impending retirement, "I had an understanding with my family and with my colleagues at Phelps Dodge that my term in office was not to be determined by the mandatory retirement age but rather by the earlier reaching of goals we had set for the company." He noted that those goals had been reached. Offering a retrospective look at what Bull Durham accomplished between 1985 and 1989, a former senior vice-president, Richard Pendleton, Jr., observed in a 1998 letter to Richard T. Moolick, "I have to tell you that (love him or hate him) Bull did an excellent job of implementing that business plan." Durham was, according to William G. Siedenburg, the vice-president of research at Smith Barney, Harris, Upham and Company, the "mainspring" of the turnaround.[11]

After Durham took early retirement, Yearley became chairman and chief executive officer and Judd became president and chief operating officer. At the time Judd continued to serve as president of Phelps Dodge Mining Company. His professional training, both in terms of formal education in mining and business administration and hands-on experience, typified what it took to manage the corporation's technologically and financially sophisticated mining operations.

Judd had a remarkable career path. A native of Butte, Montana, and son of a diamond driller who did exploratory work for the mines, he originally attended the Montana School of Mines in his hometown before completing a degree in metallurgical engineering at the University of Arizona. Work in thirteen different jobs after he joined Phelps Dodge the first time in 1963 gained him valuable firsthand knowledge of the corporation's mine, mill, and smelter operations in the Southwest. In addition, he attended school on the side to earn a master's of business administration in 1968, a professional degree few people in Western Operations had at the time. After a four-year stint at the Cities Service Company, he returned to Phelps Dodge in 1973 to oversee the new smelter complex at Hidalgo, and from there he continued up the career ladder.

Yearley possessed a similar wealth of training and experience on the manufacturing and marketing side. Between them, Yearley and Judd knew the corporate landscape intimately. Further, they were both veterans of the Committee of Five (like Durham) who would be running Phelps Dodge in general accordance with the strategic plan they laid out in 1984. Judd, however, continued only until 1991, when he reluctantly chose to retire at age fifty-two because he developed debilitating, even life-threatening, cluster headaches. The malady began in 1983, shortly after he moved to New York, and disappeared six months after he retired, but Judd

declined to return formally to the world of corporate business. Choosing to retire as president of Phelps Dodge at the peak of his career was for Judd "the most difficult thing I've ever done in my life."[12]

Yearley, on the other hand, remained at the helm of Phelps Dodge until the start of the new millennium, and for a time he added the title of president to that of chairman and chief executive officer. Beginning in 1989 his strategy was to move Phelps Dodge as fast as prudently possible beyond mere corporate survival and commit it once again to a course leading to financial strength and profitable growth. "It's not going to be a revolution," he prophesied at the start of the 1990s. "We're not going from being a copper company to making cigarettes or perfume. But we do intend to build on our strengths and, hopefully, grow and stabilize earnings."[13]

Copper remained Phelps Dodge's core business, and the corporation publicly renewed its commitment to red metal by investing more than $275 million, a sum that included the purchase of the Chino Mines Company, during just the first three years of the Committee of Five Plan. The commitment continued after Yearley took the corporate reins in 1989. During the next four years, Phelps Dodge strengthened its existing

Phelps Dodge Corporation

Earnings Rebound

Year	Net Income (Loss) (in millions of dollars)	Average Copper Price per pound (COMEX)
1980	91.3	$1.01
1981	69.3	0.84
1982	(74.3)	0.73
1983	(63.5)	0.77
1984	(267.8)	0.61
1985	29.5	0.61
1986	61.4	0.62
1987	205.7	0.78
1988	420.2	1.15
1989	267.0	1.25

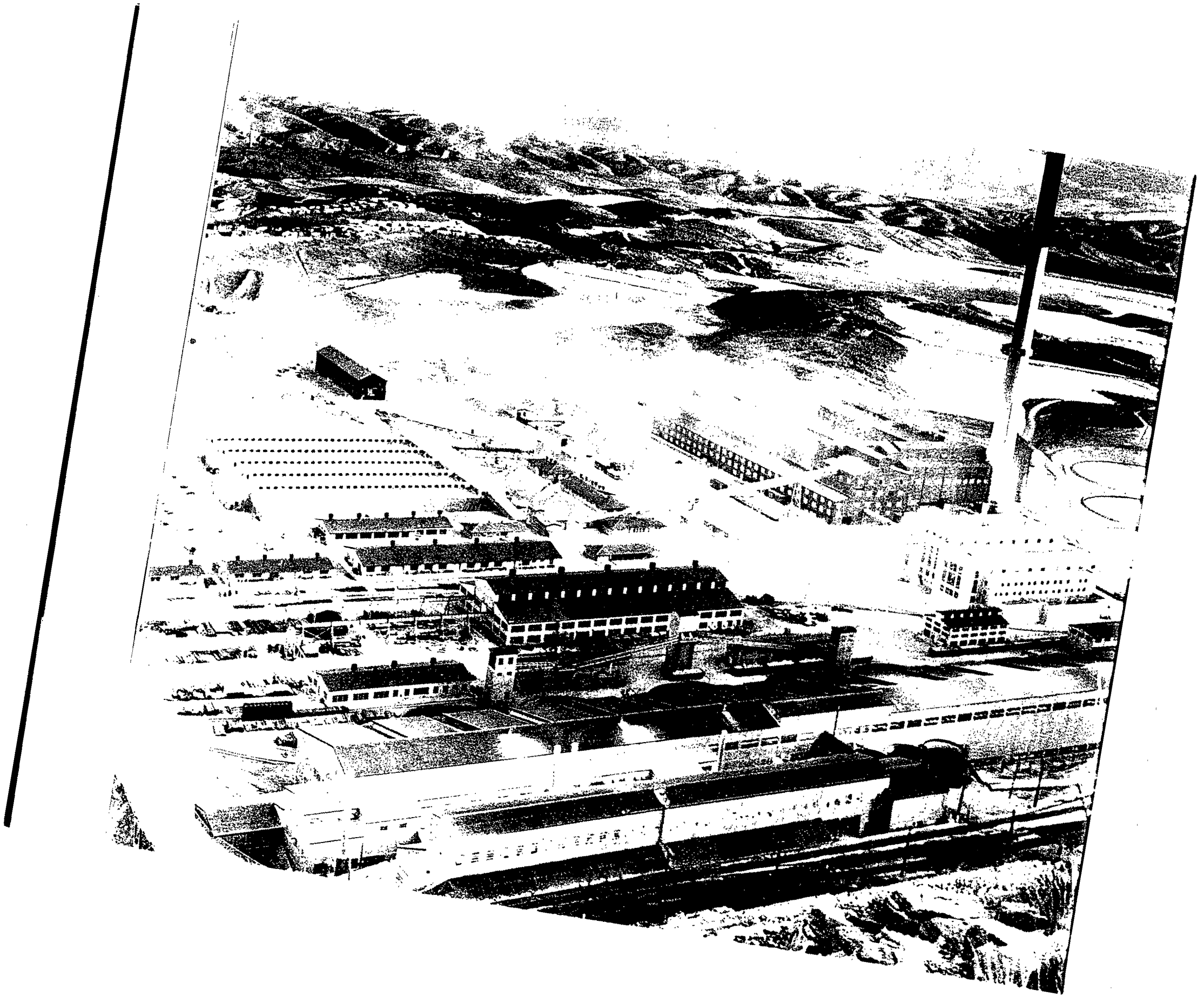
operations by investing $125 million in SX/EW technology, $250 million more on other projects intended to boost productivity and cut costs at its mining operations, and $125 million to upgrade its manufacturing plants. In addition it launched construction of the Candelaria mine complex in Chile.

All in all, Phelps Dodge, which had been labeled one of the aging behemoths of American industry in the early part of the decade, bounded into the 1990s with the vigor of a colt. In fact, as early as the second half of the 1980s, the corporation posted record copper production for five consecutive years. Chino in 1989 had the best year in its eighty-year history. The result was that when Durham retired, the corporation's balance sheet was far stronger than it had been in a decade, and the future looked bright. The restructuring has been hailed as one of the 1980s top ten corporate success stories.

The biggest financial payoff from the Committee of Five's strategy came initially in 1987 and 1988 when a dramatic climb in copper prices combined with the corporation's ability to produce low-cost copper to make Phelps Dodge quite flush for the first time since 1980. "No one breathed quite normally until copper prices jumped in 1987," quipped Yearley. That year the company had record earnings, and 1987 was only the first of several phenomenally good years. By the end of 1988, long-term debt had dropped to slightly less than $450 million from more than $600 million when the strategic plan went into effect in 1985.[11]

It was reward time too for Phelps Dodge stockholders. The corporation radiated newfound optimism when it resumed its dividend in September 1987, and it increased its payout by an impressive 33 percent the following year. Stockholders received an extraordinary dividend of $10 per share in 1989. Those dividends were paid almost entirely out of cash flow generated during those years. Greatly enhanced stock performance reflected the positive changes. Common stock that hit rock bottom in 1984 when it sold for $12.88 a share rebounded to a high of $62.75 by the time Durham left. After Yearley succeeded Durham, the price climbed from slightly more than $31 following a two-for-one split in 1992 to nearly $90 by 1997, before declining copper prices pushed it back down into the lower $50s range in late 1998 and early 1999. That was still about eight times higher than the 1984 low.

Finally, among the developments that forecast a bright future for Phelps Dodge was an exciting discovery its exploration personnel made in the desert of northern Chile. During the 1980s and 1990s, when the corporation not only restructured and turned itself around financially, it also reached out with increasing confidence to distant parts of the globe, and not just in mining but also in manufacturing.





Chapter Sixteen

FROM COPPER KINGDOM *to* GLOBAL ENTERPRISE

LONG THE ROAD back from the brink in 1984 are several outstanding landmarks in Phelps Dodge history. One is solution extraction–electrowinning (SX/EW) technology that the corporation first implemented at Tyrone, and later at Morenci and Chino, to produce low-cost copper. Another is the general make-over of the landscape of production at Morenci after Phelps Dodge had sold a 15 percent stake in the property to the Sumitomo Corporation. Buoyed by a growing sense of confidence, Phelps Dodge dramatically expanded its role in the international arena, particularly after its discovery of a world-class ore body in Chile.

Make-over at Morenci

AT MORENCI, THE internationalization of Phelps Dodge was subtle. It began after President G. Robert Durham and Leonard R. Judd, a senior vice-president, traveled to Japan in late October

AERIAL VIEW OF THE *landscape of production at Morenci in 1947. In the right foreground is the concentrator; the smelter stands in the center. After the reduction works shut down in late 1984, the smelter sat idle for the next ten years. Demolition began in August 1995, at which time workers recovered another four million pounds of copper from its maze of ducts, bins, and hoppers.*

1984 in search of investment capital to implement yet another portion of the Committee of Five Plan adopted only days earlier. Initially the corporation had placed as much as 40 percent of its Morenci complex on the auction block, but after lengthy negotiations it instead sold a 15 percent share to Sumitomo Metal Mining Company, Ltd., and Sumitomo Corporation for $75 million in February 1986. It never did sell the other 25 percent, and Phelps Dodge executives now consider that a stroke of good luck.

Certainly the Japanese "made a great buy," reflected Durham, but the company had to have the money. "What was left to sell? Only a small piece of one of Phelps Dodge's mines." In return, the stake supplied Sumitomo, a major world copper smelter operator, with a portion of Phelps Dodge's concentrate requirements. The deal thus gained the cash-strapped company much-needed capital, and the 15 percent of Morenci concentrates it dispatched to Sumitomo was the portion Phelps Dodge lacked smelter capacity for in 1986. Judd called it an "unbelievable blessing" for both parties.[1]

About a year of negotiations went into forging their partnership, but one may wonder what brought the two old-line enterprises together in the first place? They actually had much in common. Like Phelps Dodge, Sumitomo originated as a trading company (some three centuries earlier) and became a major force in the global copper industry. Its Sumitomo Metal Mining Company ranked among Japan's major mining and smelting enterprises; its Sumitomo Electric Industries was Japan's largest maker of electric wires and cables. In short, because their lines of business were so similar, the American and Japanese companies were not strangers to one another.

Judd had used consultants from Sumitomo to help him solve problems at the Hidalgo smelter. Even earlier, Phelps Dodge and Sumitomo had been wire-and-cable manufacturing partners in three countries, including Thailand. In the late 1950s, Sumitomo Electric sent engineers to Phelps Dodge's fabricating plant in Yonkers, New York, to learn how to make power cables. Because of their years of collaboration, "Sumitomo was the logical choice," emphasized Durham. It was a sign too that any past distinctions between its domestic and international operations came to mean less and less at Phelps Dodge during the 1980s.[2]

To part with even 15 percent of the corporation's crown jewel was a tough decision. When executives broached the idea of selling Sumitomo a stake in Morenci, some Phelps Dodge board members thought management had been "smoking pot," recalled Douglas Yearley. They regarded that mine as "our mother lode." Later, after its deal was in place, management advised concerned observers that day-to-day operations at Phelps Dodge Morenci, Inc., would not change substantially from those at the familiar Morenci Branch. In many ways that was true, but money from Sumitomo did pay for improvements that increased the efficiency of the sprawling complex and altered its landscape of production.[3]

Over the years, Phelps Dodge had produced copper at Morenci in various forms: initially as loaflike ingots that came from smelters located in

both Clifton and Morenci, then as flat anodes from the big Morenci smelter that operated from 1942 through 1984, and since 1987 as sheets of SX/EW-produced cathodes. Phelps Dodge's initial investment of $90 million in SX/EW technology enabled it to recover copper from dumps that contained material too low grade to run through Morenci's mills. As elsewhere, SX/EW technology dropped production costs for electrowon copper to approximately thirty cents a pound. After adding a second huge SX/EW plant in 1995, Phelps Dodge Morenci became the world's largest user of that advanced form of hydrometallurgical processing. During 1996 its SX/EW facilities yielded more than 525 million pounds of copper, or about half of all red metal that originated at Morenci.

In its quest for greater efficiency, Phelps Dodge switched from train to truck mining at Morenci during the 1980s. The open-pit mine was originally designed for rail haulage and had been operated that way since the early 1940s, but over the years truck technology had steadily improved. By the early 1980s, some haulage trucks began to work in the pit. Their stepped-up efficiency impressed corporation executives, who committed Phelps Dodge to converting the mine as promptly as practicable from trains to trucks by purchasing a fleet of twenty-nine 170-ton haul trucks at more than three-quarters of a million dollars apiece. In May 1986 all train haulage ended in the pit, and just ahead were other major changes for ore transport out of the mine.

Back in 1980, Phelps Dodge halted production at its Metcalf mine and supplied ore to both the Morenci and Metcalf mills from its Morenci mine alone. Production from the Metcalf mine resumed in 1989, as the Clay ore body in the original Morenci pit showed signs of soon being mined out. That same year Phelps Dodge spent $48 million to install an in-pit crushing and conveying system that reduced truck haulage and fully eliminated the need for trains to take ore to the concentrators. After that, trains hauled only carloads of copper concentrates and bundles of SX/EW cathodes from the Morenci complex downhill to a railroad connection in Clifton.

With the new system in place, haulage trucks made relatively short shuttles between the electric shovels and one of the two in-pit crushers or the low-grade ore stockpiles, where SX/EW technology began working its magic on copper. A conveyor belt several miles long extended from the crushers uphill to feed the mills. Where it dipped downhill, the weight of its ore load generated electricity to offset partially the cost of running the uphill portions. By the mid-1990s, Morenci used its long conveyor belt and fleet of haulage trucks—some of them carried as much as 320 tons—to move about 750,000 tons of rock per day. Louis D. Ricketts, who had installed two conveyor belts at Morenci back in the late 1890s (possibly the first ones to be used in the Southwest), would no doubt have admired such efficiency.

In the late 1990s, Phelps Dodge Morenci employed approximately two thousand people. In total, Phelps Dodge Mining Company employed some sixty-five hundred people in five countries. The most important location outside the United States was Chile, where the alliance first forged

with Sumitomo in arid southeastern Arizona flowered anew in the lonely, dry-as-dust Atacama Desert. That was where Phelps Dodge unearthed a major new source of copper. Making negotiations between the two partners easy were the alliance they had forged at Morenci and their growing understanding of one another.

The former chairman George Munroe recalled that the chief executive officer of the Sumitomo Bank had once visited Phelps Dodge headquarters while he toured the United States. Noticing the oversized portraits of the founders and former chairmen hanging in the corporation's New York boardroom, he remarked through an interpreter that Phelps Dodge was the first company he had visited in the United States where he felt a sense of history akin to that in Japanese firms. "This was comforting," thought Munroe.[3]

After its Morenci investment, Sumitomo gained enough confidence in Phelps Dodge to spend another $40 million to acquire a 20 percent stake in the massive ore body that a Phelps Dodge exploration team discovered in northern Chile. As Compañía Contractual Minera Candelaria, the newly developed mine and mill complex became Phelps Dodge's biggest and most productive venture outside North America. For that reason, Candelaria helped raise the curtain on a new phase of international mining enterprise—much as acquisition of Bisbee's Copper Queen Mine had resulted in major new opportunities in the Southwest a century earlier. In addition, discovery of Candelaria highlighted the growing sophistication of Phelps Dodge exploration personnel.

Adventures in Exploration

The work of exploration was never for the faint of heart. It often meant living in isolated camps, where the main compensations were everyday camaraderie and the special sense of excitement that came with a major discovery. It meant curiosity strong enough to drive searchers despite fears of encountering poisonous snakes and torment from blood-sucking leeches as they tramped through steamy jungles—travails that make for great stories in retrospect.

One of the best raconteurs is Patrick J. Ryan, the jovial South African–born geologist who headed Phelps Dodge's exploration activities for many years during the 1980s and 1990s. He fondly recalled a time during the early 1980s when he investigated old underground workings in the eastern Transvaal of South Africa accompanied by a local guide and a young lawyer and other personnel from Phelps Dodge's headquarters in New York. The mine was dark and infested with bats (some perhaps rabid), and because the roof of the adit was low and uneven, the group sometimes had to walk bent over. Adding to their sense of foreboding was a warning from locals that the place was home to a black mamba, a South African snake so deadly that if it bites a person above the belt there is no effective antidote for its lethal venom. The serpent is commonly nicknamed the Two Step because that is supposedly how far a person can run before being felled by its poisonous bite.

Sure enough, as they slowly proceeded deep into the mine, their guide suddenly yelled out "Inyoka!" the Zulu word for snake. Just ahead in

the glare of his light lay a black mamba. Team members nervously debated among themselves what to do. Because everyone wore respirators, muffled speech added to the otherworldly nature of their quest. Meanwhile, their adolescent guide impulsively picked up a loose piece of timber and swung at the reptile, which slithered into the dark, perhaps toward them.

They hesitated a few moments until someone yelled, "There it is!" True or not, that was enough to spook the whole group. Everyone turned and ran toward the distant entrance. Almost immediately the lawyer's hard hat slammed into a low section of roof, and the impact knocked him back onto Ryan, who was himself beating a hasty retreat. Both men tumbled to the dark floor. Whereupon, Exploration's legal counsel and the corporation's future president, Steve Whisler, did the perfectly human thing: he jumped to his hands and knees and crawled off at a record-breaking pace.[5]

"The lifeblood of a mining company is its exploration," Ryan stated with great passion during an interview in early 1996. "That is because each mine has a finite life. You must either replace exhausted ore bodies with new ones, or buy new ones. Good mines are not normally for sale. Without exploration the company is going to die." He noted that "exploration is really the cheapest way to find new mines and grow the company."[6]

Unlike exploration in the days of James Douglas, modern exploration is not an individual effort. Whenever Ryan was asked to discuss the company's activity over the years, he invariably credited teamwork. During an interview back in 1978 he noted, "Of course, most of the detailed work of piecing together the whole jigsaw puzzle of the ore body was done by my staff and these chaps deserve a tremendous amount of credit for all the work that was done in a very thorough and detailed fashion." A typical team draws together geologists, geophysicists, geochemists, mining engineers, metallurgists, accountants, and many other specialists. Like the famous detective Sherlock Holmes, they use an array of tools to obtain the clues they use to build up a picture piece by piece. This evidence will help Phelps Dodge decide whether to take the next step and actually develop a mine.[7]

While engineers and geologists investigate what lies underground, other specialists investigate the availability of a workforce, water resources, electric power, transportation and communications, and a local infrastructure to support the mine complex. Financial analysts study sources of funding and calculate the impact of interest payments on the proposed mine's operating costs and cash flows. The process illustrates how brains as well as brawn are required for success in modern metal mining. At Morenci today, computer programs will help determine the characteristics of an ore body, but the familiar rock pick and compass have by no means been consigned to the shelves of a museum. "There is still a place for the prospector," explained Robert Jenkins, who is manager of international exploration for Phelps Dodge Exploration Corporation. "You've got to get out into the field and beat on rocks. You still must walk the terrain."[8]

The first step toward locating a promising ore body is geologic mapping, which may mean walking over outcrops and noting rock types, the

abundance and type of ore minerals, and the thickness and orientation of veins and faults. At Morenci that type of basic information is often compiled with the aid of maps dating as far back as 1905. Historic maps of surface and underground geology sometimes offer the only easy way to learn about areas that are currently covered by low-grade ore stockpiles or otherwise inaccessible. Next, workers drill holes in a grid pattern to obtain samples from the mineralized area. Specialists study the data in order to fashion a three-dimensional model of the deposit, for which they will use computer modeling to predict ore grades between the drill holes. Modern exploration involves a lot of drilling and geophysical surveying because today's searcher for copper will not likely delineate a large ore body using surface evidence alone.

The exploration team forms the advance guard of any mining company. Mining by nature is temporary, and team members might be described as "the clouds" of the corporate landscape, muses S. David Colton, onetime counsel to Exploration and now a Phelps Dodge Corporation senior vice-president and general counsel: "They often come and go and don't give you anything. In fact, you're regularly confronted with disappointment," a sobering fact given a positive twist by A. L. ("John") Lawrence, president of Phelps Dodge Exploration Corporation, who observed in 1998 that "in a global sense exploration is a losing game, but there are players who are consistently successful, consistently adding value to the company, and we're one of them." Successful exploration, furthermore, requires both sustained effort and a corporate commitment that continues through both good times and bad."

The processes of exploration can take up to six years, as was the case for Candelaria, and sometimes longer. And remember, notes Colton, that "mines are very much like children: each one is different; each one is unique." For that reason, modern Phelps Dodge mines overseas, no less than the historic ones closer to home in Bisbee and Morenci, come with their own adventure stories."

From South Africa to Chile

AT ONE TIME in the not-too-distant past, Phelps Dodge had boasted of its all-American status, though during the late 1950s it reached out cautiously from its established bailiwick in the Southwestern borderlands to invest in the Southern Peru Copper Corporation. In the early 1970s it reached partway around the world to probe for mineral deposits in more distant Australia and South Africa.

There was a pattern to early overseas exploration activity. In the late 1960s and early 1970s, when foreign governments expropriated American and European-owned mines, Phelps Dodge preferred to play it safe. As it surveyed mining opportunities outside North America, apart from its relatively modest stake in Peru, it came to believe that only Australia and South Africa offered reasonable assurance that if it located a promising mineral deposit it would be allowed to develop it.

About thirty miles from the Australian



S. DAVID COLTON *became vice-president and general counsel of Phelps Dodge Corporation in 1998, at which time he joined the Senior Management Team. He was elected a senior vice-president in late 1999. Eleven years earlier he had joined Phelps Dodge Mining Company as exploration counsel. Colton later served as vice president of Phelps Dodge Exploration Corporation. He holds a B.A. degree in economics and a J.D. from Brigham Young University.*

capital of Canberra it became a partner in the Woodlawn Project, a $90 million open-pit mine that after commencing full production in 1979 yielded mainly zinc and some copper. Phelps Dodge earned $2.8 million from the joint venture in 1980, but Woodlawn proved a disappointment, and the corporation sold its one-third interest in 1985 when it pared away underperforming properties to raise money needed for other projects. Also as part of its 1985 restructuring, Phelps Dodge sold its 49 percent stake in the once-promising Cayeli copper-zinc deposit in Turkey.

It was in South Africa that Phelps Dodge made a major find—and not just in terms of mineral deposits. There it gained Patrick J. Ryan, a man in the mold of the elder James Douglas and Louis S. Ricketts, who combined rigorous scholarship with a passion for field research. From the day Ryan was born on a gold mine in South Africa in 1937, until long after he retired from Phelps Dodge as a senior vice-president in 1995, mining formed the focal point of his life. In fact, both his father and grandfather had long been active in South African gold mining. Young Pat launched his own career in mining some eight thousand feet below the surface of the Witwatersrand where he operated a jackhammer. He also attended the South African School of Mines, from which he graduated with a diploma in mining; he later earned a degree in mining geology and master's and doctor's degrees in geology from the University of the Witwatersrand. For Ryan the search for good ore bodies was more than an intellectual pursuit; it was his personal passion. He loved reading, particularly anything to do with mining, and even when ostensibly on vacation he and his wife spent considerable time visiting mines.

Ryan, after working initially for Anglo American Corporation of South Africa, joined Phelps Dodge's South African operations in October 1970 while they were still in the beginning stages. In short order he discovered a large tonnage of fluorspar in the western Transvaal, on a property he recommended that Phelps Dodge purchase in 1971. Until sold in 1999, Phelps Dodge Mining (Pty.) Ltd., was a wholly owned subsidiary operating the Witkop mine and mill to produce acid-grade fluorspar concentrates, an important mineral that the chemical industry uses to make refrigerants.

Witkop was a good beginning. In 1971 Ryan, Phelps Dodge's newly appointed exploration manager for southern Africa, played a major role in the discovery of the Black Mountain mine in far northwest Cape Province, about 180 miles from Cape Town and at the edge of the Kalahari Desert. Phelps Dodge spent about $22 million on the initial development of Black Mountain, but because it was nervous about investing any more money in South Africa it sought a partner willing to supply the necessary capital to bring the mine into production, about $220 million. That was why in 1977, following discussions with several mining companies, Phelps Dodge selected Gold Fields of South Africa Ltd. as its joint venture partner and retained a 49 percent interest in Black Mountain Mineral Development Company (Pty.), Ltd. The mine came into full production in late 1979. Though Black Mountain never was the lucrative property Phelps Dodge originally

hoped it would become, by the mid-1980s the underground mine in South Africa had matured into one of the world's leading lead producers.

The Black Mountain discovery helped make Ryan's reputation at Phelps Dodge. Back in the late 1920s, miners had sunk a shaft on Black Mountain (Swartberg) very close to the site where Ryan and his crew found a rich deposit, but those early seekers came away empty-handed. At least four more times between 1932 and 1963 mining geologists examined the area only to miss its mineral treasure. The well-concealed ore body did not provide clues that fit the searchers' preconceived notions of where to look. The story continues in 1969 with William K. (Bill) Brown, at that time Phelps Dodge's vice-president for exploration, who toured the region and concluded that the company was justified in exploring there for copper and other minerals.

Progress remained halting and uncertain until after Phelps Dodge hired Ryan. He was undeterred by geologists' lukewarm reports. After carefully studying an aerial photograph of the Swartberg range together with a plan that showed surface mineralization, he investigated the area in person toward the end of March 1971. He saw initially the shaft sunk on Black Mountain in 1929 and various copper-stained outcrops. It was nothing very exciting. However, as Ryan picked his way across the black magnetite scree that gives the promontory its name, he recognized what geologists call *gossan*, a Cornish word designating the color of earth—red, brownish, yellow—formed by decomposition of an outcrop of iron compounds and often a good indicator of copper and other metals. Earlier searchers had apparently overlooked or misread that weathered clue.

After some delicate negotiations about drilling rights with the property's owners, who had begun to look to Rio Tinto Zinc to search beneath their land, Ryan dispatched a diamond-drill operator named Danie Oberholzer to Black Mountain on June 21, 1971. A week later Oberholzer called him back to report, "We've had wonderful rains" in an area that averages only about two inches a year. The news was code for a big find. The driller, following Ryan's directions, had bored at a spot where deep underground he pierced a large mineral seam and thus proved the Black Mountain area rich in lead, zinc, copper, and silver. Later, exploration crews made an equally promising find three miles away at Broken Hill.[11]

Enthusiasts soon hailed the remote area as South Africa's newest treasure-house, perhaps even a second Witwatersrand. It was not—at least not for Phelps Dodge, which finally disposed of its 44.6 percent stake in November 1998—but during the first flush of excitement back in 1971, no one knew how Black Mountain might turn out. Unquestionably it proved a valuable experience for Ryan, whose South African discoveries earned him considerable respect from top Phelps Dodge management.

He certainly "has the touch" when it comes to finding ore bodies, emphasized G. Robert Durham, his onetime boss. In fact, it was Ryan and his enthusiastic team of geologists and other specialists who not only located the Black Mountain deposits in South Africa but also the Candelaria deposit in Chile, which turned out to

be the bonanza everyone hoped it would become. "It is very rare that you get a Candelaria," explained Dave Colton.[3]

Phelps Dodge's involvement in Chile dated from 1967 and its investment in COCESA, a wire and cable joint venture. The Marxist government of Salvador Allende expropriated the property in 1973, but following the coup that quickly brought new procapitalist leadership to power, COCESA returned to Phelps Dodge. As its understanding of Chile grew, Phelps Dodge carefully risked investing in the country's mines as well. The payoff came when its exploration team discovered the fabulous Candelaria ore body.

Candelaria is located near Tierra Amarilla, an outpost on the southern fringe of the Atacama Desert in northern Chile. The mine site lies about twelve miles south of the regional center of Copiapó, five hundred miles north of metropolitan Santiago, and about fifty miles inland from the Pacific Ocean. Some places in the Atacama Desert have rarely recorded measurable rainfall, and there are areas where its tan-brown landscape extends to the horizon unbroken by wisps of vegetation. The Sonoran and Chihuahuan deserts, location of Phelps Dodge's major mining operations in the United States, are lush by comparison. Beneath the arid ground of the Atacama Desert, however, lie rich deposits of copper.

Candelaria is a modern chapter in a lengthy and ongoing saga of mining in an area where the hunt for copper and other metals was already under way by the early nineteenth century. By the late 1830s, Chile's numerous mines and smelters allowed it to export some 26 million pounds of metallic copper a year, but because of all the new mines that came into production in the United States in the late nineteenth century, Chile's share of world output amounted to only 5 percent in 1900. By contrast, at the beginning of the next millennium it would account for a whopping 25 percent. The United States, which accounted for between 55 and 60 percent of world production in 1900, had dropped to a mere 14 percent by 1986, about the time that Phelps Dodge stepped up its exploration for more copper in Chile.

Helping give Chile's copper output a big boost in the early twentieth century was the Chuquicamata mine, which almost a hundred years later still ranked among the largest and most productive copper properties on earth. When mining began in 1915, Chuquicamata stood among the world's pioneer open-pit copper producers. The Guggenheims sold the property to the Anaconda Company during the 1920s for a total of $140 million.

In the mid-1960s, *Forbes* magazine contrasted Anaconda and Phelps Dodge as major copper producers. At the time Phelps Dodge was still fundamentally a domestic corporation (and thankfully so during the expropriations of the 1960s and 1970s). It continued to derive all of its 262,400-ton annual production and most of its $327 million in sales and $40 million in profits from operations located within the United States. As for Anaconda, it derived only 22 percent of its copper production and only 12 percent of its total profits from within the United States. *Forbes* noted that Phelps Dodge's fortunes, which

outside the United States at the time consisted mainly of a modest 16 percent interest in the Southern Peru Copper Company (later reduced to 13.9 percent), did not hinge, as Anaconda's might, on the outcome of an election in Chile. Few words were ever more prophetic.[11]

By the end of the 1950s the Yankee mining firms in Chile, notably Anaconda and Kennecott, found themselves targets of growing public criticism. Government officials grumbled that the dividends they returned to American investors should be used to fund the expansion of mines in Chile, but the two giants were afraid to do so because of the political storm they saw brewing on the horizon. It remained business as usual for Anaconda's big Chuquicamata mine until 1967, the year the Chilean government shocked the industry by taking a 51 percent stake in Kennecott's El Teniente copper mine; and two years later, in 1969 and 1970, it gained a 51 percent interest in Anaconda's Chuquicamata and El Salvador properties. Allende expropriated the remainder in 1971, with no compensation to the American company, and Anaconda never recovered from the financial disaster.

Then as now, copper was a high-profile industry in Chile. All of the top dozen Fortune 500 firms combined never bulked as large in the United States economy as did just Anaconda and Kennecott in Chile's national economy, and their mine properties proved too tempting. Originally, five separate state-owned companies ran the expropriated mines and ancillary facilities. Following the overthrow of Allende and his Marxists in 1973, the military junta agreed to compensate investor-owned copper companies for their losses, and in that way it encouraged the return of foreign investors to Chile. Even so, Chile's government retained ownership of the five nationalized copper companies, which on April 1, 1976, it merged with the Corporación del Cobre de Chile, or CODELCO, the government-owned enterprise that overnight became the world's largest copper producer. Following the troubled early 1980s, Chileans became responsible copper producers too.

One American copper giant that took newfound interest in Chile's mines in the early 1980s was Phelps Dodge. Uncharacteristically, the traditionally conservative corporation was well ahead of the pack in seeking to do business in Chile after Allende. It did hope to insulate itself from any resurgence of anti-Americanism after it discovered a major ore body by inviting its Japanese partner at Morenci, Sumitomo, to take a 20 percent stake in the new Candelaria mine and mill complex and also by putting together an international group of lenders. Today the sprawling Candelaria complex combines sophisticated engineering design with the technical skills of a highly trained, multidisciplinary workforce to yield copper concentrates at attractive production costs.

Viva Candelaria!

The story of Candelaria, as is always true at Phelps Dodge, is really that of individuals working to make things happen. It begins in the late 1970s when, at the urging of William K.

Brown, vice-president for exploration, Phelps Dodge pursued some promising leads in the Atacama Desert. Unfortunately, when Brown left a short time later he took most of the corporation's team of mining personnel in Chile with him. That forced his successor, Robert L. Swain, to start anew.

In 1982 Swain and Bert Renzetti, his exploration manager for Chile, recommended that Phelps Dodge acquire control of recently privatized mine property that subsequently became Compañía Contractual Minera Ojos del Salado. Named for a towering volcanic peak in the nearby Andes and located south of the city of Copiapó, Ojos del Salado owned and operated several small underground copper-gold mines and a mill capable of processing eight hundred tons of ore per day. President Richard Moolick, himself a trained geologist, flew to Chile in June 1982 to investigate Ojos del Salado, which he agreed could profitably mine enough 2 percent copper ore to fund an aggressive exploration program that Phelps Dodge planned for Central and South America. But he was so fearful that the Phelps Dodge directors might turn down the acquisition that he never did show them any photos of the mill "because of its ramshackle appearance." They nonetheless gave their approval, and in that way Phelps Dodge Corporation, through its recently formed Small Mines Division, gained a 64 percent stake in Ojos on January 1983 for $1.6 million.[14]

Neither its newly acquired majority interest in Ojos del Salado in Chile nor a stake in Turkey was "expected to make a big contribution to overall revenues or earnings," reported the *Wall Street Journal* in mid-1983. The oracle of Wall Street was right about the Turkey mine but dead wrong about Ojos del Salado, over which Phelps Dodge gained full ownership in 1985. Thirteen years later, in late 1998, slumping copper prices forced Ojos to close down at least temporarily, but until then, two expansion and modernization programs enabled it to generate large enough profits to fund Phelps Dodge exploration activity in Chile and Brazil. That was not even the best part—nor does it explain why Swain, Renzetti, and other Phelps Dodge exploration personnel involved in its acquisition had a right to brag that it opened the door to Candelaria. As Len Judd reflected in 1998, "We'd never have gotten Candelaria without Moolick. He got us into Ojos."[15]

In the early 1980s at the urging of Chairman George Munroe, Pat Ryan relocated from South Africa to Phoenix where he became a senior vice-president in charge of exploration and international mining operations. In that capacity he worked persistently to extend the life of Ojos del Salado at a time when Phelps Dodge cut back everywhere because of the copper crisis. "Please bear with me because we can turn this around," Ryan once begged his skeptical colleagues, who in 1985 pressured him to get rid of the Ojos property. Instead, he arranged to send surplus mine equipment from moribund Western Nuclear to upgrade operations in Chile, which in turn necessitated more ore to feed the Ojos mill. That was how the Phelps Dodge exploration crew came to discover the world-class copper deposit located across the Copiapó River from the mill and about three miles away.[16]

Ojos del Salado leased there what were known as the Lar claims and mined about eighteen hundred tons of oxide copper-gold ore from a small outcropping. It dropped its option on the property in 1984 because of poor metallurgical recovery from the oxide ore at the surface. But it remained clear to Phelps Dodge managers that they still needed to find additional ore if they hoped to keep the Ojos del Salado concentrator running. That was why Phelps Dodge geologists recommended further study of the Lar property, and the corporation optioned it again in late 1985.

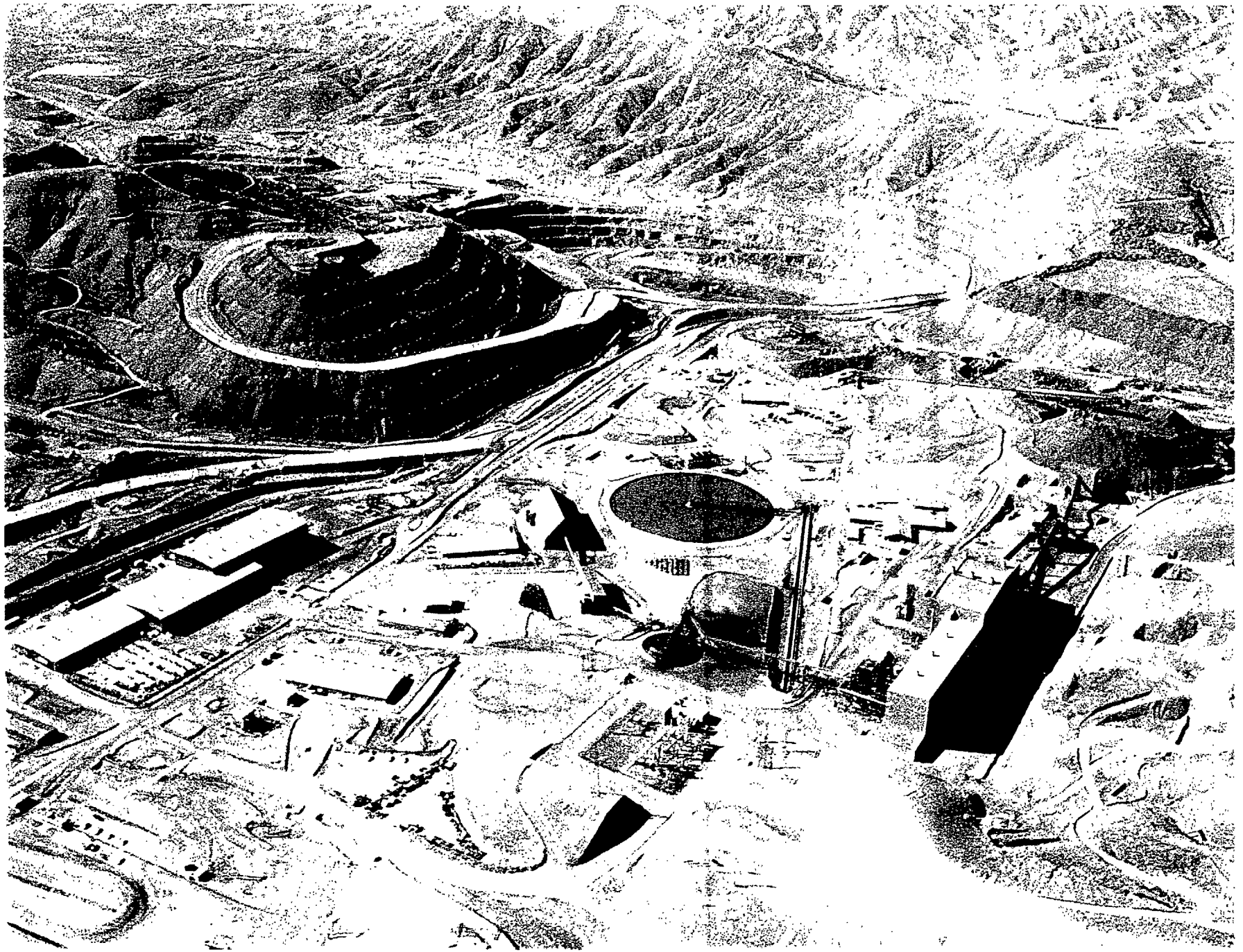
Once more it almost gave up its option on the Lar claims, and it even had a letter to that effect ready to mail when Ryan intercepted it at the last minute. He had discovered a clause in the contract that permitted Ojos del Salado personnel to mine the Lar claims to keep their concentrator running while paying out a small royalty. Meanwhile, the Phelps Dodge exploration team carried out a percussion drilling program in search of sulfide ore in an area south of the Lar mine.

One of the drills found enough promising ore to whet everyone's appetite. Using technology that runs electricity through the ground (induced polarization surveys) to reveal what lay hidden beneath the surface, the exploration team delineated a "terrific anomaly," in Ryan's words. Percussion drilling had pierced the topmost portion, but because of inrushing water they had probed no farther. However, as a result of the new information, Phelps Dodge in February 1987 bored a diamond drill hole close to the initial percussion hole. It intersected more than 165 feet of mineralization averaging almost 2 percent copper, and that proved only a promising beginning. Meanwhile, almost as a bonus, the team found enough additional ore close to the Ojos mine to keep its concentrator running for more than ten years.

As for the copper deposits that formed the basis for the new Candelaria mine (named by Phelps Dodge for Chile's patron saint of miners), more months of exploration followed, both on the ground and in the air. Exploration crews made magnetic surveys while flying across the whole area. That remarkable technology utilizing "stingers" and "birds" dated back to World War II when the highly sensitive instruments were first developed to locate enemy submarines hidden beneath the surface of the ocean. Out of the complicated maze of cross sections emerged geologic and ore body models based on data from more than three hundred test holes and almost seven thousand feet of underground workings completed between 1987 and 1990. In all, company scientists and engineers performed more than eighty thousand analyses for copper, gold, and silver as well as more than seventy thousand rock density measurements. Once the work of exploratory drilling and metallurgical testing was done, they used computerized techniques to construct a geologic block model.

One thing became clear: after years of exploration effort Phelps Dodge had indeed located a major copper deposit—and one that compared favorably with ore bodies that already had yielded fortunes in copper and other minerals at Tyrone and Ajo. For that reason, even in its exploration phase, Candelaria captivated senior Phelps Dodge management in a way that Southern Peru Copper or the South African

AN ELEVATED VIEW *of the 1990s mine and concentrator complex at Candelaria. Safety and health practices at Phelps Dodge's Chile facility are the same as those in place at its mine and mill operations in the United States.*



enterprises never really had. Executives were looking for any good news after the copper crisis of the 1980s, and that was why Candelaria was so important in the history of the corporation. It boosted morale first, and then the bottom line.

Phelps Dodge completed a final feasibility study during March 1991. Fifteen months later, the corporation decided to proceed with development and construction of its Candelaria open-pit mine. Not only had computer modeling figured into the corporation's decision, but computer-aided techniques designed the mine itself. Computer studies told Phelps Dodge where to mine first and even simulated the full landscape of production. Even after committing to the mine and concentrator complex, however, Phelps Dodge needed more than two years to complete financing arrangements that involved lenders from four countries.

Phelps Dodge crews commenced removal of the overburden on February 28, 1993, a process they completed in September 1994, only shortly before production of the first concentrate. Candelaria came into production about four months ahead of schedule and under budget at a cost of close to $570 million. By late 1994 the mine and concentrator (built by the construction giant Bechtel Corporation) operated twenty-four hours a day, seven days a week. No fewer than eight years had elapsed since Phelps Dodge first began systematic exploration of the area, and that time was reasonably short for such an accomplishment today.

Like other Phelps Dodge operations, the new open-pit mine used a computerized truck-dispatching system. From Candelaria's mill complex, trucks hauled 30 percent copper concentrate along the Pan American Highway to the Pacific Ocean. In January 1995 the first load went aboard ship at Punta Padrones, the new port facility Phelps Dodge had constructed on Caldera Bay. Providing maximum protection to the marine environment, the high-tech, totally enclosed port minimized both dust and the potential for accidental spills of concentrate, most of which was destined for Japan. "I really believe the port in Chile is probably the most incredible thing I've been responsible for building," observed Richard Rice, who oversaw construction worth at least $2.6 billion at Phelps Dodge. Chairman Yearley was only half joking when he referred to the impressive loading facility as his "Taj Ma-Port!"[15]

Compañía Contractual Minera Candelaria originally employed more than seven hundred people at the mine and mill site, the port facility, and its Santiago offices. Most of them were Chileans hired from Copiapó and surrounding communities; about 2 percent were expatriates. Phelps Dodge also constructed a number of ancillary community facilities at Copiapó, including the San Lorenzo school, roads, parks, and sports and recreational facilities. Apart from profits flowing to its American and Japanese partners, Compañía Contractual Minera Candelaria will likely inject more than $65 million each year into the Chilean economy through payrolls and the purchases of goods and services. In addition, the big mine and mill complex was predicted to generate billions more dollars in taxes for the Chilean government during the mine's life.

So rewarding was the Candelaria operation to all parties that on May 1, 1996, Phelps Dodge



LOGO FOR THE *Candelaria mine and mill complex.*

announced plans to double production at its concentrator. Its contractor finished the work in November 1997, more than eight months ahead of schedule and approximately 10 percent below the budgeted cost of $337 million. "We believe that the 18 months it took to complete this expansion is the fastest completion ever of a concentrator project of this magnitude," emphasized Yearley. In all, the expansion boosted Candelaria's annual copper production to about 380 million pounds and added approximately two hundred employees, bringing the total to nine hundred. From any perspective—whether technological or financial—Candelaria is an impressive operation. Moreover, because its development was relatively recent in Phelps Dodge history, most of the people whose skills and ingenuity (and even luck) made it possible were still alive in the late 1990s to talk about it.[18]

There is an element of luck in all exploration, emphasizes Ryan, who remains modest about his own accomplishments in Chile and South Africa. Yet he is quick to paraphrase a fellow South African, the golfer Gary Player, who observed that "the more I practice the luckier I become." And speaking of luck: during the copper crisis of the 1980s Ryan almost took a job in South Africa with his former employer, Anglo American; "I was one of the rats" who could see the Phelps Dodge ship sinking, he said, believing that the company was only a few months from Chapter XI bankruptcy (voluntary reorganization). In the end, Munroe asked him to help Durham with the corporate turnaround. As it turned out, future events proved lucky for both Phelps Dodge and Ryan.[19]

Evolution of Phelps Dodge International

Apart from its various mining and manufacturing operations in North America, Phelps Dodge by the late 1990s had assembled a far-flung empire of businesses abroad. Because the corporation's various enterprises outside the United States take so many different forms, the structure and scope of its international activities perhaps appear confusing to anyone not already familiar with its numerous landscapes of production. For example, Candelaria and other overseas mining and milling properties are part of Phelps Dodge Mining Company, based in the parent corporation's home offices in Arizona. Headquartered in the same high-rise building is Phelps Dodge Industries, one component of which is Phelps Dodge International, based in Coral Gables, Florida. In addition, several overseas carbon black plants are operated by its Marietta, Georgia–based Columbian Chemicals Company, and magnet wire plants in Austria and Mexico are part of Fort Wayne–based Phelps Dodge Magnet Wire Company, both basic segments of Phelps Dodge Industries.

For many years it was Phelps Dodge International that provided the parent corporation its greatest degree of involvement in countries outside North America. The story of International—which exercised responsibility for managing profitable and cash-generating plants that fabricated building wire, power cables, and telephone cables in more than two dozen countries, primarily in Central and South America and the Far East—dates back to the

aftermath of World War II. That was when, like most United States industries, Phelps Dodge Corporation discovered a bonanza in the postwar export trade.

With America's Marshall Plan helping to rebuild Europe, it was easy for American enterprises to sell their products abroad. But by the early 1950s both Europe and Japan had started to regain their economic strength and were becoming less dependent on companies based in the United States. Further, high-priced American goods became less competitive abroad. At one time about 30 percent of all the copper products Phelps Dodge produced were exported, but that figure soon fell to just 2 percent. It became clear that the only way for Phelps Dodge to make money abroad was to set up overseas plants jointly operated with local entrepreneurs, national governmental institutions, or competing international manufacturers.

After World War II there was little interest in Latin American wire and cable manufacture because United States businesses focused so much of their attention on the work of rebuilding Europe. However, one man at Phelps Dodge sensed an opportunity. That was Ted Michaelsen who in 1956 initiated work leading to what became Phelps Dodge Copper Products International Corporation the following year. Its first international manufacturing operation was the Pheldrak plant located in Cuba, the result of a joint venture among Phelps Dodge, the Cuban National Development Bank, and Draka, a Dutch company. In addition to the Cuba plant, which produced its first cable and wire in May 1957, Phelps Dodge in rapid succession launched plants in Venezuela, the Philippines, Puerto Rico, and Colombia. Those were the five pioneers, and a Spanish heritage was probably their common denominator.



PHELPS DODGE'S FIRST *overseas fabricating plant was in Cuba and earned a net profit of $27,000 the year after it opened in 1956, of which the parent company's share was $3,000.*

In Cuba as in other nations, Michaelsen's way was to promote a joint venture between Phelps Dodge and local investors who knew their home country well. Because of him, Phelps Dodge became one of the first American cable and wire companies to adopt that strategy. It was not foolproof, however. For a short time after Fidel Castro and his Marxist rebels came to power in 1959, the new leader of Cuba cited Pheldrak as a model for foreign investment, but shortly after Uncle Sam imposed an embargo on

Cuba, the Castro government retaliated by expropriating American properties, including Phelps Dodge's in 1960. That was a real jolt to the parent corporation, which also lost a big cable manufacturing plant to Iranian revolutionaries during the 1970s.

Over the years, Phelps Dodge closed a plant in Lebanon because of that country's increasingly unstable political climate. Allende's Marxists expropriated Phelps Dodge International's COCESA plant in Chile in 1973. Insurgents in Central America once kidnapped the company's El Salvador office workers at gunpoint and held them as pawns to persuade the government to free rebel prisoners. Currency devaluations in some countries, though less dangerous than kidnappings, posed a big problem too.

At one time, staff members of international cable-and-wire fabricating operations were trained in Phelps Dodge plants in the United States, but perhaps because of their American connections, joint ventures were sometimes criticized by native entrepreneurs for paying local workers too much. But to astute plant managers it made little sense to pay a person merely two dollars a day to run a machine costing half a million dollars. The most successful managers adapted quickly to local cultures, attended weddings and funerals, and became personally acquainted with employees' families.

When Phelps Dodge International was incorporated on December 20, 1966, its mission was to provide management, marketing assistance, technical support, engineering, and purchasing services to its associate companies worldwide, primarily manufacturers of electrical and telecommunications cables. It also contributed to the engineering and installation of telephone lines in several countries. By early 1969, Phelps Dodge's equity interest ranged from 10 percent to 61 percent in seventeen wire and cable companies operating in fifteen different countries. A decade later it had invested in thirty wire and cable plants located in twenty-two countries around the world from Argentina to Zambia. Joint-venture relationships worked well in most countries. Some started small, with an average investment by Phelps Dodge of less than $2 million, and subsequently expanded; others Phelps Dodge essentially built from the ground up. The corporation's basic strategy proved most successful in developing nations, but in England and France far less so, and from them Phelps Dodge International later withdrew.

Michaelsen, essentially the father of Phelps Dodge International, was very much at home in a worldwide environment. A native of Copenhagen and educated in Denmark and England, he was twenty-two years old when he joined Phelps Dodge Copper Products Corporation in June 1940. Michaelsen's father was Phelps Dodge's sales agent for copper rod in Scandinavia, and Wylie Brown, the president of Copper Products at the time, may have thought he was doing him a big favor by employing his son as a price clerk earning $25 a week. Whatever his motivation, Brown got young Michaelsen, who was half-Jewish, out of Denmark and thus out of harm's way from Nazi invaders.

When the newcomer reported for work, Brown instructed his colleague William Dunbar, "'This is my friend Mr. Michaelsen's son. You take him out there and show him the business. You come in and tell me every night how he is

doing." On one occasion, Dunbar shared with Michaelsen a group of records from the company's export file. That night, in yet another example of Brown's petty tyranny, he berated Dunbar for revealing too much information to their new hire. Impressed by his understudy, Dunbar later advised Brown, "I think he would be ideal to set up an export company," something Phelps Dodge lacked at the time. That concept later matured into Phelps Dodge International, probably Michaelsen's greatest legacy.[20]

Ted Michaelsen became export sales manager for Phelps Dodge Copper Products after World War II, a promotion that gave him insight into developing markets in Latin America. With a small amount of investment money he wrangled from Howard T. Brinton, Copper Products president, he launched Phelps Dodge in Cuba. Michaelsen became vice-president of newly formed Phelps Dodge Copper Products International in 1956 and its president in 1962. Five years later, he became the executive vice-president of newly formed Phelps Dodge Industries, Inc., created in 1966 to direct and coordinate the company's manufacturing activities. Michaelsen succeeded Ed Dunlaevy as president in 1968, and chief executive officer a year later, positions he held for more than a decade. In 1980, he became one of three Phelps Dodge Corporation vice-chairmen, along with Richard T. Moolick and L. William Seidman.

Over time, Michaelsen cultivated a personal style that was unusually flamboyant for Phelps Dodge. Handsome and suave, he "was a lavish spender." His Park Avenue office was by far the most extravagant in the corporation, easily surpassing that of the chairman George Munroe, in part because Michaelsen collected so many fine souvenirs during his numerous trips abroad. He had probably the best car and chauffeur. Michaelsen's philosophy was "always go first class." Though not a details person, he was a good administrator and a marketing genius. "He could sell you anything."[21]

Colleagues often considered Michaelsen a renaissance man because of his multiple talents. Without doubt he was a charismatic figure who had a special gift for identifying up-and-coming management talent and serving as their patron as they climbed the corporate career ladder. "That may have been his real contribution to the company," emphasized G. Robert Durham, who along with his successor as chairman, Douglas Yearley, was one of "Ted's guys."[22]

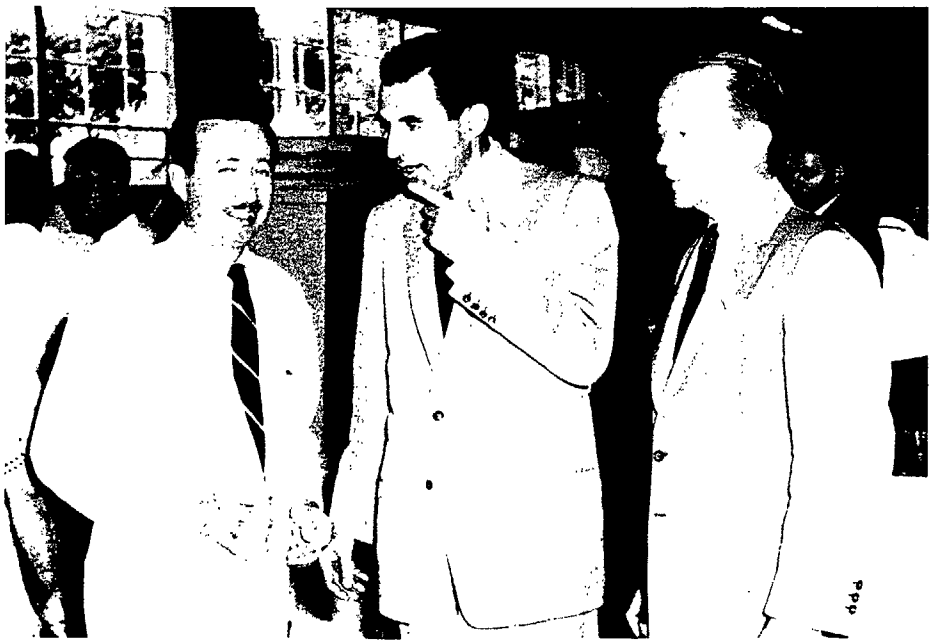
At one time Michaelsen established two or three joint ventures a year all over the world. Nearly all the companies had Phelps Dodge in their names, though it was later eliminated except for the Philippines and Thailand to lessen identification with the United States during a rising tide of anti-Americanism in the 1960s. At the time many people in Central and South America regarded Castro as a folk hero. By 1976 the number of Phelps Dodge's international wire and cable companies had climbed to twenty-six, but net profits had dropped from a high of $17 million in 1974 to less than $6 million. The net profit to Phelps Dodge in 1976 was only $2.5 million.

As president of Phelps Dodge Industries, Michaelsen grew concerned when his international subsidiary seemed to founder. "International was basically Ted's baby, and it

Ted Michaelsen *is flanked by a smiling Roberto Millar, first general manager of the Cuba wire and cable plant, and possibly Eugenio Castillo, the government official who first attracted Phelps Dodge to Cuba. The plant was successful, perhaps in part because Michaelsen persuaded Cuban legislators to enact a protective tariff that effectively barred anyone from competing in Cuba except local companies such as Pheldrak, which had no real competitors. Previously, the country's wire and cable had all been imported from Europe and North America.*

bothered him that it wasn't doing better than it was," recalled Durham, who helped to guide International's turnaround in the late 1970s. Michaelsen at the urging of Munroe called Durham, then in early retirement, in the fall of 1977 to inquire whether he might consider returning to work. Durham protested that he was "not an international type. I'm an old Midwestern businessman."[23]

Michaelsen responded that Durham's aluminum work earlier had earned him the respect of Phelps Dodge, and he invited the former executive to serve as an outside consultant to advise management about what to do about Phelps Dodge International. Durham agreed to come to New York for only ninety days. He gathered the heads of various International operations behind closed doors at the Waldorf-Astoria Hotel, located across Park Avenue from Phelps Dodge headquarters, for two weeks to determine what steps to take. Durham sought to act as a catalyst that would result in a plan to save International. He personally believed it had "significant strengths."



Durham's turn-around plan so pleased Michaelsen that he asked Durham to implement it by becoming chairman of Phelps Dodge International. "Now that wasn't the deal," his consultant protested. Durham enjoyed his early retirement. Because he owned a home near Saint Louis and a longtime second home in Florida's Long Boat Key, he stated emphatically, "For certain I won't live in New York City." Michaelsen told him to relocate International's headquarters to any place that made sense.[24]

What could Durham say? At that point he believed his health problems were behind him (see chapter 15), so he agreed to serve as chairman of International. Scouting around, Durham personally selected offices on Ponce de Leon Boulevard in the Miami suburb of Coral Gables, where Phelps Dodge International remains headquartered today. Coral Gables had the virtue of being both an attractive community and conveniently located close to Miami International Airport. In September 1978, the time of relocation to Florida, fewer than thirty people in the new Coral Gables offices oversaw an international operation that employed about six thousand workers and managers.

Durham's rescue plan was very precise, and in time he and his International colleagues did turn the subsidiary around. Durham himself became an internationalist, and he traveled the world. "I got far more personal value than I

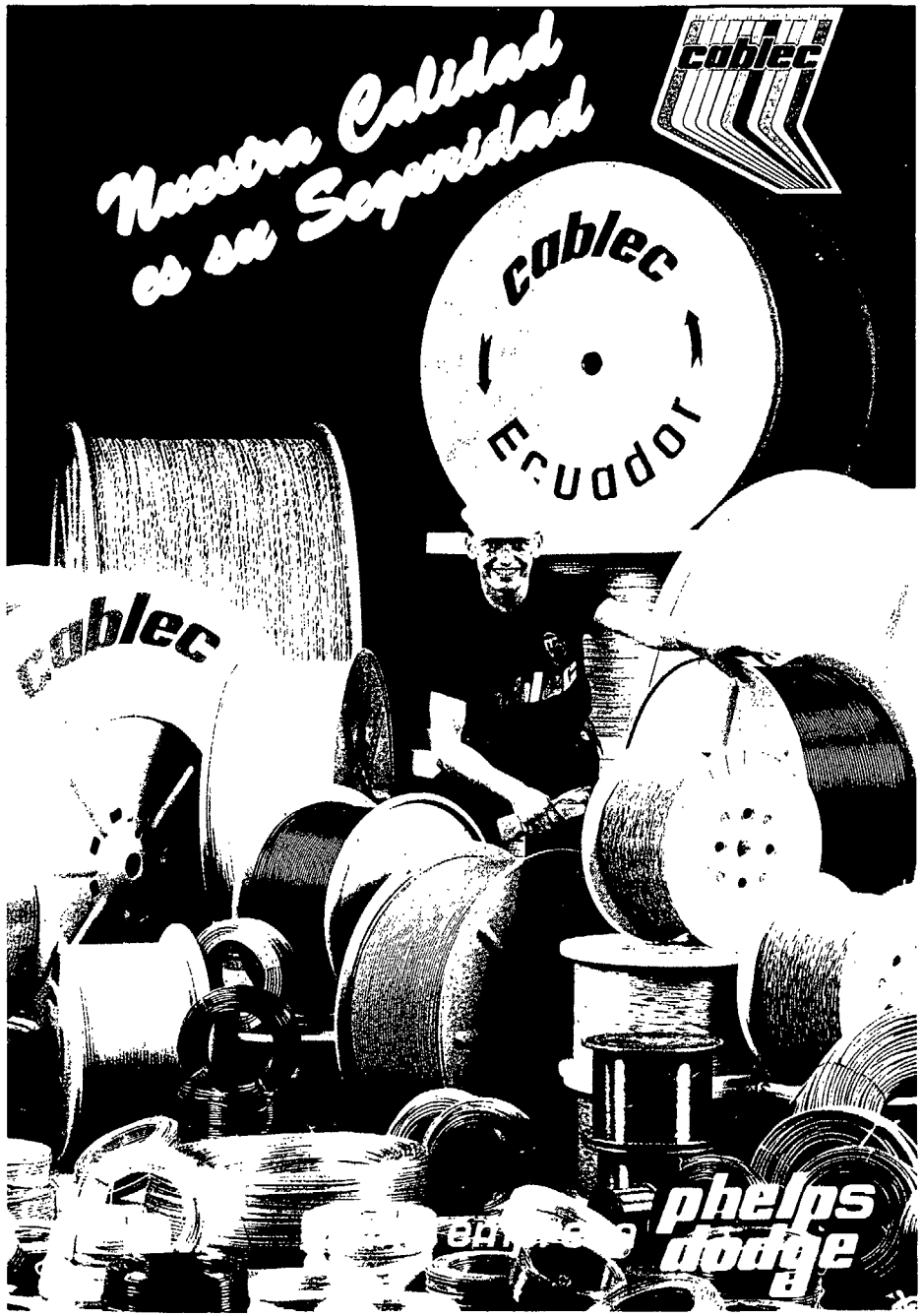
contributed," he modestly claimed. Durham "was perfect for the situation we had," recalled Orlando G. Gonzalez, who served as president under him. Gonzalez himself, who fled a job in commercial banking in Castro's Cuba in 1961 with little more than the sixty pounds of clothes he was legally permitted to take out of the country (and a clandestine English-Spanish dictionary), worked his way up the ranks of International, eventually serving as its chairman. He was one of several talented, business-minded, Spanish-speaking managers jokingly known as the Cuban Mafia, all refugees from Castro's Cuba who worked long and hard to develop and strengthen wire and cable operations in Central and South America. They may have been the best thing Castro ever did for Phelps Dodge.[25]

It took some surgery to return International to financial health. In 1978 the number of companies it oversaw was pruned back to nineteen, and then to fourteen the next year. The only year to show a net loss for Phelps Dodge International Corporation was 1982, at $32 million. Gonzalez believed that Phelps Dodge would gladly have sold International then had it been able to find a buyer willing to pay $50 million. Phelps Dodge may have been a pioneer of the joint-venture concept, but Gonzalez now wonders whether anyone in the early 1980s would have cared to purchase partial ownership of several different companies of greatly varying financial strength. In any case, Phelps Dodge International survived and eventually thrived, so that by the late 1990s it was worth at least fifteen times $50 million.

Since its first joint ventures in Cuba and the Philippines in the mid-1950s, Phelps Dodge International's lineup of wire-and-cable manufacturing businesses has evolved in many different ways. One subsidiary was Phelps Dodge Puerto Rico Corporation. Not long after it celebrated its twentieth birthday in 1978, that property was transferred from Phelps Dodge International to Phelps Dodge Cable and Wire to capitalize on the marketing of Puerto Rico–made products in the United States by the sales staffs of Phelps Dodge Cable and Wire and Phelps Dodge Copper Products.

In early 1993, through its Venezuelan associate company Alambres y Cables Venezolanos, C.A. (ALCAVE), in which Phelps Dodge had maintained a majority interest since 1957, it acquired three additional Venezuelan companies: Industria de Conductores Eléctricos C.A. (ICONEL); Conductores y Aluminio C.A. (CONAL); and Aislamientos Plásticos C.A. Among ICONEL's specialty products was submarine cable used to supply power to electric motors on the many oil rigs that dot Lake Maracaibo. Collectively, the four properties, which are all located within sight of the busy Autopista del Centro highway linking Caracas and Valencia, constitute one of the largest manufacturers of electrical and telecommunication copper and aluminum wires and cables in Venezuela and the Andean region. Continued growth of phone cable sales in Latin America, as well as telephone line installations, contributed to the Venezuelan group's excellent performance in the mid-1990s.

During that time the Latin American market



for wires and cables boomed, much as the United States market had half a century earlier with rural electrification programs. Further, in anticipation of a common market for all of South America, Phelps Dodge in the 1990s rationalized production so that each property, instead of making a broad line of products to serve a home market, specialized in a few products marketed across the continent. It had to overcome some long-standing national prejudices. Would Colombians think that cable manufactured in Ecuador, for example, was as good as that coming from their own country or from Chile? The adoption of international standards of quality assured that it was.

To serve what until the late 1990s were rapidly growing Asian markets, Phelps Dodge International Corporation opened a new $40 million wire and cable plant in Thailand in 1992. A year earlier it acquired a 20 percent interest in Keystone Electric Wire and Cable Company, Ltd., the largest manufacturer of electrical wires and cables in Hong Kong. That investment offered Phelps Dodge access to the People's Republic of China, a country that was potentially one of its most significant customers anywhere in the world and where modern electric systems were vital to the nation's expanding infrastructure and standard of living. To serve that market better, in November 1997 it inaugurated Phelps Dodge Yantai Cable Company's $18 million manufacturing plant, a

— A SEEMINGLY ENDLESS *variety of wire and cable products came from Phelps Dodge's former CABLEC plant in Quito, Ecuador.*

joint-venture facility in Shandong Province that had as participants various Chinese electrical power bureaus, Phelps Dodge Corporation, and the Keystone Corporation in Hong Kong. The manufactory was intended to produce approximately seven thousand metric tons of copper and aluminum cables annually, mostly for underground installations to replace traditional overhead power lines in China's high-density cities.

When Phelps Dodge International Corporation celebrated its fortieth birthday in November 1996 it showed no sign of growing old or set in its ways. Just one month after it inaugurated its modern plant in China, Phelps Dodge International in December 1997 agreed to acquire a 60 percent interest in a Brazilian copper and aluminum wire and cable business owned by ALCOA. As one of the country's largest wire and cable manufacturers, it would do business under the name Phelps Dodge & ALCOA Fios e Cabos Eléctricos, S.A., and allow Phelps Dodge to establish a presence in the rapidly growing Brazilian market. In fact, at the time of its fortieth birthday, Phelps Dodge International Corporation had participated in more than eighty different joint ventures in twenty-seven countries.

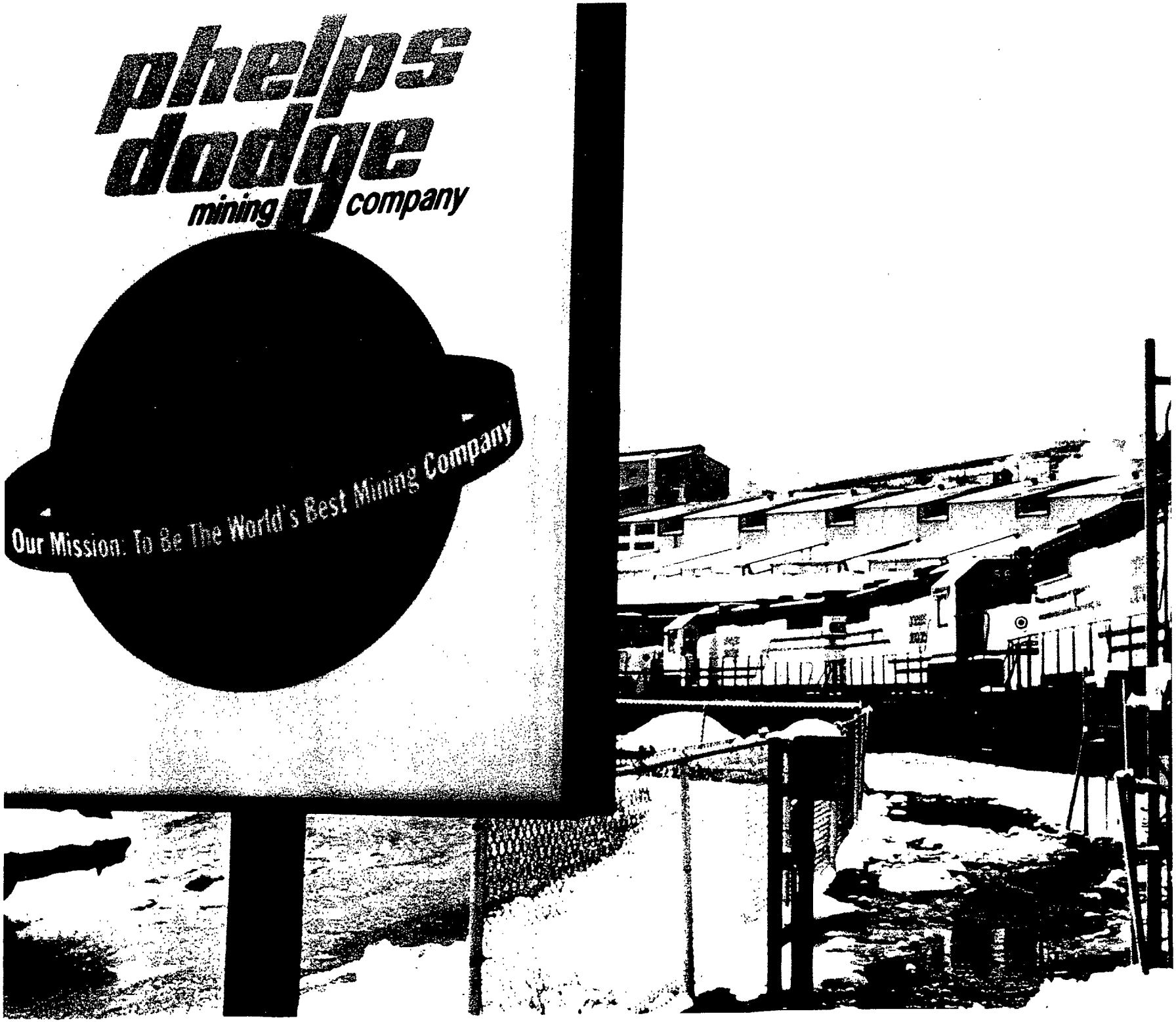
Phelps Dodge as a Modern Global Enterprise

All facilities of Phelps Dodge Industries, the parent corporation's manufacturing arm, had in common that they produced engineered products principally for the transportation, communication, and electrical sectors. The division's forty-two operating locations in twenty-six countries (in early 1999) benefited from synergies in technology, marketing, and international experience. Phelps Dodge Industries and its associate companies employed several thousand people worldwide. In the late 1990s its Columbian Chemicals Company, for example, derived more than 50 percent of its income from outside the United States.

There once was a time when Phelps Dodge companies were all fiercely independent. But by the 1990s the emerging pattern in the international arena was for whichever company established a toehold in a country first to help its Phelps Dodge sisters, whether in manufacturing or in mining. "The industries group has been a wonderful resource for the exploration group," observed its onetime counsel Dave Colton. A spare office overseas might often provide a base for initial operations, and International's knowledge of local culture, politics, and financial risk was an invaluable source of information. Observed Chairman Yearley when Phelps Dodge inaugurated its joint-venture manufacturing plant in China in 1997, "This is a historic day for the corporation." In part, that was because Phelps Dodge Yantai Cable's "venture will allow us to enhance our understanding of China's culture and business practices and will position us to capitalize on future mining and manufacturing opportunities."[226]

J. Steven Whisler, who became president and chief operating officer of Phelps Dodge Corporation late in 1997, recalled that persuading employees to move from Morenci to

Tyrone was once a difficult task, and most people were even more reluctant to relocate to Chile. Now employees come to him to ask when they can go to Chile or Brazil. "Our next challenge is to get them to feel the same way about Indonesia or China or Kazakhstan." The ongoing internationalization of Phelps Dodge, in fact, complemented an initiative the corporation launched in the mid-1990s to evaluate and modernize, where appropriate, its traditional corporate culture. Together, internationalization and culture change influenced the way Phelps Dodge Corporation conducted business as it entered the new millennium.[7]


phelps dodge
mining company
Our Mission: To Be The World's Best Mining Company

Chapter Seventeen



CHARTING A COURSE *for the* NEW MILLENNIUM



MAKING CONNECTIONS. That is the essence of the Phelps Dodge story: connections between copper ore in the ground and various high-performance conductors and magnet wire, between industrial innovations that permitted Phelps Dodge to manufacture its copper and carbon black products more efficiently than before, between swings in the price of copper and the corporation's responses over the years. Even the name Phelps Dodge speaks to the personal connections forged by the founding families.

Perhaps the single most important connection running through nearly 170 years of Phelps Dodge history is how people worked together to turn vision into enterprise. They took dreams, both financial and technological, and made something practical as well as profitable. That was the essence of what Mr. Phelps, Mr. Dodge, and Mr. James did in their day when they were merchant pioneers in the North Atlantic trade of the fledgling United States; and no less than the founding partnership in the 1830s in New York and Liverpool, modern Phelps Dodge Corporation continues to turn vision into enterprise in its everyday activities—and that includes looking ahead to prepare for its future.

— "Our Mission: *To Be The World's Best Mining Company.*" *A sign along Phelps Dodge's industrial railroad at an entrance to the Morenci complex.*

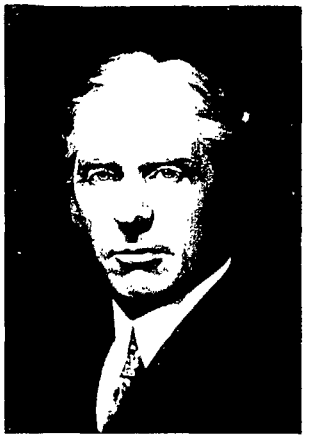
A main difference today is that the process of making connections between vision and enterprise is far more formal than it was 170 years ago. After Phelps Dodge management initiated a program in the mid-1990s to modernize its corporate culture, participants came to describe the complicated process as designing a "road map to the future." They did not plan to draw a literal map, but for a corporation largely defined by its several impressive landscapes and for which map making was second nature, the metaphor was perfect.

The step-by-step process aimed to take an abstract concept called "corporate culture"—that intangible yet palpable attitude that pervades an organization—and treat it in a concrete fashion that related directly to the future well-being of Phelps Dodge, in much the same way that matters of technology and finance were treated. Traditionally, to define the company meant listing those attributes that could be most easily measured and quantified, such as its annual production of copper or carbon black, its quarterly profits, the number of people it employed, and the number of countries in which it operated. Those are all valuable measures of how well Phelps Dodge makes connections between vision and enterprise and how it has grown over the years.

Back in 1909, shortly after Dr. James Douglas became the corporation's first president, Phelps, Dodge & Company marketed 185 million pounds of copper, tallied $49 million in assets, and paid out $5.4 million in dividends; in 1997 Phelps Dodge Corporation, headed by Douglas C. Yearley, marketed 1.6 billion pounds of copper, totaled nearly $5 billion in assets, and paid out $123 million in dividends. In Dr. Douglas's time, unlike our own, the hand of government regulation seldom extended into everyday business, and environmental issues infrequently attracted serious attention from anyone.

Despite the obvious changes—especially all the readily measured ones—there has been considerable continuity at Phelps Dodge too, much of it occurring in the hard-to-define area of corporate culture. Although there were positive attributes worth celebrating, Chairman Yearley and his management colleagues were also correct to ask whether other attributes of corporate culture encouraged thinking and behaving in time-honored ways that actually impeded Phelps Dodge as it prepared itself for the new millennium. That certainly was a matter worth studying. So questions about corporate culture formally occupied center stage at Phelps Dodge in the late 1990s as never before in its history, and the positive results of that attention may well be remembered as one of Yearley's most important legacies.

No one could predict exactly how Phelps Dodge corporate culture might continue to evolve in the coming years, yet study of its origins and evolution does offer valuable clues. This much is certain: Phelps Dodge is anything but a "soulless" corporation, to recall a term that critics once used to bash big business in America. Its unique corporate culture forms its soul—and its heart. Speaking of which, whatever else might change, one important measure of continuity at Phelps Dodge is its enduring commitment to philanthropy, a commitment that originated with its founders.



The modest and soft-spoken Cleveland Hoadley Dodge (1860–1926) succeeded James Douglas as chairman of Phelps Dodge Corporation.



Cleveland Earl Dodge *(1888-1982). "He always enjoyed Mr. Dodge" when he came to Arizona on one of his periodic visits, reminisced Julia Mazanek, who served more than fifty years as a secretary at Phelps Dodge in Douglas and Phoenix. She recalled the tall, "very kind looking" Dodge as an "easy man to talk to," adding, "I liked the New York people."*

Cultural Continuity: Family and Philanthropy

Consider for a moment the connections that exist between the founding families of Phelps Dodge, basketball, and philanthropic activity, the last of which is among the more quantifiable attributes of the modern corporate culture at Phelps Dodge. This story begins with William E. Dodge, Jr., who contributed significantly to establishing a training school for directors of local branches of the Young Men's Christian Association, secretaries, as they were originally called. Located in Springfield, Massachusetts, the YMCA's School for Christian Workers evolved into Springfield College. Cleveland Hoadley Dodge took up his father's interest in the school—whose motto was "A Sound Mind in a Sound Body"—and it was he who apparently suggested to teachers that someone should develop a wholesome winter activity for students to play indoors. He worried that patrons of the YMCA's recently built gymnasium in New York City grew tired of calisthenics as their primary recreation all winter long. The person who responded most effectively to Dodge's challenge was young James Naismith, the school's Canadian-born physical education teacher, who during the winter of 1891 invented a brisk indoor sport called basketball.[1]

Cleveland H. Dodge's son, Cleveland Earl Dodge, continued his family's many philanthropic activities even as he took an active role in the business enterprise his great-great-grandfather Anson Greene Phelps and his great-grandfather William Earl Dodge launched in 1834. Although Cleveland E. Dodge retired as a vice president of Phelps Dodge in 1961 at the age of seventy-three, he remained a director of the corporation until 1967. From then until his death at age ninety-four in November 1982, he remained on the board as an advisory director. His formal career at Phelps Dodge began shortly after graduation from Princeton University in 1909. Before he took a desk at the firm's headquarters at Cliff and John streets in New York, he first worked underground at the Copper Queen Consolidated Mining Company in Bisbee. Employed as a common miner, he assumed the name Charles because he thought Cleveland "seemed too highbrow." He also worked in Douglas to gain firsthand knowledge of smelter operations. Except for military service during World War I, Cleve Dodge spent the next seven decades associated in one way or another with the great enterprise that bore his surname.[2]

His son, Cleveland E. Dodge, Jr., also served on the corporation board of directors (from 1968 until 1994), but he chose not to work directly for Phelps Dodge. Thus the passing of Cleveland Earl Dodge effectively ended four generations of uninterrupted service in the management of Phelps Dodge by members of the Dodge family.

The changing corporate role of the Phelps Dodge families suggests one more way the company evolved during the 1980s and 1990s, the decades when it pruned away some businesses and acquired new ones. Yet despite the many changes detailed in earlier chapters, Phelps Dodge Corporation held firm to certain aspects of its past as it approached the new millennium. Its systematic altruism, as distinct from tens of millions of dollars disbursed each year for taxes,



Phelps Dodge scholarship winners on a trip to Ajo in 1954. A year earlier, the corporation enlarged its scholarship program to include students at Arizona State College in Flagstaff (now Northern Arizona University) as well as those at the state college in Tempe (now Arizona State University) and at the University of Arizona. Between 1949 and 1980 Phelps Dodge scholarships enabled more than eight hundred students from the Southwest to pursue higher education – including Lattie Coor, who in 1990 became the fifteenth president of Arizona State University.

payrolls, and purchases, had an important civic impact across the Southwest, as well as in many other locations where Phelps Dodge had its facilities; and in that way it remained true to the vision of its founders. When Anson G. Phelps died in 1853, he left more than half a million dollars to charity, an amount greater than any New Yorker had bequeathed for good works before that time. It might be worth noting, too, that when Phelps died, young Andrew Carnegie still managed a telegraph office in Pittsburgh and young John D. Rockefeller did chores on his father's farm near Cleveland, Ohio. After the Civil War, the personal fortunes of those two men and others grew many times larger than those of the original Phelps Dodge partners, but Anson G. Phelps gave away his money before American philanthropy was in vogue. He was a pioneer of philanthropy.

The corporation perpetuating his name launched the Phelps Dodge scholarship program in 1949 in cooperation with Arizona State College (now University) in Tempe and the University of Arizona in Tucson. In years past it awarded twelve undergraduate scholarships and two graduate scholarships annually, and though

that has changed now, it continues to maintain basic commitment to education. However, education is only one component of a remarkable story of modern philanthropy.

At the suggestion of its board of directors at the December 1953 meeting, Chairman Louis S. Cates authorized a contribution of $1 million in seed money to a not-for-profit corporation known as the Phelps Dodge Foundation to provide financial support for "religious, charitable, scientific, literary or educational purposes." Cates noted that Phelps Dodge had already been making substantial annual gifts for charitable purposes and that establishment of a permanent fund was one way to insure the continuation of such gifts in the future.[1]

The fund received an additional $1 million from Phelps Dodge Copper Products Corporation and $225,000 from Phelps Dodge Refining Corporation. The foundation made it possible for Phelps Dodge to maintain a program of philanthropy without spending money needed for ongoing operations. Over the next forty years the assets of the foundation grew in market value to approximately $17 million (in 1998) with help from additional contributions by the corporation. The money it gives away each year pays for several four-year National Merit Scholarships

Gifts Galore

A list of just *one year's recipients of Phelps Dodge philanthropy would be a very lengthy one. Among many beneficiaries in its home city were the Phoenix Art Museum, Heard Museum, Phoenix Symphony, Arizona Opera Company, and Arizona Theatre Company; but Phelps Dodge money is also distributed in many far-flung locations. Gifts both large and small went to the Ajo Historical Society, Bisbee Council of the Arts and Humanities, Bayard Public Library, Grant County Softball Team, Silver City Gospel Mission, Myrna Loy Theater in Helena, Montana, South Arkansas Symphony, Hopkinsville Community College, Fort Wayne Museum of Art, Akron Art Museum, Easter Seals of Norwich, John F. Kennedy Center for Performing Arts, Metropolitan Museum of Art, O'Higgins Sportive Club in Chile, and dozens of other organizations.*

During the 1990s, for example, Phelps Dodge helped underwrite the cost of the Smithsonian Institution's Janet Annenberg Hooker Hall of Geology, Gems and Minerals, which opened in the National Museum of Natural History in Washington, D.C., on September 20, 1997. The dazzling display included large dioramas illustrating four of the nation's greatest mines, one of which, naturally, was Bisbee's Copper Queen. But that was not all. Among the showstoppers on permanent exhibit were the Hope Diamond and Queen Marie Antoinette's diamond earrings.



that permit children of employees to attend colleges or universities of their choice. It supports undergraduate and graduate-level programs for minority college students too. In all, from 1949 to 1997 Phelps Dodge provided scholarships to more than twenty-five hundred students attending dozens of different educational institutions across the United States.

The Phelps Dodge Foundation, Phelps Dodge Corporation, and its various business units gave some $3 million per year in the late 1990s to charitable causes, and that sum does not include contributions of time and money by employees to their local communities. Nor does it include donations of land that has recreational value or that conserves the Southwest's priceless natural, historical, or archaeological heritage. As one of the largest property owners in Arizona and New Mexico, Phelps Dodge has a long-standing tradition of donating such land to private and public organizations, such as the Nature Conservancy and the National Park Service. One subsidiary, the Pacific Western Land Company, donated approximately seventy acres of land in Grant County, New Mexico, in 1981 to the Nature Conservancy for a riparian preserve. That land, located along a floodplain about thirty miles northwest of Silver City, was included in the Gila Riparian Project dedicated to protection and study of the abundant plant and animal life that is part of the river environment.

Of course, neither its many philanthropic activities nor its annual infusion of salary and tax revenues into state and local economies would continue for long if Phelps Dodge did not continually look to its future. Even as it mines ore today, the corporation must search for additional sources of copper and other minerals that will assure it long-term success; and that commitment too, no less than the enduring legacy of its founding families and the ongoing commitment to philanthropy, defines its corporate culture.

Culture Change: Pioneering the Creation of Value

IT WAS IN 1995 that Phelps Dodge formally launched a program to examine and adjust where necessary its existing corporate culture so as to prepare itself to meet challenges posed by the twenty-first century. You may ask, what is the essence of corporate culture? "It's history, in a word," responded Thomas St. Clair, the corporation's former senior vice-president and chief financial officer. And that history, noted Yearley, included a strong work ethic. "'Conservative.' That's another word that would clearly characterize us."[1]

One example of how history defined corporate culture could be seen in the way Phelps Dodge traditionally managed its employees, for the concept of corporate culture is intimately related to leadership at all levels. Until the early 1980s, that hadn't changed significantly since the 1920s. "There was something of a military tradition out there," recalled the past chairman George Munroe of Phelps Dodge's western mining operations. At all its branches a rigid hierarchy existed, and observers sometimes compared company mining towns to military bases. Yet, whenever longtime employees chose to comment on everyday life in Phelps Dodge

INCLUDED WITH THE *original United Verde mine property were imposing pre-Columbian ruins called Tuzigoot. In the late 1930s, Phelps Dodge donated the historic site in the Verde Valley to the local school district to give to the National Park Service for excavation and preservation. Tuzigoot, an Indian word that means "crooked water," became a national monument by proclamation of President Franklin D. Roosevelt in 1939. Today its ancient ruins continue to fascinate thousands of visitors a year. Much more recently, Phelps Dodge donated nearby Hatalacva, a site even bigger than Tuzigoot, to the Archaeological Conservancy.*

communities, they were usually positive. They recalled low rents and how company maintenance crews regularly provided for the upkeep of their houses. A very special time was Christmas. At Ajo an enormous fir or pine tree arrived from Oregon by rail for electrical personnel from the New Cornelia Mine to install as the centerpiece of their vividly lighted display in the town's plaza.[5]

Even the odd juxtapositions of company-town life are often remembered fondly. Morenci, for instance, had a dance floor, and people there wore formal attire, as they did in New York or anywhere else. The retired president Warren Fenzi recalled as a young engineer being dressed for a special occasion in a white shirt but no tie. "You'd dance and go outside and have a fist fight, make up, and go back in and buy the guy a drink. Even Harry Lavender got in fights."[6]

Lavender, like all old-style branch managers, had great authority. That was encouraged by the physical separation that historically existed between Phelps Dodge headquarters in New York and its nearly autonomous branches in Arizona and New Mexico. "The western manager was a law unto himself," noted Yearley, and old-timers occasionally refer to the branch managers of former times as "little gods." It was with a mixture of awe and fear that they recalled Walter Lawson, who managed Phelps Dodge's Western Operations from 1955 to 1969 from his office in Douglas. He always urged his company chauffeur to drive fast. That may have been standard procedure on the lonely roads of Arizona (which once had no daytime speed limit), but in Colorado, when a state trooper pulled over Lawson's chauffeur, the officer remarked with amazement that he had never before been passed while chasing another speeder! The story, even if some details are apocryphal, still illustrates the great intensity of Lawson's style. In the mines "the pecking order was absolute."[7]

A similar autonomy prevailed in the corporate offices in New York. "I was shocked," recalled Munroe of his first days at Phelps Dodge, "to find the segregation or separation" between manufacturing and mining. In years past that separateness had permitted executives like Wylie Brown to hone the traditional command-and-control style of management into an intimidating form of tyranny.[8]

Not until 1990–91, when Phelps Dodge again had a strong balance sheet, did anyone in management talk seriously about strategies for long-term growth or culture change. Until then the corporation was focused mainly on the need to stay alive. But during Management Review Week in mid-1995, a biennial gathering in Phoenix of executives from all parts of the corporation, discussion turned to employee surveys that identified a rather hard-edged corporate culture at Phelps Dodge. Some observers thought that was simply a lingering legacy of the 1983 strike, while others believed it was far older than that: mining companies in general had traditionally cultivated a tough and rugged persona. There was more to it than that, however. To succeed at Phelps Dodge an individual needed to find a niche and "do a hell of a good job" in that area of specialty, recalled L. William Seidman of his years at the company.[9]

It was time to alter the way Phelps Dodge managed people. Management launched the culture change initiative, and the man appointed to head the team to study what kinds of changes

were required to modernize the corporate culture was Ronald Habegger, who took a year's leave from his position as a senior vice-president of Phelps Dodge Magnet Wire in Fort Wayne to work at corporate headquarters in Phoenix. Habegger's perception was that during the grim years of the 1980s, when the battle for survival animated Phelps Dodge, command-and-control management was a positive virtue. At that time, for example, employees in the mining company instinctively looked to Leonard R. Judd for direction and unhesitatingly asked, "What do you want us to do?" The command-and-control culture's most negative aspect was that over time it inhibited employees from trying anything new. If that mindset prevailed for any length of time, "at some point businesses stop developing new roads and start maintaining streets," explained Habegger.[10]

Added Yearley, "A corporation has to reinvent itself periodically or it is going to die." Reinvention was necessary even for terms like *culture change*, which was quickly superseded by a more colorful and more comprehensive slogan, "Pioneering the Creation of Value." The work of Pioneering the Creation of Value is so important to Phelps Dodge that it became a formal part of the corporation's vision statement adopted in 1998. The phrase speaks to an ongoing need to effect clearly identified changes in Phelps Dodge culture and sharpen the corporate vision as leaders look to the years ahead; it speaks to the need to preserve all the best elements of a time-honored way of doing business while cultivating continuous improvement in company personnel. One major challenge is to encourage a people-oriented leadership style among its executives. That is harder than it sounds because the mining industry in general has traditionally valued actions above feelings.

A question asked repeatedly during follow-up discussions among executives was how various types of activity added value to Phelps Dodge and its employees, customers, shareholders, and communities. Finding more efficient ways to turn dirt and rock into valuable metals was one very straightforward answer. Another was the "Zero and Beyond" safety initiative intended to reduce accidents companywide to zero: "That means zero fatalities, zero injuries, and zero accidents," explained the corporation president and chief operating officer J. Steven Whisler. How an emphasis on safety added value to Phelps Dodge was self-evident.[11]

By the mid-1990s, too, Phelps Dodge needed to refashion its corporate culture to fit its newly expansive way of thinking, especially if it hoped to respond quickly to mining and manufacturing opportunities abroad. That meant eliminating certain obsolete hierarchical traditions and abandoning concerns among leaders about "turf." In addition, Phelps Dodge needed to foster a corporate culture that was attractive to young people, a modern generation of employees who are neither as patient as their elders nor as likely to recall long hours worked by employees during the copper crisis of the mid-1980s. "Our expectation of a normal workday 'is not normal,'" noted the senior vice-president and chief financial officer Ramiro G. Peru, speaking of one lingering result of the old survival mode of thinking. "This company's challenge is to find a balance between family and personal life and your worklife."[12]

At the same time it must develop a more democratic "listen and lead" culture. But any move away from the traditional command-and-control style of management presented quite a challenge to the old-line enterprise that Yearley once described, tongue-in-cheek to an audience at his alma mater, Cornell University, as "a mining company founded by two Presbyterians. We don't do warm and fuzzy." Further, "the company was really big on status," recalled Peru, who grew up in Morenci where the geography of power was a fact of everyday life.[13]

In one sense, changes in corporate culture take place all the time, sometimes in response to internal initiatives like the one that spurred Phelps Dodge in 1995, and sometimes in response to the changing world in which businesses must operate. Formal internal changes were often long in coming because Phelps Dodge was so old school in so many ways. Warren Fenzi recalled a time when all goals in mining related to costs and entailed a very detailed type of cost accounting. "But we didn't care about how the copper was sold." His onetime boss, Ernest Wittenau, the general superintendent at Morenci, "was quite a stickler for accounts. He would even shut down crews at the end of the month because they were using too much powder for that month."[14]

In the 1950s and 1960s there was no such thing as benchmarking, no corporatewide budget committees, and no strategic planning committees beyond the senior officers. To the corporation's former president and chief operating officer, Len Judd, Phelps Dodge when he rejoined it in 1977 was not professionally managed. Prior to 1979, the mining side of the corporation had no formal budgets because no one seemed to know how to budget for the inescapable uncertainties of mine production. A manager might question, "What if it rains? What if it snows? It will disrupt production." As long as individual mines made money, corporate executives seldom seemed to care about formalities of budgets. Phelps Dodge Corporation itself created a formal planning committee only in 1981.[15]

"I found it amazing," reflected Peru, that "growing up in Morenci you thought of Phelps Dodge as some big, sophisticated company with the latest and greatest of everything." Later he discovered "when it came to management practices on the financial side, they just weren't there." Peru started at Phelps Dodge in 1979, the same year that formal budgets were introduced in western mining operations. Today, "I think our cost accounting system and metals accounting system in the Mining Company are second to none. I think that has been the secret of our ability to manage those businesses."[16]

Many people credit L. William Seidman with launching the modernization of budgeting and long-range planning at Phelps Dodge, and indeed when Munroe hired him in 1977 as chief financial officer those were among his principal assignments. His reforms represented "a breath of fresh air," recalled G. Robert Durham, who came to Phelps Dodge the same month as Seidman. A former White House economics adviser, Seidman viewed himself as a provocateur within the corporation and an agent of change. Of course, many people originally resisted strategic planning, and some joked that he had

better be careful when he visited mining properties out West, where the initiatives from New York headquarters were not always welcomed. Many believed that the corporation's mining operations lagged well behind Phelps Dodge Industries in implementing the modernization Seidman advocated.

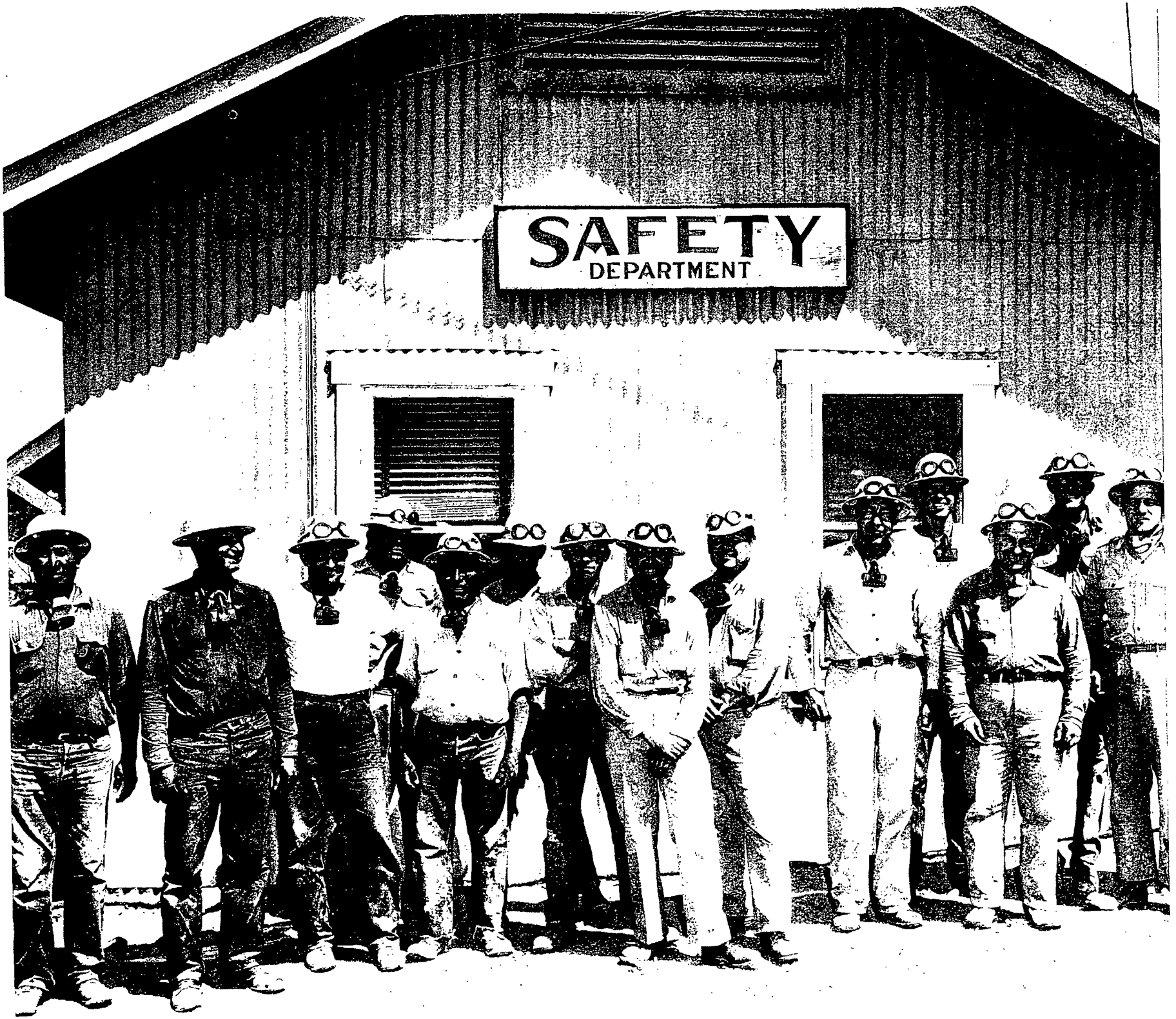
Seidman, who had family roots in Grand Rapids, Michigan, where the accounting firm of Seidman and Seidman was prominent, was Munroe's roommate at Dartmouth and his classmate at Harvard Law School. He had played high school football in Grand Rapids with Gerald Ford, who after he succeeded Richard Nixon as president of the United States, called Seidman to serve as his economics adviser. Following Ford's loss to Jimmy Carter in the 1976 elections, Munroe invited Seidman to come to Phelps Dodge where he served as chief financial officer and one of three vice-chairmen after Munroe created that office in 1980. Seidman left in 1982 to become dean of the business school at Arizona State University but continued on the Phelps Dodge board until 1985, when he became chairman of the Federal Deposit Insurance Corporation.

Regardless of the driving force behind the changes, Phelps Dodge streamlined most noticeably after the copper crisis of 1983–84, when distinctions between East and West eased and finally disappeared following relocation of the corporation's headquarters to Phoenix. The long-standing tendency of individual branches to regard themselves as little fiefdoms disappeared too, observed Whisler. That was, he believed, partly because Phelps Dodge once had a certain comfortable largess or fatness it could no longer maintain.

In matters of safety, however, Phelps Dodge Corporation was always in the vanguard. "Safety is the leading indicator of operating excellence," observed Yearley, and emphasis on safety sends the signal that "we care." Over the years the corporation continued to set the bar of safe production ever higher, which in the late 1990s became nothing less than Zero and Beyond. At many facilities even a close call or near accident warrants serious investigation. At every plant numerous posters exhort employees to work safely, and many slogans originate with employees themselves.[17]

Charles R. Kuzell is generally recognized as the father of Phelps Dodge's modern safety program. As manager of the United Verde Branch in the 1930s, Kuzell instituted a formal code of safe practices. First, he had each job analyzed for its hazards, and then he listed specific safety precautions required to insure maximum worker protection. In the early 1950s a "Master Code for the Elimination of Accidents" further defined what safe production meant in practice.

Many significant improvements have occurred since then, and they include meticulous recordkeeping and a system of rewards for both the best and most improved safety records. Phelps Dodge Tyrone, for example, felt proud when it won the national Sentinels of Safety Award twice in a row during the mid-1990s. The award is a historic bronze statue of a mother and child that represents family members who want each miner to return home safely (though today a good many people who work in mines are women). The Sentinels of Safety Award has since 1925 recognized open-pit mines having the best


SAFETY
DEPARTMENT

MEMBERS OF THE *Safety Department at Ajo in 1954. More recently, in 1989 Phelps Dodge instituted the Chairman's Safety Awards for the best safety performance and most improved safety performance at its North American operations; and it introduced a similar international program in 1992. That year the winner of the latter award was Columbian International Chemicals Corporation.*

safety records in the United States; each employee receives a special lapel pin as part of the honor.

Whenever Phelps Dodge acquired a new subsidiary, one of the most visible aspects of its being "PD-ized" was heightened emphasis on safety in all operations. In 1990, for example, after Chino employees lowered the recordable accident rate by 72 percent over the previous year, they won the coveted James Douglas Memorial Safety Trophy, a Phelps Dodge award given annually since 1926.

Over the years, culture change in an informal sense embraced how Phelps Dodge treated its numerous Hispanic employees. Until the civil rights revolution of the 1960s, how they fared both on the job and in the surrounding mining communities mirrored the prevailing prejudices of the American Southwest. In Morenci, some restaurants once posted signs that read "No Mexicans Allowed," and the Morenci Social Club once was rigidly segregated by race and ethnicity. On one side was the theater, with segregated seating; the adjacent library and parlor were off limits completely to people of Hispanic ancestry. Downstairs was the bowling alley, and except for men and boys hired to set pins, Mexicans and Mexican Americans were not allowed in there either. A local Elks Club refused them membership until its numbers dropped so low that it changed its admission policy, but by then Hispanics were reluctant to join.

In the mines, too, the old culture meant lower wages for Hispanic workers who did the same jobs as Anglos, or their being barred entirely from certain jobs. For many years the mines of Bisbee did not permit Hispanic workers underground. That was not the case in Morenci, which had a much larger Hispanic workforce; but just the same, there were jobs and places fully off limits to people of Mexican ancestry. The railway brotherhoods were extremely unyielding and did not even permit Hispanic track workers to touch locomotives.

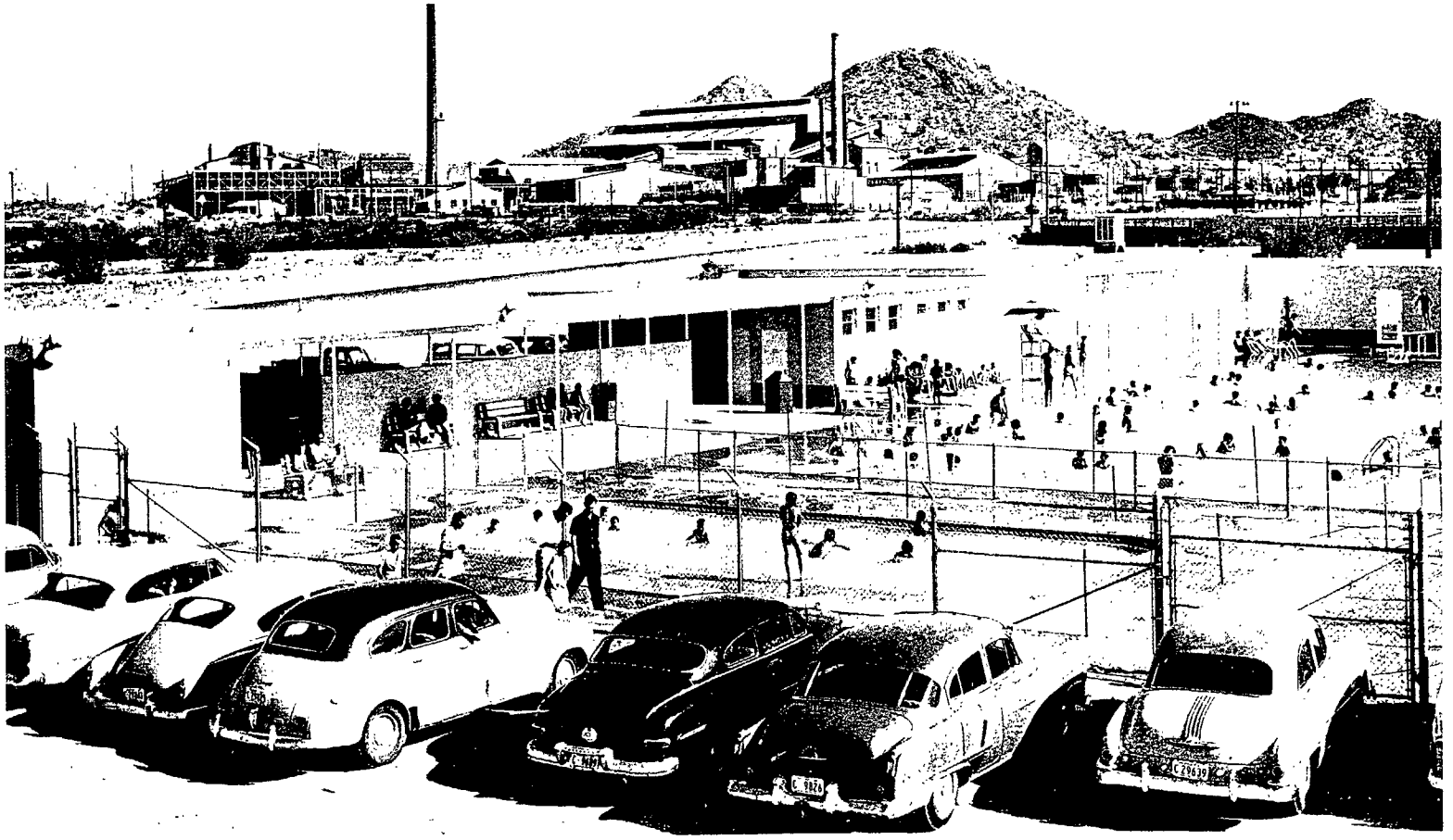
There once were separate change rooms too. Simon Peru, a retired Morenci employee, recalled that after he joined Phelps Dodge in 1952 he mistakenly headed into the wrong change room. Seventeen years later, when Arthur Kinneberg returned to Morenci as general superintendent in 1969, he found the change room at the smelter still segregated. Having spent seven years in Chile, he disliked racial and ethnic distinctions. Thus he ordered the partition removed to create one large room, though some of his non-Hispanic supervisors objected to the change.

Most Hispanic employees tended not to blame Phelps Dodge for discrimination but rather cited fellow workers from Arkansas, Oklahoma, and Texas, who were often poorly educated and prejudiced against people of African or Mexican ancestry. "They felt superior to some of the minority people" was a common complaint, and Hispanic workers adjusted as best they could. Simon Peru's father-in-law, Pete Gomez, recalled attending Spanish school in Morenci as a child during summers in addition to his regular school. His instructors, all from Mexico, taught Mexican history and related subjects.

Times have certainly changed for the better for Gomez, Peru, and other Phelps Dodge workers of Hispanic heritage. As of the late

1990s, they composed approximately 40 percent of the corporation's some ninety-five hundred employees in the United States, and they have many more Spanish-speaking counterparts in Central and South America. Together they form Phelps Dodge's largest minority. Pete Gomez's grandson, Ramiro G. ("Ramey") Peru is now a top corporate executive, although (and offering an ironic commentary on generational differences) he did not grow up in Morenci speaking Spanish! He struggled to learn it later as an adult.[18]

Women too made many gains in what once was considered a male-oriented industry. Historically, they held few jobs outside the plant offices, except during World War II or during the big strike of 1983. Today, as is true in American society generally, women at Phelps Dodge can be found doing nontraditional work, for example, as research engineers, hydrogeologists, and haul truck drivers. Women today serve as supervisors in various operations and as company executives. In 1997 Susan M. Suver became Phelps Dodge



THE NEW CORNELIA BRANCH *in May 1954 and Ajo's swimming pool. Ajo once had formally designated neighborhoods called Mexican Town and Indian Town, an arrangement inherited from the Calumet and Arizona Mining Company, and there were separate days reserved for Anglo, Hispanic, and Indian residents to enjoy the local pool.*

Corporation's vice-president for organization effectiveness and communications. She worked her way through Arizona State University, where she majored in communications. Suver came to Phelps Dodge after spending ten years in the international travel industry. Among her tasks is to educate the public, especially the media, about how mining contributes to everyday life, and especially to the high standard of living many people take for granted. "I like the challenge here," she observes of her diverse responsibilities.[19]

Back in the nation's capital is Linda D. Findlay, who succeeded Charles A. Burns as vice-president for government relations. Her office is located almost within sight of the White House, and among her jobs is to educate members of Congress about issues of interest to Phelps Dodge and the nation's mining industry generally. Women executives like Findlay and Suver historically did not begin their business careers intending to work for a mining company. Findlay, before coming to Phelps Dodge in 1992, had served fifteen years as legislative assistant for environmental issues to New Mexico's Senator Pete V. Domenici. The corporation's second female vice-president (after Anita H. Laudone, who was elected vice-president and secretary in 1984) majored in English at Kenyon College in Ohio and worked for a time as director of admissions at a girls school in Virginia. After joining Phelps Dodge, Findlay recalls, "I learned a lot very quickly."[20]

Patricia Young, who is a shift supervisor at Morenci, is a second-generation Phelps Dodge employee. Her work experience includes driving haul trucks at both Morenci and Tyrone, where she was the first female supervisor of dispatchers. Today she oversees thirty shovel operators, truck drivers, and cat skinners who operate the big earthmovers. Of her work as a haul truck driver, when asked "Does it give you a sense of power to be up there that high?" she quickly responded, "Oh, yes," but "you get used to the distance." Of her current job she adds, "It's a good company to work for. I like what I'm doing."[21]

In total, about 15 percent of the employees of Phelps Dodge Corporation in the late 1990s were women. "In this organization there are a lot more women moving up than there were just five years ago when I started," noted Sue Suver in 1998.[22]

Together Employees and Management Succeed

The person who presided over Phelps Dodge during the 1990s was the chairman and chief executive officer Douglas C. Yearley, who during much of the time held the title of president too. He firmly believes that among his legacies will be the 1995 culture change initiative, which he hopes will encourage employees to work closely together instead of jockeying for position in a hierarchical structure based on command and control.

Perhaps because of his strong desire to nurture a modern listen-and-lead culture as the corporation entered the new millennium, Yearley was comfortable discussing ways that Phelps Dodge perhaps fell short in the past. "I'm a realist," he stated during one of our several interviews for *Vision and Enterprise*. "As you go

back into our history there's going to be some dirty laundry. There has to be. The rules of the game sixty or seventy years ago were totally different. We were basically following the rules, and perhaps even remaining a little better than the rules, but still by today's perspective some things look pretty shabby." He added, "We're in dirty businesses, and we still carry the legacy of [the Bisbee deportation]." His candor was not only refreshing, it was representative of the openness he sought to foster at Phelps Dodge.[23]

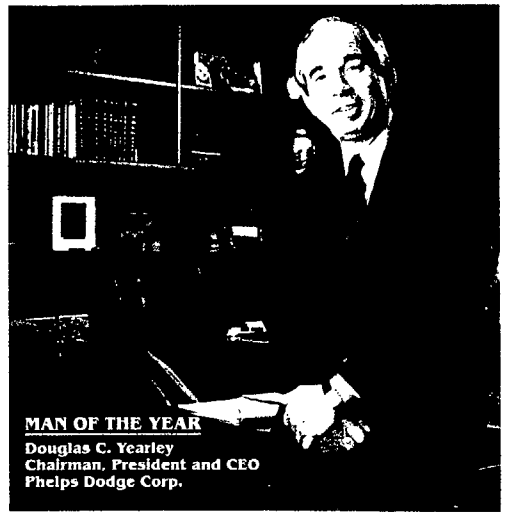
To understand the ways that Yearley shaped and guided Phelps Dodge during the ups and downs of the 1990s, it is important to know what experiences molded his own career in business and his personal outlook. The future chairman grew up in Oak Park, Illinois, a Chicago suburb once known to cynics as Saints' Rest because it contained many churches and not a single saloon. The community is perhaps best known today as the place where Frank Lloyd Wright maintained his famous studio for many years, and Oak Park's main landmarks are twenty-five surviving Prairie-style buildings that Wright designed. Among the other notable native sons of Oak Park was Ernest Hemingway.

The Oak Park of Yearley's youth continued to be a leafy, middle-class suburb. His mother was a high school English teacher who was very musically oriented; and music naturally became part of her oldest son's life. Yearley played a clarinet in his high school orchestra—and he was also a member of its football team. Classical music remains one of the great loves of his life. He seldom travels by car without listening to one of the classics, notably opera. In 1998 he realized a long-held dream when he conducted the Phoenix Symphony in Rossini's stirring *William Tell Overture*.

Along the way Yearley developed a love for history too. He enjoys well-crafted studies like Stephen Ambrose's *Undaunted Courage*, a popular biography of Meriwether Lewis. In fact, when I first discussed the possibility of writing a modern history of Phelps Dodge Corporation, Yearley mentioned how much he enjoyed David McCullough's biography of Harry Truman. I wondered whether he saw parallels between troubles that beset Phelps Dodge during the early 1980s, when he was one of Munroe's lieutenants, and those that Truman confronted as president of

AMERICAN METAL MARKET

Copper Club



The New York–based Copper Club recognized Douglas C. Yearley as its 1993 Copper Man of the Year. The award, bestowed each of the preceding thirty years, honors individuals who have made outstanding contributions to the industry. Yearley has fostered cooperation among world copper producers and promoted greater use of copper globally. In 1989 he helped found the International Copper Association, which he served several years as chairman. The Copper Club honor also paid tribute to Yearley's role in helping to engineer the dramatic turnaround of Phelps Dodge during the 1980s.

the United States during the tumultuous years of the late 1940s and early 1950s.

Like Truman, Yearley despises arrogance and pomposity. Perhaps for that reason he was reluctant to brag about personal accomplishments, even for the historical record. From other sources I learned that he was a driving force behind the International Copper Association, which world producers formed in 1989 to promote the use of copper. He is also disinclined to take himself too seriously. When, for instance, a Phoenix business publication asked him in 1996 what profession he would pursue if he were not running Phelps Dodge, he shot back, "A beach bum." He was kidding, of course. "I have a sense of humor and I don't forget to smell the roses." He is also a family man who met his wife, Anne, when they were students, he attending Cornell.[24]

Yearley's father, a college-trained metallurgist employed as a sweeper in a foundry during the harsh years of the Great Depression, was very pleased when Cornell University admitted his son to its engineering program. "I never saw Cornell before I went," Yearley recalled. A few days after he arrived on campus, professors warned the entering freshmen that only one in three of them would graduate from the demanding program in engineering. "I was a free spirit" but determined to be among the one-third who made it.[25]

Shortly after receiving his bachelor's degree in metallurgical engineering in 1958, Yearley interviewed with the legendary curmudgeon, Admiral Hyman Rickover, for a position in the reactors branch of the United States Navy. After experiencing the infamous Rickover humiliation of applicants, he elected instead to take a job at Electric Boat, where he worked on nuclear submarines in 1958 and 1959. At the time that was America's first line of defense. Because of the nation's near panic after the Soviet Union launched its Sputnik satellite, life at Electric Boat was chaotic, recalled Yearley, and a day's work there often lasted sixteen hours because of constant pressure to get the ballistic missile submarines into the water.

Yearley, who in 1960 accepted an offer to work for Phelps Dodge Copper Products, joined its Bayway facility in New Jersey in product development. In the "Hawaiian Room" (so named by fellow workers because machinery used in Yearley's experiments caused the place to vibrate and sway like a hula dancer, according to one account, or because those experiments left a person nicely tanned, according to another), he sought to cast copper tubing continuously, which would mean potentially huge savings to Phelps Dodge. He came away from that assignment with seven patents, but "none of which was worth a damn." He simply couldn't get the casting process properly refined.

"I didn't like engineering. I wasn't very good at it," he confessed. "I had two failed projects." Looking around for other work, he pondered returning to school to earn a master's degree in business administration. Instead he went to Harvard's Program for Management Development in 1968. The idea of sending a junior employee to school for advanced training was so foreign to Phelps Dodge at the time that the company paid only for tuition—though Yearley soon discovered that everyone else in the program was on an expense account. At the age of thirty-three, he commuted by car for eighteen

weeks between New Jersey and Massachusetts, returning home to spend each weekend with Anne and their four children, who then ranged in age from one to nine. "It was a defining event in my life. I found I loved business. I loved the complexities of finance and marketing."

Afterwards, Yearley worked another nine months at Bayway. One day as he sat in his starkly functional office, he was surprised to receive a phone call from Ted Michaelsen, president of Phelps Dodge Industries, whose own office was located across the Hudson River in a posh section of Manhattan and a world away from gritty, industrial Bayway. "Doug, I want you to be in my office tomorrow morning at nine o'clock."

"Yes, sir. Can I prepare myself for anything?"

"Your future," and with that cryptic bit of advice, Michaelsen hung up.

"I wasn't sure what I was going into."

Michaelsen, with Munroe's blessing, put Yearley on a career track that exposed him to numerous different situations, many of which, his patron warned, would involve having to make personal sacrifices. On one occasion, Michaelsen called and said, "You are now operations manager for Asia and Africa for the International company." For Yearley that meant about every two months in the late 1960s and early 1970s he made a three-week trek to consult wire and cable plant managers in Lebanon, Zambia, India, Thailand, and Japan.

Back in the United States he was next assigned to run the Los Angeles Tube Mill of Phelps Dodge Brass Company, and in that capacity he saw how easy it was for a corporation and its individual operations to become complacent. He recalled his first day on the job. Yearley arrived at the plant early Monday morning and was surprised to see rats scurrying all around after workers started the noisy machinery. The operation, which made water and condenser tubes, obviously had problems. His tactic was to ask the employees for ways to make conditions better. In short order "the rats disappeared and the place started to look good. We went from losing money to making money." Of the Los Angeles Tube Mill of Phelps Dodge Brass Company, which he later headed, he adds, "It was an independent command because I was three hours away from New York."

Next he became vice-president for marketing at Phelps Dodge Cable and Wire Company. "That was a tough transition because I had never done any selling at all." Not until 1980, when George Munroe made him president of Phelps Dodge Sales Company, did Yearley cross to the parent corporation from Phelps Dodge Industries, but all those early field assignments were invaluable for what followed next.

His many years in copper sales helped Yearley understand the corporation's core business well: "I got to know all the customers, and got to know how the copper was produced." In those days you'd take your customers to the mines, and that also provided Yearley an opportunity to become acquainted with mining employees. By the time he became chairman of Phelps Dodge Corporation, he already possessed an insider's detailed knowledge of its operations.

On March 3, 1989, the *New York Times* headlined its account of Yearley's succession, "Another Cost-Cutter to Head Phelps Dodge." One tale of his cost cutting that achieved near

legendary status dates from the time Yearley summoned his top 120 managers from around the world to Phoenix *in the summer* (and which he still does for the Global Leadership Forum). People do not ordinarily consider Phoenix an appropriate place to hold business meetings during the summer. "As soon as they step outside," Yearley chuckled, "it's 110 degrees. They can't believe the heat." But the new chairman loved the deal. He locked up a block of rooms at a posh Phoenix resort at a bargain rate. Besides saving money, the thrift sent a strong signal that Phelps Dodge was not about to get complacent about spending. *Industry Week* in 1990 profiled Yearley as one of "America's Unsung Heroes" because of his role in putting torque in the turnaround at Phelps Dodge.[26]

Chauffeured Cadillacs are only a memory now, a casualty of the mid-1980s thrift. Similarly, Phelps Dodge owned no jet until 1999, when it gained one in an acquisition that greatly enlarged its international presence. Until then, Yearley regarded such amenities as incompatible with Phelps Dodge's goal of becoming the "low-cost producer in everything we do." He had observed in 1997, "Just in the last three or four years have I been able to relax about expenses," a comment he made before the late 1990s plummet of copper prices required renewed belt-tightening.

One of Yearley's goals for changing corporate culture at Phelps Dodge was to improve communications throughout the company, a work-in-progress I observed during a brief research trip to Phelps Dodge Magnet Wire in Fort Wayne, Indiana. The corporate "Town Hall Meeting" held in early August 1997 was in some ways an extension of "Donuts with Doug," an open forum he hosts several times a year for employees at the Phoenix headquarters. After a thirty-minute presentation on the state of the company, Yearley (speaking from Phoenix) fielded ninety minutes of nonstop questions phoned in from places as distant as Connecticut and Chile. Employees all over the corporation's sprawling landscape were free to participate. Some facilities, such as Phelps Dodge Tyrone, were particularly involved in the process, others much less so. Obviously it takes time to change corporate culture, but it seems to start with this form of improved communications.

How did Yearley develop his obvious interest in collaborative management? "Mostly from common sense. I am comfortable as a consensus builder." He recalled postgraduate management education at Harvard Business School as an early form of sensitivity training. "It is important to emphasize the people side. We have a better trained and more sophisticated group than fifteen years ago. We had a bunch of people in cubby holes who knew how to sell copper or break rocks, etcetera, fifteen years ago. There was no cross fertilization and there was no external training; there was no benchmarking."

During my stay in Fort Wayne I also observed another aspect of corporate culture, a Phelps Dodge Code of Ethics seminar regularly conducted to familiarize employees with what constitutes proper conduct in situations ranging from correct financial reporting to sexual harassment. The vice-president and corporate secretary, Robert C. Swan, posed a series of hypothetical questions intended to encourage employees to think ethically by considering three basic issues: Is it legal? Is it ethical? Is it good

business practice? In Fort Wayne questions of ethics and security loom large because several magnet wire competitors are located in close geographical proximity to one another. What if, for instance, a manager overheard a discussion of trade secrets by competitors aboard a commercial flight? That was one issue actually discussed at the Fort Wayne seminar, and among the many responses it elicited was one lighthearted suggestion to cup an in-flight magazine to your ear so as to hear better!

Something else highlighted in Fort Wayne was that the beautiful new One Technology Center, the headquarters building that Phelps Dodge Magnet Wire opened in 1994 adjacent to its big manufacturing plant, had very few doors on its offices. That was because the architect sought to encourage openness and cooperation among employees. There were, of course, locked and guarded doors in the research laboratory and pilot production facility where Magnet Wire developed, tested, and evaluated process improvements and new products.

On a related front: an initiative launched at Morenci in 1997 and affecting all of Phelps Dodge Mining Company's nonunion employees in the United States sought to create an all-salaried workforce. A kindred goal was for close-knit crews to make many day-to-day decisions and generally operate with a minimum of formal supervision. Since 1991, Phelps Dodge Morenci has used the acronym TEAMS (Together Employees and Morenci Succeed) to describe that philosophy.

Exactly where the idea originated is not certain. "I was using teams in Los Angeles" at the Phelps Dodge tube mill, recalled Yearley. "Didn't call them that." Some people credit the El Paso refinery for formalizing the basic concept in the late 1980s. But at Morenci the teams concept was specifically oriented toward employee groups in the mine and its support facilities, and it offered another example of the kinds of creative initiatives bubbling to the surface in various parts of Phelps Dodge that contributed to culture change. Further, as Yearley observed in the *Business Week* "President's Forum" in 1993, "Narrow specialties are as obsolete on the work floor as in the executive offices. Of course, I'm not suggesting that we rid our companies entirely of specialists. They serve a valuable need. We must, however, cross-train much of our work force and expose workers to as many aspects of business as possible." In practice that meant giving greater emphasis to effective communication, driving responsibility down in the organization, and even teaching business classes to employees to help them understand the big picture of how Phelps Dodge worked.[7]

A watershed for managers at Morenci was the 1983 strike, when a rigid hierarchy and union work rules hurt the corporation badly and opened eyes regarding traditional command-and-control culture. At that time promotions, for example, came not from performance but from union-protected seniority. How did a manager get a job? "It was his turn," noted the onetime Morenci mine superintendent Michael Allen. So, how many workers did it take to fix a truck? Often, two. A union mechanic would say, "I took the bolts off, but I'm not taking the wires off," recalled Allen in 1992. How many workers did a mine foreman supervise? In 1986, about six. In 1992? A remarkable twenty-one. What was the

absentee rate in mine operations? Eighteen percent back in 1986, but less than 1 percent by 1992. Measurements of efficiency are no less impressive today.[28]

To cynics, all such changes may seem like good old-fashioned paternalism. In some ways they probably were, and at a corporation as history-minded as Phelps Dodge that was not necessarily a bad thing. Phelps Dodge has no union workers at Hidalgo, and at Morenci it has been nonunionized since the 1983 strike. In various ways, the task of keeping nonunionized employees happy imposes many demands on company managers that were formerly addressed by union officials.

Contrary to popular belief, Phelps Dodge did not eliminate trade unions from its far-flung operations during the dark days of 1983 when it operated its facilities in defiance of strikers. The pattern was far more complicated than that. Phelps Dodge Magnet Wire in Fort Wayne and Hopkinsville remained unionized in the late 1990s, as did several carbon black plants of Columbian Chemicals Company. Within Phelps Dodge Mining Company, the Hidalgo smelter never organized, and all unions at Tyrone had decertified by 1994. In the mining sector the only unionized property left in the United States by the middle of 1999 was the Chino operations, where approximately half its workers were dues-paying members.

When Phelps Dodge purchased a two-thirds interest in Chino Mines from Kennecott in late 1986, seven unions were in place, at least one of them since the 1930s. First negotiations were held in 1989. After that, five locals decertified, beginning with the Machinists union in 1990. Eventually all that remained were a local of the International Brotherhood of Electrical Workers with about seventy-five members and Local 890 of United Steelworkers with about five hundred members. That was the Juan Chacón local, not only one of New Mexico's oldest unions but one that sees itself as the proud heir to the "Salt of the Earth" legacy of the 1940s, a battle with New Jersey Zinc as dramatized in the feature film by that name. Phelps Dodge Corporation had absolutely nothing to do with that strike, but it acquired the historical burden along with the Chino property.

In the late 1990s Local 890 had a meeting hall in the town of Bayard where bold letters on its outside wall proclaimed "Union Yes!" and a series of attractive murals inside detailed its members' version of local labor history. Because unionism in New Mexico was intimately linked to civil rights for Hispanic workers, it included elements of a religious commitment, as when labor leaders exhort, "This is the union your father and grandfather fought for." That kind of loyalty was one reason workers at Phelps Dodge's only unionized copper property in the United States voted by a two-to-one margin in 1996, 1997, and again in 1998 to maintain representation by the United Steelworkers of America. In November 1998, local members of the Steelworkers and Electrical Workers unions ratified new four-year contracts by a margin of more than 90 percent to replace agreements that had expired some two years earlier.

Quite clearly, the ways employees and management interact at Phelps Dodge will vary considerably between the mining and industries groups and between union and nonunion

facilities. The ongoing search for creative strategies to enhance interaction between management and employees is one way Yearley and his successors have helped to prepare Phelps Dodge for the challenges certain to lie ahead.

Responding to New Challenges

IN RECENT YEARS, Phelps Dodge declared a new commitment to protection of the environment. It would no longer be simply reactive, as in the old days, but fully active. The corporation promised publicly in 1992 not merely to comply with government regulations but to exemplify the best contemporary industry practice in all environmental matters. "I consider myself an environmentalist," opined Yearley in May 1993. "I have children and grandchildren and I am concerned about the water they drink, the air they breathe and the land around them. I also want them to find good jobs, to live in a country with a strong economy, and be able to enjoy a good standard of living."[29]

As he explained to the Colorado School of Mines in November 1994 in its Distinguished Lectureship Series, "I am absolutely in favor of environmental regulation. These changes are not always easy for industry, and the real downside is that some of the changes have not led to a better environment but simply more cost." Nonetheless, Phelps Dodge committed millions of dollars each year to ensure its good stewardship of the environment. Yearley stated that when his company closed a mine, for example, it had to be made environmentally benign. "And we'll do that."[30]

During the 1970s the main focus of environmentalists was the corporation's older smelters. Eventually Phelps Dodge closed all of those in Arizona and constructed or acquired modern ones in New Mexico. The two New Mexico smelters must capture more than 90 percent of the contained sulfur in the concentrate, and both easily achieve that. At Chino in 1995 the capture rate was 96 percent; Hidalgo's was 95 percent.

By the 1990s considerable environmental concern came to focus on the mines themselves. One group of environmental radicals publicly proclaimed its goal as "Mine Free by '93." What such opposition meant for the industry was vividly illustrated in Montana, where Phelps Dodge sought for several years, without success, to obtain permits it needed to extract precious metals near Lincoln. In forty thick volumes the joint-venture partners sought to address all relevant issues raised by state and federal officials, yet still there was no end in sight for the process. Set atop one another the volumes stood an impressive thirteen feet high.

In the end, the Seven-Up Pete Joint Venture produced mainly the mountain of paper and an outburst of environmental hysteria. Opponents included an array of environmental extremists, some carrying assault weapons and sidearms and wearing paramilitary khaki, who crossed the line between wild-eyed militants and responsible environmentalists. In the end, the plodding pace of the permit process and a severe slump in the price of gold helped convince Phelps Dodge that it could earn a better return on its dollars elsewhere. In September 1997 it announced sale of its 72.25 percent stake in the project to its

partner, Canyon Resources, a Colorado-based mining company.

At the same time that Phelps Dodge pulled out of Montana, it scaled back exploration activities within the United States. Effective January 1, 1998, the corporation reduced annual spending on domestic exploration for new mineral deposits from $5 million to $1 million. In addition, it closed the majority of its exploration offices in the United States and decreased the number of exploration employees based there from forty to ten.

Exploration to expand mineral reserves at existing Phelps Dodge operations in the United States would continue, as would exploration abroad, under the aegis of Phelps Dodge Exploration Corporation. Formed in 1994 to streamline and focus the company's activities in some twenty-six countries, including Madagascar, where it discovered a potentially momentous nickel-cobalt deposit, Exploration is based in Phoenix and headed by A. L. ("John") Lawrence, a Phelps Dodge vice-president. Holding both bachelor's and master's degrees in geology from Cambridge University, he worked for De Beers and Anglo American before joining Phelps Dodge as a project manager in South Africa.

The cutback within the United States recognized that a great deal of exploration had already been conducted there and that the regulatory climate made starting new mining operations ever more difficult and expensive. International opportunities had become more abundant and had greater profit and growth potential. By redirecting its exploration resources toward those opportunities, Phelps Dodge intended to ensure the ongoing success of its core mining business. As Patrick Ryan, onetime head of exploration, explained in late 1996, he was "extremely pessimistic" about new mines in the United States. He cited the Montana gold project, which may have cost the corporation as much as $60 million by the time of the 1997 sale to Canyon Resources and yielded nothing.[91]

Obtaining permits for new mines in the United States only grew increasingly difficult, and a single land exchange with the federal government for a minable tract of land could take years. With the rest of the world opening up to exploration, domestic companies refocused their angles of vision overseas. "That's where people are going to open mines," emphasized Ryan. "It is not a case of wanting to run away from one's environmental responsibilities," contrary to the claims of some critics. Phelps Dodge already had demonstrated responsibility in "engineering the best environmental protections for Candelaria." Further, mining companies benefited from a certain amount of geographic diversification, political unrest in one country being a case in point. Added Ryan, "To say we're only going to mine in the United States would be insane."

He noted too what a daunting challenge it is for exploration personnel to find the new copper Phelps Dodge needs just to replenish what it mines each year—some 180 million tons of material. And Ryan's former colleague Phil Matthews, manager of Geophysical Services for Phelps Dodge Exploration Corporation, underscores the seriousness of the pursuit when he says, "We're of course somewhat biased, but we really feel that the life's blood of this corporation is in our hands."[92]

In practical terms, what they're saying is that Phelps Dodge exploration teams must find an ore body roughly the size of Candelaria in Chile every six years just to have copper enough in the future to replace what it mines today. Further, to enlarge the mining enterprise would require even more frequent or larger mineral discoveries. Do the intimidating statistics cause the corporation's president to lose sleep? "Every night," quips Steve Whisler without betraying any overstatement or exaggeration.

Whisler is certainly a key player who will help determine where Phelps Dodge pursues exploration next. The onetime legal counsel to the exploration group as well as to its parent corporation, he served as president of Phelps Dodge Mining Company for much of the 1990s, until Timothy R. Snider, one of the early advocates of solution extraction–electrowinning at Tyrone, succeeded him in September 1998. Late the previous year, at age forty-three, Whisler was promoted to president and chief operating officer of Phelps Dodge Corporation.

Like three of his recent predecessors as president, Len Judd, Richard Moolick, and Warren Fenzi, Whisler is a son of the West: he was raised and educated in the shadow of the Colorado Rockies. Though the youngest president in Phelps Dodge history, he brings a potent combination of education and experience to his office. Just after he graduated from the University of Colorado in Boulder with a bachelor's degree in accounting, Whisler launched his business career in 1975 as a summer intern at Western Nuclear in Denver—and that internship may rank among the ill-fated enterprise's most positive contributions to Phelps Dodge! The uranium company subsequently financed Whisler's way through the University of Denver College of Law, where he specialized in natural resources law, business planning, and taxes. Afterwards he added a master's degree in mineral economics at the famed Colorado School of Mines.

As an attorney Whisler continues in the tradition of Page and Munroe; as a mining man he walks in the footsteps of the Douglases, Cates, Fenzi, Moolick, and Judd; as a trained businessman he follows the course of Judd and Durham. Like Yearley he attended Harvard's program in advanced management. However, Whisler's own combination of legal, mining, and business education is unique for any president of Phelps Dodge. It might be added that he gained valuable additional experience via the school of hard knocks, thanks to his self-appointed mentor, Moolick: "I sent Whisler out to get his nose bloodied in the 1983 strike at Morenci. Here was an opportunity for a guy to see what the real world was like."[13]

Just two years earlier, in April 1981, when Whisler was still working for Western Nuclear, he received a call from Moolick at the corporation's headquarters. "We need you in New York tomorrow. I don't know what your job or salary will be." A few minutes later Moolick called back to ask, "Do you have a passport?" In that rather casual way, Whisler became legal counsel to the exploration group.[14]

Colleagues describe Whisler as both intense and relaxed. In most executives that would be a contradictory combination, but he



J. Steven Whisler *became president and chief operating officer of Phelps Dodge Corporation in 1997. He brought an impressive combination of college and university training and hands-on experience to his work. Whisler has served on the board of directors of Burlington Northern Santa Fe Corporation and UNOCAL Corporation as well as those of numerous civic groups and organizations. He has been a director of Phelps Dodge Corporation since 1995.*

possesses an ability to focus all his energy on solving a problem—he is, in his own words, a perfectionist—and yet he somehow remains relaxed about any public assertion of his authority. After he became head of Phelps Dodge Mining Company in 1991, he spent a week at each facility doing manual jobs, including some that were grimy and physically demanding, just to show employees "he was for real" and that he had not forgotten his roots as a construction worker in Colorado. Whisler drives himself to work in a pickup, and to date his preferred leadership style has been to labor behind the scenes and give others a generous measure of credit for the positive results. He often compliments his management colleagues by referring to them as his "thoroughbreds."

Like many others at Phelps Dodge, Whisler as president and chief operating officer must struggle to juggle demands of work and a normal home life; he has a wife, Ardy, and two young children. One way he copes with the inevitable stresses is by maintaining his sense of humor, a trait he has in common with his predecessors Yearley and Judd.

During his more than two decades at Phelps Dodge, Whisler gained important insights into the strengths and weaknesses of the corporation: "One of Phelps Dodge's greatest strengths is that it is 170 years old. One of Phelps Dodge's greatest weaknesses is that it is 170 years old." The challenge for present and future generations, he recognizes, will be to keep those two facts in proper perspective—much as employees did during the late 1990s culture change—and to use personal knowledge of the company's rich and complex history to best advantage as they make decisions that shape its future business landscapes. Whisler, who together with senior executives coined the slogan "Pioneering the Creation of Value" and helped make the concept central to the corporation's vision for itself, leaves no doubt that the important work of culture change begun by Yearley will continue as the enterprise charts its course for the new millennium.[5]



Chapter Eighteen



BACK *to the* FUTURE

IN THE POPULAR Hollywood movie *Back to the Future*, time travel takes place in a converted DeLorean automobile. The teardrop-shaped General Motors EV1 was hardly a time machine in the literal sense, but it provided an impressive link between past and future, between the unfulfilled promise of electric cars in the early twentieth century and the vehicles likely to become commonplace on the roads and highways of the twenty-first century.

Phelps Dodge leased an EV1, the first electric vehicle mass-produced in recent years in the United States, for employees to use. Individuals took turns commuting in it for several days and offering their evaluations. The corporation's green model, a muted color chosen specifically to emphasize the conservative nature of Phelps Dodge, was in the shop the day I took a brief test drive in mid-1997, so I enjoyed scooting around the streets of Phoenix in a racy candy-apple-red model. It was a sleek and quiet automobile, and it cornered like a low-slung sports car. It was no oversized golf cart, either. It could easily accelerate from zero to sixty miles per hour in under nine seconds.

— BACK TO THE FUTURE: *this image of newborn babies in the nursery at Phelps Dodge's Douglas hospital reminds us that today is always born out of yesterday. That is true too for Phelps Dodge Corporation.*

Its inside climate was controlled by a heat pump and ozone-friendly refrigerant. The entire motor drive unit weighed 150 pounds, about 66 percent less than the typical gas-powered four-cylinder engine, it had only one moving part, and it never required an oil change. It used seven different onboard computers. All in all, General Motors filed twenty-three new patents in connection with development of the EV1. Its most noticeable drawback in the late 1990s was the capacity of its twenty-six storage batteries, which limited the EV1's range between charges to approximately seventy miles. If the sleek automobile, or some kind of successor model, ever becomes a popular consumer item, it bodes well for Phelps Dodge Corporation because of the copper its electric motors and support facilities will use.[1]

Even without the EV1, automobiles require more copper than ever before in history—about fifty pounds today versus only thirty pounds just a decade ago. Although by the 1990s, aluminum radiators replaced copper ones in about 75 percent of American-made automobiles, that was not the case in Japan and many other foreign countries, where a large majority of new cars still contained copper radiators. Those same automobiles used many dozens of small motors (needing countless miles of magnet wire) to roll down windows, adjust seats, activate antennae, lock doors, and do a myriad of other tasks. A new Lexus, for example, utilizes some 165 electric motors. Copper is also used extensively in automobile air conditioners and audio systems.

The same increase in copper usage was noticeable in residential and commercial construction. By the mid-1990s the substitution problem once posed by plastic pipes and aluminum building wires had diminished. In fact, by that time copper had regained much of the market once lost to aluminum. Copper consumption outside the United States expanded rapidly too, skyrocketing 1,200 percent between 1970 and 1992 in Asia, excluding China and Japan, and within those two nations it still grew by a respectable 224 percent. Japan and several rapidly industrializing nations of the Far East, the so-called economic tigers, accounted for fully one-third of global demand by the mid-1990s. That was the primary reason, when Asian economies faltered in late 1997, the world price of copper dropped from $1.23 a pound in June 1997 to an average of $0.70 a pound during the last quarter of 1998. The next year promised no improvement, the price falling in January 1999 to $0.65 a pound on the London Metal Exchange.

"We're dealing with the lowest annual average copper price, on an inflation-adjusted basis, of the century," observed Timothy R. Snider, president of Phelps Dodge Mining Company. The abrupt nose-dive caused the corporation to trim global copper production by 100,000 tons and its workforce at Chino by approximately three hundred. In two market-driven cutbacks, the first since 1985, it closed its last working properties underground at Ojos del Salado and at Cobre Mining Company in New Mexico.

But what about the challenge of fiber optics? Glass was never a viable competitor until thin filaments proved to have impressive conductivity. Glass substitution hurt copper in communication wiring, the very market in which it had seemed least exposed. Fiber optics



Timothy R. Snider *was elected president of Phelps Dodge Mining Company and a senior vice-president of the corporation in September 1998 at age forty-eight. A graduate of Northern Arizona University (1979) with a degree in chemistry and geology, he began his climb to the top of the mining company as a laborer at the Copper Queen Branch in 1970. Snider championed the development of solution extraction–electrowinning operations at Tyrone and Morenci, where he later held the position of president, Phelps Dodge Morenci, Inc. He attended the Wharton Advanced Management Program in 1996.*

became important in transmission of data by telephone; however, electricity that powers the machines that generate data for fiber optics still relies heavily on copper, as do local connections—including those likely to be found inside a future generation of computers linked together by globe-girdling electronic networks.

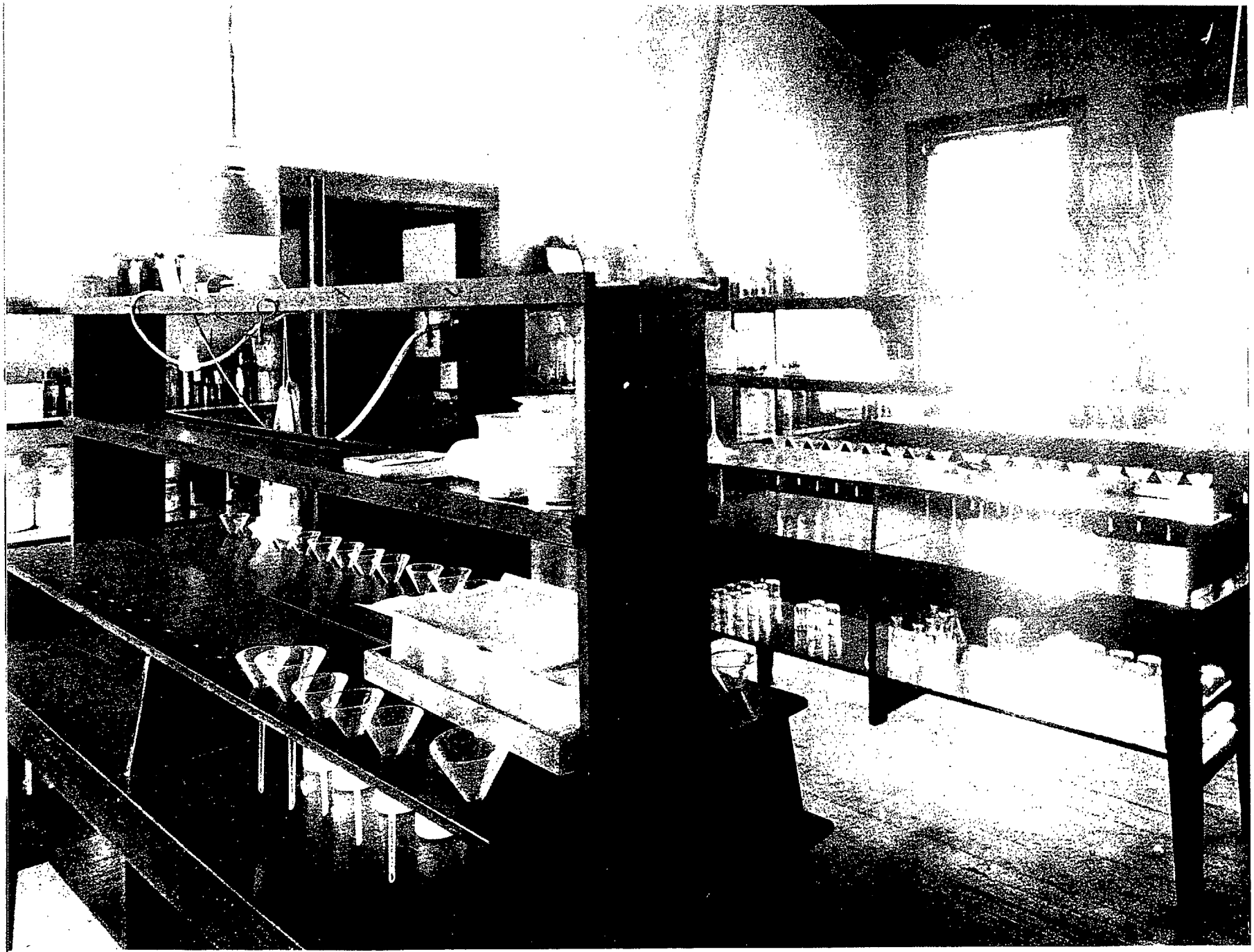
From Molecule to Market

In September 1997 IBM announced that it had developed a way to make computer chips by using copper instead of aluminum, the metal long favored by manufacturers. The innovative product, aptly code named the Coppermine series by Intel, could ultimately trim the cost of chips by as much as 30 percent and speed calculations by perhaps as much as 40 percent. Further, the new technology will enable chips to operate with less electricity, making them especially useful for laptop computers and other battery-operated electronics products. IBM's breakthrough use of copper in chips will boost red metal's reputation but probably not its production because only a tiny amount is required to make each chip. If nothing else, the symbolism is important.

Who could predict what discoveries might emerge from Phelps Dodge's own research laboratories? Research has long been important to the corporation. As recently as the 1970s, for example, it staffed and equipped research laboratories at manufacturing facilities in Yonkers, New York; Elizabeth and South Brunswick, New Jersey; and Fort Wayne, Indiana, to study process improvements and new products. The Blue Box was the nickname for its mammoth cube-shaped laboratory at Yonkers used in connection with the Electric Research Council's program on extra-high-voltage and cryogenic cable development.

At the end of the twentieth century, Phelps Dodge Corporation operated three state-of-the-art research laboratories (as distinct from quality control or assay offices): one in Fort Wayne next to the main offices of Phelps Dodge Magnet Wire; another in Marietta, Georgia, at the new headquarters building of Columbian Chemicals Company; and a third in Safford, Arizona, for Phelps Dodge Mining Company. The Fort Wayne laboratory, for instance, "is partly intended to be impressive from the standpoint of showing our customers our *commitment*," notes Daniel E. Floryan, Magnet Wire's vice-president for quality and technology, "but also it is a very functional tool. We think it is one of the best laboratories dedicated to magnet wire, certainly in this country, and probably in the world." Floryan enjoys walking customers through the facility just to "wow" them with its top-flight research and problem-solving capabilities. Although the mass media today tends to focus on flashy high-tech communications and computer breakthroughs, Floryan believes there is considerable room for innovation in basic manufacturing processes, such as making electric motors more energy efficient, which requires innovations in magnet wire coatings.[3]

Although each of the Phelps Dodge research facilities has a distinct mission and history, over the years all have discovered ever larger expanses of common ground. Research in particle science shows how Phelps Dodge is extending its reach



HISTORIC LABORATORY INTERIOR *at the New Cornelia Copper Company in Ajo. Phelps Dodge today has several modern research facilities. Two of the most impressive are at Phelps Dodge Magnet Wire in Fort Wayne and Columbian Chemicals Company in Marietta, Georgia (see pp. 358–59). Research is vitally important in mining too, as the 1998 relocation of the laboratory of Phelps Dodge Mining Company to modern quarters in Safford attests.*

literally from molecule to market. What researchers in Georgia using Columbian's million-dollar field emission microscopes learn about basic properties of carbon black particles may well prove useful to scientists in Arizona who ponder afresh the fundamental aspects of producing copper and other minerals, including something so deceptively simple as the explosive force needed to blast copper ore from benches in an open-pit mine.

To nonspecialists the job of setting the explosive charges required to break ore into what will become successively smaller-sized pieces and particles may seem like uncompromisingly low-tech activity. Yet Phelps Dodge Mining Company researchers at the Safford laboratory have learned that using a satellite-based global positioning system allows workers to drill a close-to-perfect array of holes that, with precise preparation, can cause a blast to yield material of optimum size for maximum processing efficiency. This research can save energy both at the site of the blast and in subsequent processing of the ore. In short, innovation in "blast fragmentation" equals many dollars saved.

At a time when about half of all Phelps Dodge copper derives from the solution extraction–electrowinning process, its Safford research center examines ways to optimize existing SX/EW facilities as well as develop SX/EW processing units portable enough to make small or remote ore bodies profitable. That is one of several promising projects involving liquid-to-liquid extraction of metals that someday may make energy-hungry smelters obsolete. Another goal is to extract red metal in a cost-effective way from progressively leaner grades of ore. "The real challenge for the future," observed Robert E. Johnson, a metallurgical engineer and scientist who oversaw approximately thirty-five researchers at the Process Technology Center in Safford, "is that ore bodies of the past are not long going to be there." In the United States exploration teams will probably not find copper deposits like those that made Butte and Morenci famous, but Johnson, now retired, remains confident that mining company researchers (and like-minded people throughout the industry) can give Phelps Dodge the technological tools it needs to assure its future success in mining.[4]

The list of research activities at all three facilities is a lengthy one, and the search for ways to improve existing processes and for new or better products is a serious quest. Nonetheless, all forms of innovation, no matter how esoteric, have their lighter moments. On one occasion, technicians in Fort Wayne bought a cigarette-wrapping machine in hopes of using it to make a special type of paper-insulated magnet wire. They failed to achieve fully the desired results, but just the same they rigged it up with lots of "bells and whistles" to create the illusion of a finely tuned mechanism, held an open house, and thus encouraged puzzled technicians from the competition to duplicate Magnet Wire's "success."

Like mine exploration personnel, with whom they have so much in common, the corporation's researchers sincerely believe they hold the prosperity of Phelps Dodge in their hands. For them this makes the challenge of Pioneering the Creation of Value especially meaningful: "We embrace it fully," says John O. Marsden, vice-president for technology, Phelps Dodge Mining

Company, and a graduate of the Royal School of Mines in London. One indication of long-term support for the contributions that laboratory workers make: during cutbacks at Phelps Dodge Mining Company in 1999 because of copper's low price, nothing was trimmed from the budget for research. Much will inevitably change at the corporation during the coming years, but Phelps Dodge's commitment to its own world-class research teams appears solid.[5]

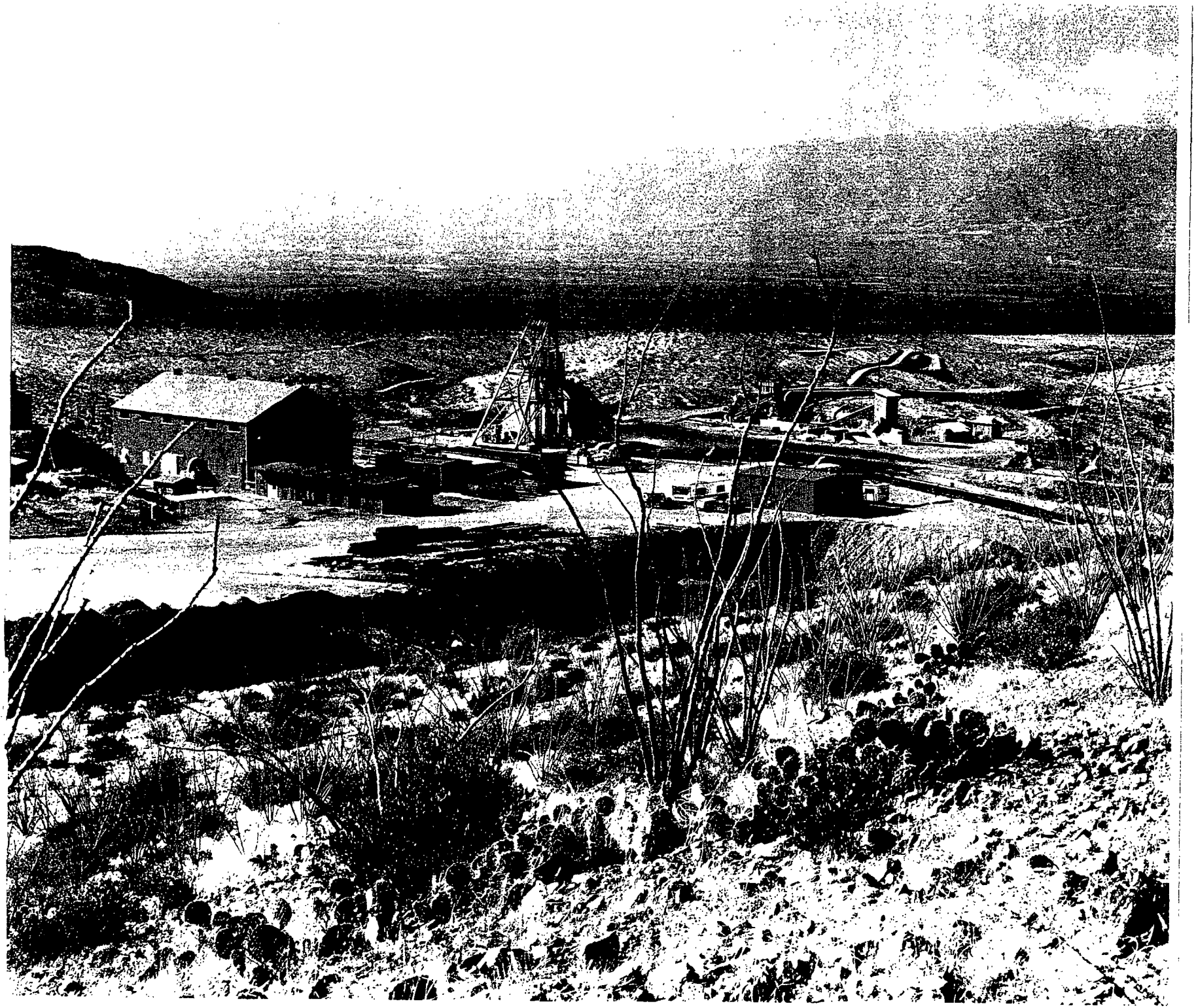
The Certainty of Ever-changing Landscapes

PHELPS DODGE'S OWN landscapes of production, no less than the world markets for copper, have witnessed major changes in recent years. On November 16, 1996, demolition experts sent the Morenci smelter's two 600-foot-high stacks crashing down at precisely eight o'clock on that Saturday morning and forever changed the local skyline. Both had been impressive landmarks, the oldest one dating from 1941 when it ranked as the world's tallest industrial stack. Again, on February 12, 1997, just three months after Morenci's two smokestacks disappeared, a carefully placed series of explosives felled a long-unused smelter stack located just south of Clifton. For years, the tall sentinel greeted motorists as they dropped down into the San Francisco River valley. It was an imposing remnant of the Arizona Copper Company smelter built in 1913 and last operated by Phelps Dodge in 1938. Workmen had long since removed the buildings, but the solitary stack remained in place for several decades to jog the memories of old-timers who recalled the original landscape of production.

Nineteen miles south and across the mountains from Clifton and Morenci a different kind of landscape evolution was proposed for an open plain just north of the cotton-growing town of Safford. There never was a mine settlement on the site, but no one could say with certainty what the future might bring. Safford was where Phelps Dodge hoped to launch a $370 million copper-mining project by the early 2000s. For far longer than most people could recall, the Safford project had been a sleeping beauty for Phelps Dodge, always full of alluring promise as perhaps the most significant copper find in North America since World War II but never awaking to its full potential. Perhaps that will have changed by the time this book is published—but then again a 30 percent slump in the price of copper during 1997 and 1998 caused many plans to be scaled back or put on hold. Even so, "Safford is a great ore deposit," according to the retired senior vice-president Patrick J. Ryan, who first looked it over back in 1971.[6]

Phelps Dodge holdings in the Safford mining district, a rectangle in the foothills of the Gila Mountains that is roughly twelve miles long by three miles wide, encompass some twenty thousand acres of patented land and four significant bodies of ore. These include the Lone Star, a huge copper deposit buried beneath six hundred feet of overburden, together with the San Juan, Sanchez, and Dos Pobres ore bodies. The near surface oxide portion of the deposits is today "the most significant undeveloped copper resource in the United States," stated John Broderick, onetime project manager, in 1997.

THE LANDSCAPE OF *the Safford project in 1974. In the early 1980s the facility consisted of two shaft sites ten thousand feet apart that Phelps Dodge planned to connect underground. The company attempted a block-caving operation by carving out a room the size of a football field. But the explosion and caving resulted in blocks the size of houses, something not desirable. Phelps Dodge suspended work during the corporate restructuring of the mid-1980s and allowed water to flood the underground passageways. It currently expects to mine the ore by open-pit methods.*



Some people even predicted a new Morenci. More realistically, a new mine complex at Safford would probably employ about 250 people, and operating at full capacity, the Dos Pobres and San Juan deposits would provide about two hundred million pounds of copper each year for at least fourteen years.[7]

The corporation's interest in copper in the Safford area actually dates back to September 1957 when it optioned a group of claims located north of town. Phelps Dodge conducted exploratory drilling two months later, exercised its option to purchase the claim group in 1960, and commenced sinking an 1,875-foot shaft into a deeply buried sulfide ore body in November 1968. The Dos Pobres deposit proved a disappointment, and Phelps Dodge actually lost $85 million in a futile attempt to mine it by block-caving, then seemingly the most appropriate technology for a mine that deep. During corporate cutbacks of the mid-1980s it appeared doubtful that the Safford property had any future.

Yet over the years Phelps Dodge added three more copper deposits in the area, including Lone Star, which it gained as part of the Chino Mines Company wheeling and dealing with Kennecott in 1986. Lone Star came to Phelps Dodge along with a curious history: it was where Kennecott had planned to detonate an underground nuclear blast in the 1960s. The company had actually obtained a permit from the Department of Defense to do so.

It was all part of Project SLOOP, which now seems like science fantasy; but like the atomic-powered bomber and similar exotic projects that never progressed beyond the drawing boards, it dated from an era of popular fascination with all things nuclear—and that included Phelps Dodge's own infatuation with uranium and its Western Nuclear subsidiary. As part of Project SLOOP, the Atomic Energy Commission, Lawrence Radiation Laboratory, United States Bureau of Mines, and Kennecott conducted a two-year study of how to use a nuclear explosion to mine copper. The proposed blast twelve hundred feet beneath the surface would be equivalent to twenty thousand tons of TNT and would in theory pulverize an underground deposit containing eight million pounds of copper that Kennecott could then leach, presumably without problems from lingering radiation. The explosion never took place, and the copper is still there.

Federal and state laws today require that mining companies protect, relocate, or otherwise mitigate the effects of their operations on plants and wildlife. Thus around 10 percent of any money Phelps Dodge spends to develop its open-pit operation at Safford will go toward environmental protection. For example, a leach pad liner to prevent pregnant leach solution from touching undisturbed soil costs $35 million. Phelps Dodge, which for years had no formal environmental department, is now determined to remain well ahead of any environmental mandates or regulations.

On the opposite side of Arizona is Phelps Dodge's Copper Basin property, a medium-sized porphyry copper deposit located about midway between Skull Valley and Prescott. Despite its name, Copper Basin is actually situated nearly a mile above sea level. Phelps Dodge has held several claims in that area since the 1880s, when William E. Dodge became president of the

Copper Basin Mining Company, but it never became a big producer compared to Bisbee or Morenci. Over the years, Phelps Dodge drilled the area extensively to define a deposit of about seventy million tons of ore running approximately .5 percent copper. If the corporation should acquire additional land by purchase or exchange so it could conveniently locate its shops, concentrator, dumps, and tailing sites, the property might be a viable producer.

Meanwhile, a search for more copper around the corporation's active mining sites goes on. Back in 1988, Phelps Dodge officials had estimated that mining and milling operations would cease at Tyrone by the early 1990s and that nearby Chino had reserves sufficient to keep it operating about twenty more years, until 2008. As a result of outstanding efforts by exploration and mine staffs, in the late 1990s Chino still has twenty years of reserves and Tyrone at least ten.

At some properties, no one can be sure what the future holds. On November 29, 1995, for instance, Phelps Dodge had the tall smelter stack at Ajo demolished and remnants of the old smelter and concentrator complex removed from the landscape. The time-honored Tucson, Cornelia & Gila Bend Railroad seemed destined for the scrap heap as well, but early in 1997 everything changed. Phelps Dodge announced plans to invest $2 38 million to bring the moribund New Cornelia Branch back to life in 1999 after a fourteen-year hiatus. That meant obtaining a variety of permits and making major upgrades to the infrastructure, including building a state-of-the-art concentrator and refurbishing the railroad so that it could once again haul concentrates forty-four miles from Ajo to Gila Bend.

That was not happy news for retirees who imagined they had moved to a small, quiet town when they bought one of the nine hundred homes Phelps Dodge sold in Ajo in the early 1990s. (Many home buyers seemingly forgot that Phelps Dodge had advised them that it might later restart operations.) But hardly had anyone had time to voice a strenuous complaint before Asia's economic troubles cooled demand for copper and caused a price slump that forced Phelps Dodge to suspend the planned renovation work. Whenever it resumed depended on copper's recovery. As always, in Ajo, Safford, and every other would-be copper-producing community, the name of the game is the Price Is Right!

The mines of Bisbee could come back to life too with the right technology and a high enough price for copper. Development of its Cochise deposit would likely require a combination of open-pit mining and the solution extraction–electrowinning process that has proved such a blessing to Phelps Dodge since the mid-1980s. As for the United Verde property at Jerome, there seems little likelihood of revival. It is a topographically complex site, yet Phelps Dodge and Cominco Ltd. did launch a joint venture there in the 1990s to search for copper and zinc deposits. "You never say never in this business," emphasized J. Steven Whisler, president of Phelps Dodge Corporation.[8]

That was one reason no one dared to predict how the mining landscapes of Phelps Dodge might evolve in the future. There may be some big surprises along the way. It is not inconceivable, for example, that if company or industry researchers perfect a process that permitted Phelps Dodge to process copper ores

of all types into refined cathodes at its individual mine properties, smelters might vanish entirely from the corporation's familiar landscape of production.

Mining's Life Insurance Policy

THE MANUFACTURING LANDSCAPE continues to evolve as well. In 1994, for instance, Phelps Dodge bought a magnet wire plant in El Paso, Texas, and spent $14 million on its expansion. Two years later Phelps Dodge Magnet Wire began construction of a $42 million plant in Monterrey, Nuevo León, Mexico. That facility, completed in 1998, was intended to serve the growing transborder maquiladora market and free up capacity in plants north of the border to meet growing demand for magnet wire within the United States. Columbian Chemicals Company continued to expand too; for instance, early in 1999 it acquired an 85 percent stake in a South Korean carbon black–manufacturing firm for $73.1 million. That permitted Phelps Dodge Industries to gain important market share in Asia, much as it did in South America with acquisition of the gigantic Copebras plant in Brazil a year earlier.

Already by the mid-1990s Phelps Dodge Industries accounted for about a third of the parent corporation's operating earnings, and in that way it provided a "life insurance policy for mining," emphasized Manuel Iraola, who became its president in 1995. He observed too that Phelps Dodge Industries was not an old-fashioned conglomerate but rather a collection of compatible process-oriented businesses that fabricate basic products used by a diverse group of manufacturers.[9]

The theory Iraola described in early 1997 (and which the Committee of Five had first enunciated in the mid-1980s) became reality during the second quarter of 1998, when copper prices that dropped from an average of $1.33 a pound in 1995 to $0.75 a pound in 1998 caused Phelps Dodge Corporation to cash in its "insurance policy." For the first time ever, Phelps Dodge Industries earned more than Phelps Dodge Mining Company ($46.1 million versus $34.9 million), or 67 percent of total operating income. That unprecedented pattern continued for the remainder of 1998. In all, when the corporation closed its books for the year, the Industries side accounted for operating income of just under $354 million, and Mining, slightly more than $110 million. Just a year earlier their relationship had been reversed, operating income from the latter in 1997 totaling more than twice that of the former ($459 million to $208 million).

One caveat: somewhat more than half the operating income for Phelps Dodge Industries during 1998 derived from the its first quarter sale of Accuride Corporation, its wheel and rim business. Accuride, with 70 percent of the market share in North America, dominated the overall medium-heavy wheel market and the sixteen-inch commercial light truck market, but Phelps Dodge concluded that it had better ways to invest its dollars. For a time, back in 1994, Hudson International, failing to perform well because of a downturn in federal defense spending and other reasons, appeared destined for sale; Phelps Dodge seemed ready to give it away. But Iraola, the new head of Phelps Dodge Industries, flew to South



MANUEL J. IRAOLA *was elected president of Phelps Dodge Industries, the diversified manufacturing business of Phelps Dodge Corporation, in 1995. He also serves as a senior vice-president of the corporation and a member of its board of directors. Born in Havana, Cuba, Iraola holds a B.S. degree in industrial engineering from the University of Puerto Rico, and an M.B.A. degree from Sacred Heart University in Fairfield, Connecticut. He attended Pennsylvania State University's Executive Management Program in 1991. Iraola came to his current position by way of Columbian Chemicals Company, where he was the senior vice president and chief financial officer at the time Phelps Dodge acquired it in 1986, and later Phelps Dodge International Corporation, where he served as president.*

Carolina instead and, after studying the problem, installed a new management team headed by a young and energetic Glenn Decker. The facility, reborn as Phelps Dodge High Performance Conductors, once again headed down the often winding road to success.

Legacy: Triumph over Adversity

Any attempt to explore the many landscapes of Phelps Dodge presents a challenge because they are constantly changing. Could it be otherwise for an active mining and manufacturing enterprise? I write these words early in 1999 knowing full well that before *Vision and Enterprise* appears in print a year from now, familiar components of Phelps Dodge Corporation may well be gone and new ones added. The same will be true for personnel.

Among the more intriguing of its modern landscapes, and a prime example of why it is impossible to anticipate what changes lie ahead, is one that Phelps Dodge proposed back in the late 1980s for the area near Clarkdale, Arizona, where tailings, or finely ground rock, from the old United Verde concentrator had been deposited in a bend in the river until the early 1950s. Phelps Dodge proposed to cap the tailings over and landscape the area to create an attractive golf course and real estate development called Verde Valley Ranch. There was precedent for this because in the 1920s, when William Andrews Clark owned the mine, his company built an extensive employee recreation facility nearby that included a clubhouse and a nine-hole golf course that used cotton hulls for its greens. He also built a two-story house that Phelps Dodge anticipated using as a museum. Alas, though the process of creating the Verde Valley Ranch began in 1987, applications for the necessary permits were still caught in a political and environmental thicket more than a decade later.

Some things, however, remain remarkably consistent through the years, and for that reason *Vision and Enterprise* concludes with a late 1990s example of Phelps Dodge's ability to triumph once again over adversity. The incident is reminiscent of the day back in 1832 when the recently built Phelps & Peck warehouse collapsed in New York; from that tragedy emerged a new business partnership two years later, Phelps, Dodge & Company.

The more recent misfortune occurred at Morenci just two days before Christmas 1997. Shortly after the morning shift change at seven, the Phelps Dodge Morenci president, H. M. ("Red") Conger, was on his way to work when he received word that a power line had gone down. That did not concern him greatly until he learned why: after steady service for more than ten years, 180 feet of the conveyor system that spanned Highway 191 had collapsed suddenly and without warning, taking out the power line. One moment the conveyor carried crushed ore as usual from the pit to stockpiles for the concentrators; then a joint failed, and the next moment it was a massive pile of twisted steel blocking the main highway. A vital artery in the production of copper—Morenci produced more then a billion pounds of copper in 1997—was severed.

Emergency measures had to be taken without delay. First, Morenci personnel made certain that no one was trapped beneath the

wreckage. Then Conger, employing the teams approach, formed eight or nine groups to deal with different aspects of the recovery process. Soon flaggers rerouted traffic through the mine; the State of Arizona gave Phelps Dodge permission to extend a haul road along the top of the existing highway. Large trucks worked around the clock to supply the concentrators with ore that formerly traveled by conveyor.

On Christmas day one team gingerly picked apart the hulking remains. It was dangerous and "very nerve wracking" work, recalled Conger; the metal pieces were bent and twisted to form something like a gigantic spring, and removing one piece could release potentially lethal energy. Meanwhile, a fabricator in Salt Lake City built new conveyor sections, including a 100-foot truss that it carefully trucked along interstate highways much of the way to Morenci.

Conger, who had worked there only since October 1, drew upon his own training as an engineer at the Colorado School of Mines and upon earlier experience he had gained when an important conveyor at the Chino Mines Company went down after a motor caught fire. That misfortune also happened on December 23! The remarkable coincidence caused Steve Whisler to quip to Jim Madson, then vice-president and general manager of Phelps Dodge Mining Company, "Don't ever send this guy to another property that has a conveyor." Conger recalled that, with a little humor and a lot of teamwork by hundreds of employees and retirees who toiled through the holidays, they had the vital conveyor system back in action in exactly thirty days. Through it all the Morenci mine never shut down.

What happened at Morenci in late 1997 and early 1998—like the mid-1990s storm-caused roof collapse at the sprawling Phelps Dodge High Performance Conductors plant in Inman, South Carolina, and additional disasters at Phelps Dodge facilities on other occasions—illustrates that success in business includes employees pulling together to help a company triumph over adversity. By that measure, Phelps Dodge Corporation should be able to anticipate a good future.

The long-term outlook is bright for other reasons too. At Morenci, for example, where Phelps Dodge and its predecessors have mined mountains of copper for well over a century, may lie the world's largest chalcocite blanket ore body. Even now, "we haven't defined the edges of this thing," said Conger of its "fantastic opportunities" for copper production as he looked ahead to the twenty-first century. No wonder he added—with words commonly used by many other Phelps Dodge employees—"I really like this business."[10]

When Douglas C. Yearley retires at the beginning of the new millennium, the legacy of his long tenure at Phelps Dodge Corporation, including twelve years as chairman, can be measured in many different ways. Foremost among his contributions is that he, a metallurgist by training, engineered a new corporate "alloy" that was tougher and more durable than the sum of its parts. In other words, since 1989 when he succeeded G. Robert Durham, Yearley and his lieutenants have consistently labored to give Phelps Dodge the strength and resilience it required to respond successfully to future challenges.

Crushed ore drops *onto a stockpile from the in-pit conveyor, as photographed in Morenci on a snowy day in January 1997. Eleven months later the portion of the system spanning the highway just out of sight to the left suddenly collapsed.*



Yearley once termed that process "managing for the downside—even on the way up." In late 1998 he observed to his industry colleagues: "When times are good, nothing earns money like a mine. I submit to you that this is one of our industry's biggest problems. Those of us in the mining business are like surfers—we can't control or even predict the commodity price wave. The best we can do is stay on our boards and ahead of the curl. But in the euphoria of riding a wave of $1.35 copper, it's easy to forget to look around at the tides of supply and demand, political forces and global economics, and not see the breaking wave until it has washed over you."[11]

During the 1990s, Yearley promoted low-cost production of copper, the corporation's core business, as well as prudent diversification into noncopper areas intended to provide downside protection during unavoidable slumps in the price of copper. In many ways large and small he and his lieutenants sought to strengthen the balance sheet to increase the value of Phelps Dodge to its shareholders and keep it a blue-chip enterprise. They pushed forward the process of globalization that Durham earlier fostered, achieving success in the Candelaria mine in Chile.

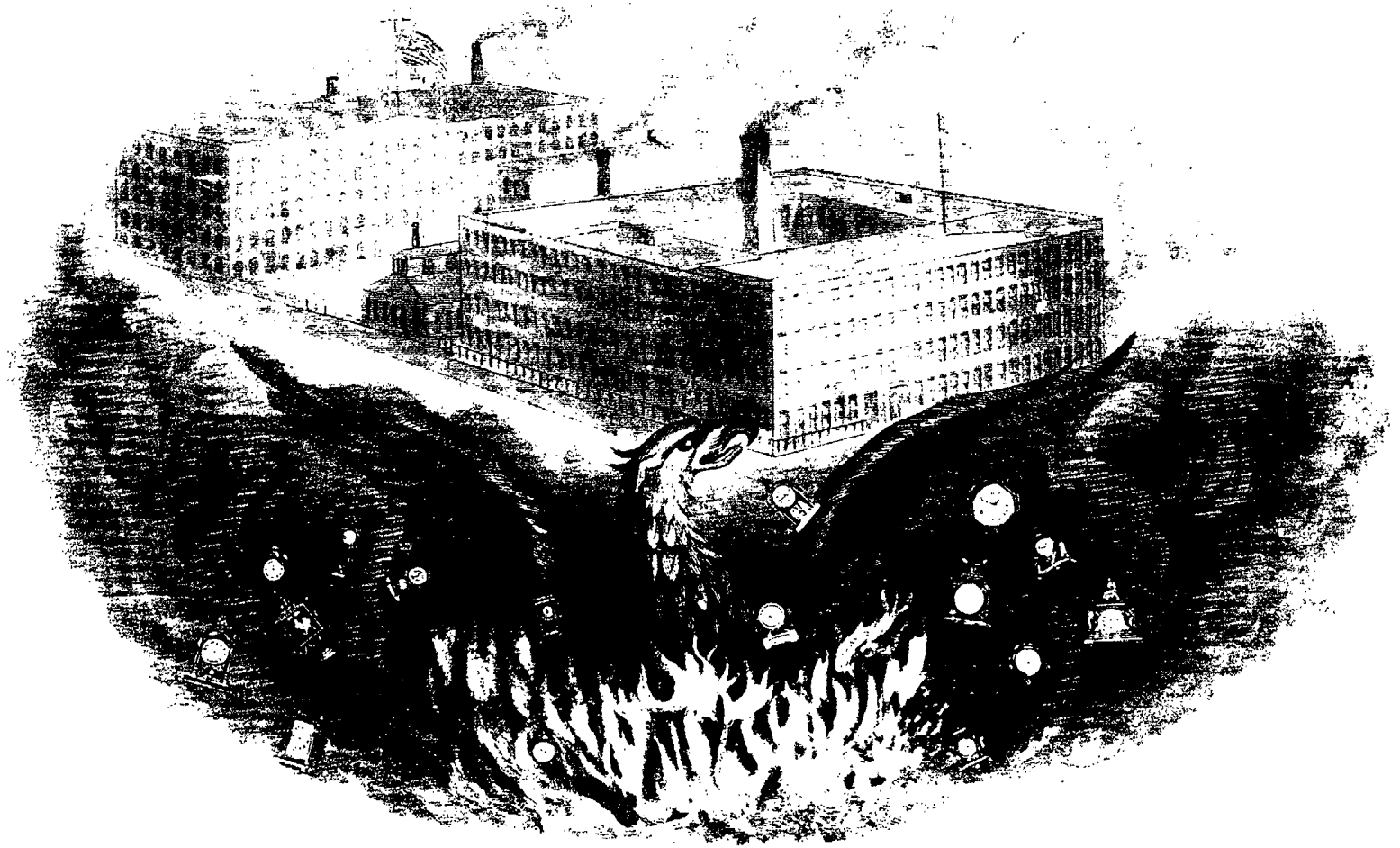
Remarked Gary Loving, vice-president for South American operations, "I think the vision at the top is one that understands how to stay strong in this business." That conviction is affirmed by many financial observers outside the corporation: "PD management has done a superb job of running the company over the last ten years," noted Morgan Stanley Dean Witter in late November 1998.[12]

Yearley and his leadership team have supported positive changes in Phelps Dodge's corporate culture as part of their larger goal of seeking "operating excellence." They have worked to foster better communication throughout the corporation as part of an openness they believe will lead to greater employee participation in management at all levels, which in turn will produce positive results for everyone. They continue Phelps Dodge's long-standing commitment to philanthropy in student scholarships and a variety of community betterment programs.

The vision that Yearley and other employees of Phelps Dodge translated into profitability during the good years of the early and mid-1990s greatly strengthened the nearly 170-year-old corporation and positioned it well to triumph over adversity. That vision also encouraged individuals to discover for themselves that "I really like this business." And "this business," it must be added, included production of about as much carbon black as copper, or approximately 1.8 billion pounds each in 1998.

In fact, the corporate-restructuring program that Yearley and his colleagues set in motion back in the mid-1980s makes the name Phelps Dodge increasingly synonymous with both copper and carbon black as the new millennium approaches. That remarkably synergistic combination is likely to reward investors and employees alike, along with all others who benefit from Phelps Dodge's formal commitment to Pioneering the Creation of Value. Anson Phelps certainly would have understood and approved what that pledge means; and as a pioneer himself in the world of multinational business, he would surely be proud of the enterprise that carries his name and vision into the twenty-first century.

BACK IN THE *early 1880s when Phelps Dodge's Ansonia Clock Company plant burned to the ground in Brooklyn, it used the symbol of the Phoenix in its products catalog to inform customers of its rebirth. That remains an apt symbol for a corporation with a proud history of bounding back from adversity.*



New Clock Factories Brooklyn





Chapter Nineteen

UPDATE 1999: THE PACE OF CHANGE

ISION AND ENTERPRISE ends its story of Phelps Dodge Corporation early in the summer of 1999, when the book manuscript began the process leading to its publication the following year. However, like a fast-flowing river, the pace of change at Phelps Dodge did not moderate during that interval. In fact, it picked up considerable speed, and like a river full to its banks, it cut some significant new channels and bypassed old ones.

The following, in brief, are several key events that impacted Phelps Dodge Corporation in mid-to-late 1999. All of these add to the history told on the previous pages.

A major milestone for Phelps Dodge during the past twenty-five years was construction of the Hidalgo smelter and the town of Playas in New Mexico as part of a successful corporate commitment to clean air. The massive smelter, along with the one in Chino, supplied a steady flow of copper anodes to the refinery in El Paso. For a variety of reasons, the familiar landscape of production changed in 1999, as it had so often in years past. Phelps Dodge Mining Company took steps during the first week of September 1999 to shut down (at least temporarily) its Hidalgo smelter because of

THE FACES OF CHANGE. *No longer can mining operations be thought of as a "man's business." A collective portrait of women at work at Phelps Dodge Morenci in 1999: Sara Skoff, SX/EW metallurgist (upper left); Connie Waddell, mine engineer (upper center); Patricia Young, supervisor change agent (lower right); and Rachel McCarthy, haul truck driver (lower left).*

rock-bottom copper prices and a noticeable slackening of concentrate production in the Southwest. When it closed the smelter, it mothballed the settlement of Playas.

Further, Phelps Dodge Mining Company placed on standby the smaller of two concentrators at its Morenci, Arizona, mining complex. The giant mine would continue to yield approximately 800 million pounds of copper a year. In fact, by the year 2001 the company expected to use solution extraction–electrowinning technology for all copper from Morenci, up from the present 50 percent. The $220 million conversion will shave seven to nine cents a pound off production costs, an important saving in times of low copper prices—and a blessing when prices climb again. The anticipated changeover to all SX/EW production at Morenci further contributed to the shutdown of the Hidalgo smelter. Outside Arizona and New Mexico, Phelps Dodge Mining Company sold its Witkop mine and related fluorspar-producing facilities in South Africa.

Phelps Dodge Industries took steps to combine Phelps Dodge Magnet Wire Company and Phelps Dodge International Corporation (which included Phelps Dodge High Performance Conductors) into a single wire and cable manufacturing division. Phelps Dodge further announced that it would cease all wire and cable manufacturing in Ecuador and close a small rod mill and magnet wire facility in Venezuela. It closed its magnet wire plant in Hopkinsville, Kentucky, as well as two small High Performance Conductors facilities in Montville and Fairfield, New Jersey.

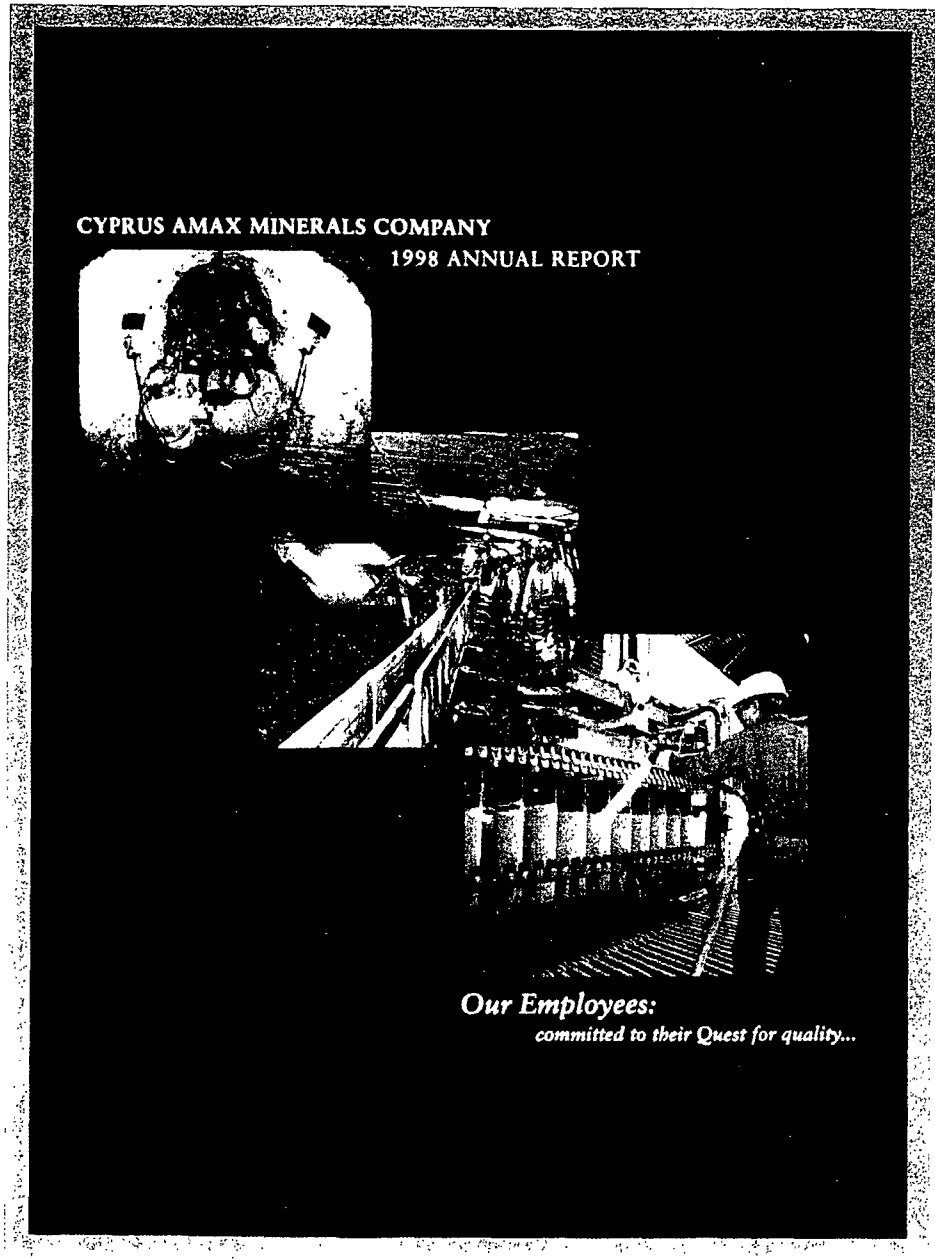
The late 1990s downturn in world copper



Julia Mazanek on *the job in Phoenix in 1999. Probably the longest-serving employee in the history of Phelps Dodge Corporation, she recalls many of the landmark events that occurred during the fifty years since she started work at the Douglas, Arizona, offices in 1947.*

prices created several major headaches for American producers and long-term structural changes in the entire industry, not just at various Phelps Dodge operations. For example, back in 1996 at the top of the market boom, Broken Hill Proprietary, the Australian mineral giant, paid $2.4 billion for large copper mines in Nevada and Arizona, but in mid-1999 it closed those properties, which included the modern San Manuel smelter in Arizona. On the other hand, as had often been the case in the past, the months of prolonged adversity presented Phelps Dodge with some unusual growth opportunities.

At the 1999 Global Leadership Forum (the successor to Management Review Week) in Phoenix in July, top executives publicly noted that they were exploring various ways to reinvent the corporation. That meant altering the historic pattern of a major restructuring at Phelps Dodge every fifty years to a fifteen-year cycle. What form reinvention might take became clear only a few weeks later when Phelps Dodge announced a takeover offer for both Cyprus Amax Minerals Company and ASARCO Incorporated. The bold move compared favorably



Phelps Dodge to Acquire Cyprus Amax

Deal Valued at $1.79 Billion; Hostile Struggle to Buy Asarco Set to Continue

WALL STREET JOURNAL, OCT. 1, 1999

— THE FRONT COVER *of the last annual report issued by Cyprus Amax Minerals Company, which became a wholly owned subsidiary of Phelps Dodge Corporation late in 1999*

with how Phelps Dodge acquired Calumet and Arizona Mining Company and United Verde Copper Company in response to the depression of the 1930s.

Two industry giants, ASARCO and Cyprus Amax, announced plans on July 15, 1999, for a $1.86 billion merger as Asarco Cyprus Inc. Had they been successful they would have created the world's largest publicly traded copper firm. But when the stock market reacted with apathy to the proposed merger, Phelps Dodge saw the chance to create a copper colossus with itself in the driver's seat.

When the two companies rejected its plan for a three-way combination, Phelps Dodge countered with a public offer for both copper companies that provided their shareholders a 40 percent premium. On September 24, the same day that Phelps Dodge received the needed anti-trust clearance from the United States Department of Justice, ASARCO's largest shareholder, Grupo Mexico S.A., greatly complicated the merger scenario by launching a tender offer for

ASARCO. The following week Phelps Dodge Corporation announced that it had signed a $1.8 billion cash-and-stock buyout agreement for Cyprus Amax, effective immediately. It declined to trump Grupo Mexico in a bidding war for ASARCO.

This ended the six-week takeover drama, which Chairman Douglas Yearley aptly characterized as an "emotional roller-coaster" and as intellectually challenging as "three-dimensional chess" for his management team. When it gained Cyprus Amax, Phelps Dodge Corporation became the largest publicly traded copper company, accounting for approximately 12 percent of the world's total annual output of the red metal. Among all producers, it ranked behind only CODELCO, owned by the government of Chile. Further, when it completes its integration of Cyprus Amax operations by the end of 2001, Phelps Dodge's new landscape of production should yield savings of at least $100 million a year.[1]

Cyprus Amax, based in Englewood, Colorado, had 4,000 employees at the time Phelps Dodge acquired it in 1999. It ranked as the world's largest producer of molybdenum, as well as a major player in copper. Its copper properties included the El Abra mine in Chile (51 percent ownership), Cerro Verde mine in Peru, and the Bagdad, Sierrita, and Miami open-pit mines in Arizona. Among its several processing facilities were a copper refinery and rod mill in Miami, Arizona, and a rod mill in Chicago, Illinois.

The abbreviated family tree for Phelps Dodge's newest member starts with the formation of the American Metal Company (Limited) in 1887. Seventy years later the firm merged with the Climax Molybdenum Company, organized in 1918, to form what became AMAX Inc. American investors organized Cyprus Mines in 1912 to explore for metals on the island of Cyprus. The two firms combined as Cyprus Amax Minerals Company in 1992.

Of course, it gave Chairman Yearley great personal satisfaction to know that after the acquisition was completed, the Phelps Dodge name continued. He quickly noted, however, that while the time-honored name was emotionally important to him, paying homage to the corporation's historical legacy "can't ever get in the way of good business judgment." Yearley observed that while "the Cyprus people are sad to see their name retired, . . . these things happen. I'm delighted that we've been able to survive this one." With the latest growth of Phelps Dodge, he said, "it is going to be harder and harder for someone to acquire us and take our name away."[2]

Exactly how the Phelps Dodge landscape of production will change during the next year or two is a story that remains to be told. As for the headquarters location, well before its acquisition of Cyprus Amax, Phelps Dodge announced that when its current lease expired, it planned to relocate its corporate offices from a familiar address at 2600 North Central Avenue to Square One, a twenty-story copper-trimmed building proposed for downtown Phoenix. The move could take place as early as November 2001.

Finally, the two executives who did most to open the dramatic new chapter of Phelps Dodge



Portrait of *David L. Palatie, who became a member of the Senior Management Team in March 1999. After a 34-year career with Motorola Inc., he joined Phelps Dodge Corporation as senior vice president, human resources. Palatie holds a bachelor of science degree in psychology and personnel management from Arizona State College and a master of arts degree in education from Northern Arizona University.*

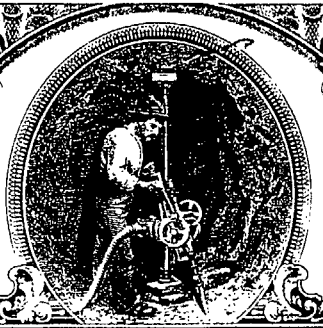


— Portrait of *J. Steven Whisler in September 1999, at which time he served as director, president, and chief operating officer of Phelps Dodge Corporation. During the year 2000 he succeeded Douglas C. Yearley as chief executive officer and chairman of the board.*

history that started with acquisition of Cyprus Amax were Douglas C. Yearley and J. Steven Whisler. In June 1999 the Phelps Dodge Board of Directors announced that it intended to name Whisler to succeed Yearley as chairman and chief executive officer of the corporation. Whisler became chief executive officer on January 1, 2000, and chairman four months later at Phelps Dodge's annual meeting held on May 3, 2000, when Yearley retired after more than forty years of service. For both men, the acquisition of Cyprus Amax will stand as a major milestone in any account of their leadership at Phelps Dodge Corporation.

It will be up to Whisler, a man some company insiders describe as "intense and brilliant" to make Phelps Dodge's acquisition of Cyprus Amax work. The challenge, he notes, is "to continue to grow and prosper in a world that is increasingly global and competitive. No one, whether Phelps Dodge, ASARCO or Cyprus or a mom and pop shop, can afford to be small and inefficient."[3]

100 SHARES



100 SHARES

Number
223691

Shares
100

PHELPS DODGE CORPORATION

INCORPORATED UNDER THE LAWS OF THE STATE OF NEW YORK

This is to Certify that DOMINICK & DOMINICK

is the owner of [illegible] fully paid and non-assessable Shares of the par value of Twenty-five Dollars each in the Capital Stock of Phelps Dodge Corporation, transferable in person or by attorney upon the surrender of this Certificate duly endorsed. This Certificate is not valid until countersigned by the Transfer Agent and registered by the Registrar.

Witness the seal of the Company and the signatures of its duly authorized officers. Dated [illegible]

By Geo R Drysdale
SECRETARY

Louis S. Cates
PRESIDENT

AUTHORIZED OFFICER
CITY BANK FARMERS TRUST COMPANY,
REGISTRAR

AUTHORIZED OFFICER
CENTRAL HANOVER BANK AND TRUST COMPANY,
TRANSFER AGENT

NOTES

ALL INTERVIEWS, *unless otherwise noted, were conducted by the author.*

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3. As stated in *Purchasing*, March 8, 1990, p. 70.
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5. Interview with Pedro Gomez, Safford, Ariz., January 5, 1997.

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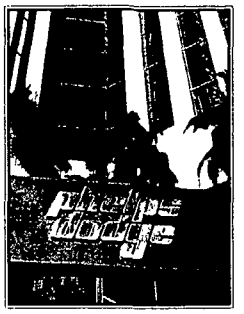
A Landscape Designed for Production

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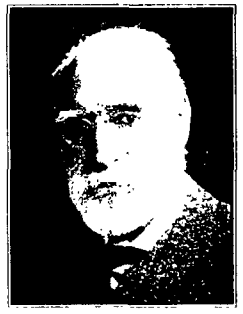




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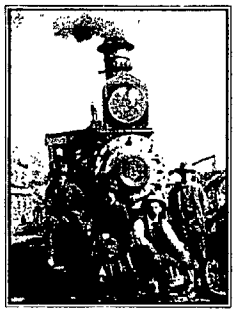
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7. As quoted in Phyllis B. Dodge, *Tales of the Phelps-Dodge Family: A Chronicle of Five Generations* (New York: New-York Historical Society, 1987), 203.
8. *Phelps Dodge Annual Report* (1945), 5, 9.

Chapter 10

In Search of Easy Street

1. Interview with Walter Ainsworth, Fort Wayne, Ind., July 31, 1997; *Fort Wayne Journal-Gazette*, August 24, 1966; *Fort Wayne News-Sentinel*, August 24, 1996.
2. *Forbes*, August 1, 1958, p. 10.
3. *Forbes*, August 1, 1958, p. 10.
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5. *Forbes*, December 1, 1964, p. 42.
6. *Phelps Dodge Annual Report* (1957), 10; *Forbes*, April 1, 1958, pp. 10–11.
7. *Forbes*, July 1, 1962, p. 20.
8. *Iron Age*, November 12, 1966, p. 122.
9. *Forbes*, November 1, 1968, p. 68.
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Chapter 11

A Decade of Uncertainty

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12. *Forbes*, April 1, 1967, p. 68.
13. Telephone interview with Charles A. Burns, October 1, 1998.
14. Interview with L. William Seidman, Washington, D.C., May 1, 1998; *Phelps Dodge Annual Report* (1971), 15.
15. Interview with Jack Ladd, Bisbee, Ariz., February 20, 1997.
16. *Forbes*, May 1, 1972, p. 34.
17. Telephone interview with Leonard Judd, July 6, 1998.
18. Interview with George B. Munroe, Albuquerque, July 24, 1996.

Chapter 12

Red Metal Blues

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2. *Phelps Dodge Today*, March 1983, p. 3. This publication was distributed to employees of Western Operations from 1979 to the end of 1984.
3. *New York Times*, April 8, 1982.
4. Interview with George Munroe, New York City, May 4, 1998.
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6. *Business Week*, July 21, 1980, p. 66; interview with L. William Seidman, Washington, D.C., May 1, 1998.
7. *Business Week*, April 12, 1982, p. 5, and July 26, 1982, p. 59.
8. *Phelps Dodge Today*, June 1982, p. 7.
9. *Phelps Dodge Today*, September 1982, p. 3.
10. *Phelps Dodge Today*, June 1980, p. 3.
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12. *Forbes*, August 1, 1958, p. 10.
13. Interview with George B. Munroe, May 4, 1998.
14. Remarks of George B. Munroe to 1984 Annual Meeting of Stockholders as reported in *Phelps Dodge Today*, June 1984, p. 8; *New York Times*, April 27, 1984; *Phelps Dodge Today*, March 1984, pp. 4–5.
15. *Business Week*, July 26, 1982, p. 59.
16. Interview with Richard T. Moolick, Glenwood Springs, Colo., October 1, 1997.
17. *Business Week*, July 26, 1982, p. 60.
18. Interview with Douglas C. Yearley, Scottsdale, Ariz., February 17, 1997; *Business Week*, July 26, 1982, p. 60.
19. *Business Week*, July 26, 1982, p. 60.
20. *Phelps Dodge Today*, March 1982, pp. 5, 9.
21. *Phelps Dodge Today*, June 1982, p. 3.

Chapter 13

Hammered on the Anvil of Adversity

1. Televised comments by Bruce Babbitt when he sent the National Guard to Morenci.
2. Interview with Douglas C. Yearley, Scottsdale, Ariz., February 17, 1997.
3. Interview with George Munroe, New York City, August 20, 1998.
4. Interview with Richard T. Moolick, Glenwood Springs, Colo., October 1, 1997.
5. *Business Week*, July 26, 1982, p. 58.
6. *Business Week*, May 20, 1967, p. 156. The summary of events from the 1940s to the 1967 strike derives from James Kearney's manuscript history of Phelps Dodge.
7. *Iron Age*, December 21, 1967, p. 35.
8. *Phelps Dodge Today*, September 1980, p. 3, and December 1980, p. 3.
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10. *Phelps Dodge Today*, June 1983, p. 3.
11. Interview with Jack Ladd, Bisbee, Ariz., February 20, 1997.
12. Interview with Jack Ladd, Bisbee, February 20, 1997.
13. Interview with Richard T. Moolick, Glenwood Springs, October 1, 1997.
14. *Fortune*, August 22, 1983, p. 107.
15. *Arizona Republic* (Phoenix), October 3, 1983.
16. *Fortune*, August 22, 1983, pp. 106–108.
17. *Fortune*, August 22, 1983, pp. 106–108; *Phelps Dodge Today*, September 1980, p. 3; interview with Matthew P. Scanlon, Phoenix, Ariz., March 22, 1986.
18. Interview with Richard T. Moolick, Glenwood Springs, October 1, 1997.
19. Interview with J. Steven Whisler, Phoenix, January 3, 1997.
20. *Phelps Dodge Workers Strike Bulletin 1983*, July 6, 1983.
21. *Phelps Dodge Workers Strike Bulletin 1983*, July 18, 1983.
22. Interview with Leonard Judd, Paradise Valley, Ariz., March 20, 1996.
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24. "Procedures for Crossing a Picket Line," handout in Phelps Dodge Morenci archives, Morenci.
25. Written recollections of Matthew P. Scanlon to Carlos A. Schwantes, September 3, 1998.
26. *Fortune*, August 22, 1983, p. 107.
27. Interview with Simon Peru, Safford, Ariz., January 5, 1997.
28. As quoted on KPHO news, August 9, 1997; *Daily Labor Report*, August 10, 1983; interview with Matthew P. Scanlon, Phoenix, March 22, 1996.
29. Written recollections of Matthew P. Scanlon to Schwantes, September 3, 1998.
30. Written recollections of Matthew P. Scanlon to Schwantes, September 3, 1998.
31. Interview with Matthew P. Scanlon, Phoenix, March 22, 1996.
32. Interview with Arthur Kinneberg, Phoenix, March 16, 1998.
33. Interview with Matthew P. Scanlon, Phoenix, March 22, 1996; interview with Richard T. Moolick, Glenwood Springs, October 1, 1997.
34. Interview with Matthew P. Scanlon, Phoenix, March 22, 1996; interview with Richard T. Moolick, Glenwood Springs, Colo., October 1, 1997.
35. Interview with Matthew P. Scanlon, Phoenix, March 18, 1998.
36. Interview with Richard T. Moolick, Glenwood Springs, October 1, 1997.
37. Interview with Richard T. Moolick, Glenwood Springs, October 1, 1997.
38. Interview with Matthew P. Scanlon, Phoenix, March 18, 1998.
39. *New York Times*, July 30, 1984.
40. Interview with James Madson, Phoenix, January 2, 1997.
41. *New York Times*, May 7, July 30, 1984.
42. Interview with Richard T. Moolick, Glenwood Springs, October 1, 1997.
43. Interview with J. Steven Whisler, Phoenix, July 13, 1998; interview with L. William Seidman, Washington, D.C., May 1, 1998. The retired vice-president and general manager Arthur Himebaugh made a similar assessment of Moolick's importance in an interview, Phoenix, August 27, 1998: "Right or wrong," he made decisions.





Chapter 14
"Fix It, Sell It, or Shoot It"



1. Interview with G. Robert Durham, Phoenix, Ariz., November 13, 1997.
2. As quoted in *Wall Street Journal*, November 24, 1989.
3. Interview with Richard W. Rice, Phoenix, June 1, 1998.
4. Interview with G. Robert Durham, Phoenix, November 13, 1997; interview with Douglas C. Yearley, Phoenix, October 1, 1998.
5. D. C. Yearley, "Confidential Review of World Copper Industry, August 1984," pp. 5–6, typescript copy in Phelps Dodge Corporation archives, Phoenix.







6. Interviews with Douglas C. Yearley, Scottsdale, Ariz., February 17, 1997, and Phoenix, October 1, 1998.
7. *Wall Street Journal*, July 28, 1983; memo from George Munroe to Carlos A. Schwantes, August 19, 1998.
8. Interview with George Munroe, New York City, May 4, 1998; memo from George Munroe to Schwantes, August 19, 1998.
9. Interview with George Munroe, New York City, May 4, 1998; memo from George Munroe to Schwantes, August 19, 1998.
10. Interview with G. Robert Durham, Phoenix, November 13, 1997; interview with George Munroe, New York City, May 4, 1998.
11. Interview with George Munroe, New York City, May 4, 1998.
12. Interview with Ramiro G. Peru, Phoenix, October 1, 1998; interview with Leonard R. Judd, Scottsdale, Ariz., October 25, 1998.
13. Interview with G. Robert Durham, Phoenix, November 13, 1997; interview with Leonard R. Judd, Scottsdale, October 26, 1998; memo from George Munroe to Schwantes, August 19, 1998.
14. Interview with G. Robert Durham, Phoenix, November 13, 1997; interview with Douglas C. Yearley, Scottsdale, February 17, 1997; interview with Leonard R. Judd, Scottsdale, October 26, 1998.
15. Interview with Leonard R. Judd, Scottsdale, October 25, 1998.
16. Interview with Leonard R. Judd, Scottsdale, October 26, 1998.
17. *Wall Street Journal*, July 28, 1983.
18. Interview with G. Robert Durham, Phoenix, November 13, 1997; *Pay Dirt*, December 1984, p. 12A.
19. "Highly Confidential to Mr. Munroe," September 26, 1984, photocopy in Schwantes's possession; interview with George Munroe, New York City, May 4, 1998.
20. Undated notes from Richard T. Moolick to Carlos A. Schwantes (sent late 1998).
21. Interview with Arthur Kinneberg, Phoenix, March 16, 1998.
22. Interview with Arthur Kinneberg, Phoenix, March 16, 1998.
23. Speech by G. Robert Durham to the American Mining Congress, October 8, 1986, p. 3, copy in Phelps Dodge Corporation archives.
24. Interview with Patrick J. Ryan, Scottsdale, November 21, 1996.
25. Interview with G. Robert Durham, Phoenix, November 13, 1997.
26. Interview with G. Robert Durham, Phoenix, November 13, 1997.
27. Interview with William C. Tubman, Phoenix, July 1, 1997; interview with G. Robert Durham, Phoenix, November 13, 1997.
28. Interview with George Munroe, New York City, May 4, 1998.

Chapter 15

Turnaround Time

1. *Fortune*, October 28, 1985, p. 42; interviews of Ramiro G. Peru, Phoenix, Ariz., October 1 and 2, 1998; interview with Leonard R. Judd, Scottsdale, Ariz., October 26, 1998.
2. Interviews with Ramiro G. Peru, Phoenix, October 1 and 2, 1998; interview with Leonard R. Judd, Scottsdale, October 26, 1998.
3. *Fortune*, May 15, 1995; *Brewery Gulch Gazette* (Bisbee, Ariz.), March 17, 1993.
4. Interview with Richard W. Rice, Phoenix, Ariz., June 1, 1998.
5. Interview with Leonard Judd, Paradise Valley, Ariz., March 20, 1996; interview with G. Robert Durham, Phoenix, November 13, 1997.
6. *Pay Dirt*, September 30, 1986; interview with Leonard Judd, Paradise Valley, Ariz., March 20, 1996.
7. Transcript of Phelps Dodge Corporation 1985 Annual Meeting.
8. Interview with Douglas C. Yearley, Scottsdale, Ariz., February 17, 1997; *Financial World*, December 23, 1986, p. 101.

9. *Brewery Gulch Gazette*, March 27, 1993.
10. Memo from Jack Walsh to Robert C. Swan, August 24, 1998, in Swan's possession.
11. Interview with Douglas C. Yearley, Scottsdale, February 17, 1997; *Morenci Copper Review*, May 1989, p. 2; Richard Pendleton, Jr., to Richard Moolick, February 25, 1998, in Moolick's possession; *American Metal Market*, Supplement, February 17, 1993, p. 4A.
12. Interview with Leonard R. Judd, Scottsdale, October 26, 1998.
13. *Industry Week*, December 3, 1990, p. 17.
14. *American Metal Market*, Supplement, February 17, 1993, p. 4A.

Chapter 16

From Copper Kingdom to Global Enterprise

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2. Interview with G. Robert Durham, Phoenix, November 13, 1997.
3. *Wall Street Journal*, November 24, 1989; interview with Douglas C. Yearley, Scottsdale, Ariz., February 17, 1997.
4. Interview with George B. Munroe, Albuquerque, N.Mex., July 24, 1996.
5. Speech of Douglas C. Yearley to American Mining Hall of Fame, December 2, 1995, typescript copy in Phelps Dodge Corporation archives, Phoenix; interview with Patrick J. Ryan, Scottsdale, March 19, 1998; interview with J. Steven Whisler, Phoenix, January 3, 1997.
6. Interview with Patrick J. Ryan, Scottsdale, November 21, 1996.
7. *S.A. Mining and Engineering Journal*, August 1978, p. 24.
8. Interview with Robert Jenkins, Tucson, Ariz., June 2, 1998.
9. Interview with David Colton, Phoenix, June 1, 1998; interview with A. L. Lawrence, Phoenix, March 20, 1998.
10. Interview with David Colton, Phoenix, June 1, 1998.
11. Undated Johannesburg, South Africa, newspaper clipping supplied by Patrick J. Ryan; "The History of Phelps Dodge in Southern Africa," paper prepared by M. J. Evans, A. L. Lawrence, and P. J. Ryan, copy in Phelps Dodge Corporation archives.
12. Interview with G. Robert Durham, Phoenix, November 13, 1997; interview with David Colton, Phoenix, June 1, 1998.
13. *Forbes*, December 1, 1964, p. 42.
14. Richard T. Moolick to Carlos A. Schwantes, June 26, 1998.
15. Interview with John ("Phil") Matthews, Tucson, Ariz., June 2, 1998; interview with Robert Jenkins, Tucson, June 2, 1998; interview with José Luis Gorrini, Santiago, Chile, May 26, 1988; *Wall Street Journal*, July 23, 1983; interview with Leonard R. Judd, Scottsdale, October 26, 1998.
16. Interview with Patrick J. Ryan, Scottsdale, March 19, 1998.
17. Interview with Richard W. Rice, Phoenix, June 1, 1998; interview with Douglas C. Yearley, Phoenix, July 13, 1998; P. J. Ryan and J. L. Madson, "Candelaria—Low Cost Copper-Gold Producer in Chile," *Mining Engineering*, August 1996, pp. 35–41, and September 1996, pp. 44–51.
18. Phelps Dodge news release, November 3, 1997.
19. Interview with Patrick J. Ryan, Scottsdale, November 21, 1996.
20. Interview with William Dunbar, Bay Head, N.J., July 25, 1996; phone interview with William Dunbar, August 3, 1998.
21. Interview with Douglas C. Yearley, Scottsdale, February 17, 1997.
22. Interview with G. Robert Durham, Phoenix, November 13, 1997.
23. Interview with G. Robert Durham, Phoenix, November 13, 1997.









24. Interview with G. Robert Durham, Phoenix, November 13, 1997. The "Plan for Restructuring Phelps Dodge International Corporation" is dated June 1, 1978, copy in Schwantes's possession.
25. Interview with G. Robert Durham, Phoenix, November 13, 1997; interview with Orlando Gonzalez, Coral Gables, Fla., October 13, 1997.
26. Interview with David Colton, Phoenix, November 10, 1997; Yearley as quoted in Phelps Dodge news release, November 14, 1997.
27. Interview with J. Steven Whisler, Phoenix, January 3, 1997.



Chapter 17

Charting a Course for the New Millennium

1. Phyllis B. Dodge, *Tales of the Phelps-Dodge Family: A Chronicle of Five Generations* (New York: New-York Historical Society, 1987), 231–32.
2. "Reminiscences of Cleveland E. Dodge," typescript manuscript provided by Clee and Phyllis Dodge, Pownal, Vt.
3. As quoted in G. Robert Durham, *Phelps Dodge Corporation: "Proud of Its Past, Prepared for the Future"* (New York: Newcomen Society of the United States, 1989), 23.
4. Interview with Thomas St. Clair, Phoenix, March 18, 1997; interview with Douglas C. Yearley, Scottsdale, Ariz., February 17, 1997.
5. Interview with George Munroe, New York City, May 4, 1998.
6. Interview with Warren Fenzi, Santa Barbara, Calif., April 15, 1997.
7. Interview with Douglas C. Yearley, Scottsdale, February 17, 1997.
8. Interview with Douglas C. Yearley, Scottsdale, February 17, 1997; interview with George B. Munroe, Albuquerque, N.Mex., July 24, 1996.
9. Interview with L. William Seidman, Washington, D.C., May 1, 1998.
10. Interview with Ronald Habegger, Phoenix, March 21, 1996; interview with Ramiro G. Peru, Phoenix, October 1, 1998.
11. Interview with Douglas C. Yearley, Scottsdale, February 17, 1997; J. Steven Whisler as quoted in *Workscapes*, February 1998, p. 3.
12. Interview with Ramiro G. Peru, Phoenix, November 26, 1996.
13. Speech by Douglas C. Yearley at Cornell University, October 12, 1995, copy in Phelps Dodge Corporation archives, Phoenix; interview with Ramiro G. Peru, Phoenix, November 26, 1996.
14. Interview with Warren Fenzi, Santa Barbara, April 15, 1997.
15. *Business Week*, July 26, 1982, pp. 58–60; interview with Ramiro G. Peru, Phoenix, October 2, 1998.
16. Interview with Ramiro G. Peru, Phoenix, October 2, 1998.
17. Interview with Douglas C. Yearley, Scottsdale, February 17, 1997.
18. Interview with Simon and Velia Peru, Safford, Ariz., January 5, 1997.
19. Interview with Susan Suver, Phoenix, March 18, 1998.
20. Interview with Linda Findlay, Washington, D.C., April 30, 1998.
21. Interview with Patricia Young, Morenci, Ariz., March 21, 1997.
22. Interview with Susan Suver, Phoenix, March 18, 1998.
23. Interview with Douglas C. Yearley, Scottsdale, February 17, 1997.
24. *Phoenix Business Journal*, April 5, 1996, p. 28; interview with Douglas C. Yearley, Scottsdale, February 17, 1997.
25. Interview with Douglas C. Yearley, Scottsdale, February 17, 1997.
26. *New York Times*, March 3, 1989; *Enterprise*, March–May, 1992, p. 11; interview with Douglas C. Yearley, Scottsdale, February 17, 1997; *Industry Week*, December 3, 1990, pp. 17–18.
27. Interview with Douglas C. Yearley, Scottsdale, February 17, 1997.



28. *Enterprise*, March–May, 1992, p. 19.
29. *Chairman's Quarterly Letter*, May 1993.
30. Interview with Douglas C. Yearley, Scottsdale, February 17, 1997.
31. Interview with Patrick J. Ryan, Scottsdale, November 21, 1996.
32. Interview with John ("Phil") Matthews, Tucson, Ariz., June 2, 1998.
33. Interview with Richard T. Moolick, Glenwood Springs, Colo., October 1, 1997.
34. Interview with J. Steven Whisler, Phoenix, January 3, 1997.
35. Interview with J. Steven Whisler, Phoenix, July 13, 1998.

Chapter 18

Back to the Future

1. "EV1 Electric," undated brochure prepared by General Motors.
2. Phelps Dodge Corporation news release, October 21, 1998.
3. Telephone interview with Daniel E. Floryan, February 10, 1999.
4. Interview with Robert E. Johnson, Morenci, Ariz., June 11, 1998.
5. Telephone interview with John Marsden, February 10, 1999.
6. Interview with Patrick J. Ryan, Scottsdale, Ariz., November 21, 1996.
7. *Tucson Monthly*, December 1997, pp. 34–39.
8. Interview with J. Steven Whisler, Phoenix, Ariz., January 3, 1997.
9. Interview with Manuel J. Iraola, Phoenix, February 17, 1997.
10. Interview with H. M. ("Red") Conger, Morenci, June 11, 1998.
11. Remarks by Douglas C. Yearley to CRU Benchmarking Base Metals Operations Conference, Tucson, Ariz., November 5, 1998.
12. Telephone interview with Gary A. Loving in Santiago, Chile, July 13, 1998.





Chapter 19

Update 1999: The Pace of Change

1. Telephone interview with Douglas C. Yearley, October 22, 1999.
2. Telephone interview with Douglas C. Yearley, October 22, 1999.
3. *Arizona Daily Star* (Tucson), September 26, 1999.

GLOSSARY

NOTE: *Cross-referenced items are in italic type.*

acid plant. A *smelter* facility that recovers sulfur dioxide from discharged gases and manufactures sulfuric acid from it.

adit. A nearly horizontal entrance to an underground mine.

anode. a: A slab of fire-refined copper weighing about 750 pounds that has been formed in a mold. A typical one at Phelps Dodge is about 99.5 percent pure. From *smelters* at Chino (and Hidalgo when it was in operation) it goes to El Paso for *electrolytic refining*. b: In the *SX/EW* process it is the positive electrical pole to which direct current is applied.

assay. Chemical evaluation of an *ore* sample to determine the value of a mineral deposit.

ball mill. A large steel cylinder partially filled with steel balls that cascade as the mill rotates to grind *ore*.

blister copper. A form of copper that develops a blistered surface after casting due to gases generated during solidification. Because it is only 96 to 98 percent pure, it is further refined at the *smelter* and cast into *anodes* that go to the *refinery* for additional purification.

block-caving. A process whereby large blocks of ore are undercut and allowed to fall and fracture into smaller pieces that can be loaded through chutes into mine cars and taken to the surface. It is the lowest-cost underground mining method.

blow in. To put a *smelter* furnace into operation.

carbonate ore. A carbonate of copper that contains carbon dioxide and is typically found in the uppermost portions of *ore* bodies.

cathode. Copper 99.99 percent pure that results from the *SX/EW* process or from *electrolytic refining* of *anodes*.

cement copper. A sludge of wet, powdery copper particles, containing 50 percent to 80 percent copper, that is sent to a *smelter* for further treatment.

claim. A tract of land with defined boundaries that includes mineral rights extending downward from the surface.

concentrate. Copper-bearing material produced by the *flotation* process that contains 15 percent to 30 percent copper plus various quantities of sulfur, iron, and other impurities; it is sent to a *smelter* for further treatment.

concentrator. A plant where barren material is rejected as *tailings*, thus concentrating the copper in the *ore* before it goes to a *smelter* for further treatment.

converter. In a *smelter*, this is a large brick-lined

cylindrical vessel in which molten copper *matte* from a *reverberatory* or flash *furnace* has impurities such as iron and sulfur removed by blowing air through the liquid materials. As the converter is tilted, the *slag* and molten metal are poured off separately.

drift. A horizontal passageway in an underground mine; it typically follows a vein of ore.

electrolytic refinery. A facility in which fire-refined copper *anodes* are immersed in an acid solution containing *cathode* starter sheets. An electric current passed between the *anode* and *cathode* causes copper to transfer from the *anodes* and be redeposited as 99.99 percent pure copper on the *cathodes.*

flotation. A method of combining finely ground *ore* with water and chemical reagents to create a frothy mixture that separates metallic particles from other minerals; the metallic particles are then collected and

in-pit crusher. Machines used to crush *ore* in an open-pit mine preparatory to sending it to a *concentrator* for further treatment.

leach dump. A pile of rock material consisting of low-grade copper *ore*, either *oxides* or *sulfides*, through which acid-rich waters are percolated to dissolve and subsequently precipitate the copper. Copper precipitation is the process whereby copper in solution is deposited on iron. The precipitate when largely drained of water is known as *cement copper*, and it is then sent to the *smelter* for further treatment.

leaching. A process used to remove soluble minerals by percolating solutions through low-grade *oxide* and *sulfide ores.*

lode. A continuous mineral-bearing deposit or vein.

highly variable composition and structure, containing a combination of fine-grained minerals with some larger-grained mineral constituents. Since porphyries occasionally contain finely disseminated grains of copper *sulfides*, especially chalcopyrite, in small quantities, they constitute the *ore* body for low-grade copper deposits. In many places "porphyry" has come to be used to describe any large-tonnage, low-grade, highly altered copper deposit.

prospects. Mineral workings of unproved value.

raise. A mine shaft driven from below upward.

refinery. A facility in which pure *electrolytic* copper is made by electrolysis and the precious and rare metals are recovered. Two of importance in the history of Phelps Dodge were located at Laurel Hill (in New York City) and El Paso.

reverberatory furnace. A furnace with a ceiling that radiates heat back onto the surface of the material being treated.

shaft. A vertical or nearly vertical opening into the earth for mining.

skip. A container used to lift *ore* through a *shaft* and to the surface above a mine.

slag. The waste product of a *smelter.*

smelter. A metallurgical complex in which material is melted in order to separate impurities from pure metal.

stope. Underground opening from which *ore* is extracted.

sulfide ore. *Ore* composed of copper, sulfur, and usually iron along with various other minerals.

SX/EW. Abbreviation for the *hydrometallurgical* process known as solution extraction–electrowinning that produces *cathodes* of 99.9 percent pure copper.

tailings. Finely ground rock materials left after milling is complete; distinct from the old waste dumps, today's low-grade ore stockpiles, that contain rock not currently of sufficient value to warrant milling.

tailings ponds. Built-up or diked ponds in which *tailings* slurry water is impounded to settle and evaporate. When filled, another level is developed above the former pond, creating a terraced effect.

workings. A general term indicating any mining development.

(Adapted from *Arizona Highways*, October 1975, p. 37; and Philip Varney, *Arizona Ghost Towns and Mining Camps*, Phoenix: Arizona Highways, 1994, p. 81.)

SOURCES AND SUGGESTIONS FOR FURTHER READING

DURING MY EXPLORATION of Phelps Dodge's lengthy and complex history I received information and other forms of help from numerous individuals. On the pages that follow, I wish to acknowledge their contributions, without which this book would have been impossible to research and write. If I missed a contributor, I apologize for my unintentional oversight.

The list includes librarians and archivists across the United States—including the kindly and efficient staffs of the American Antiquarian Society, Worcester, Massachusetts; Ansonia Public Library, Connecticut; Arizona Historical Society, Tucson; University of Arizona Library, Tucson; Arizona State University Library, Tempe; University of Idaho Library, Moscow; Huntington Library, San Marino, California; and New York Public Library—as well as numerous individuals who shared their insights and personal information about Phelps Dodge during interviews.

In addition to searching the records stored in Phelps Dodge's corporate archives in Phoenix, I pursued other forms of historical information by traveling to the far-flung operations of Phelps Dodge Mining Company located in Ajo, Bisbee, Jerome, Morenci, and Safford, Arizona; Tyrone, Hurley, Santa Rita, and Playas, New Mexico; El Paso, Texas; Norwich, Connecticut; and Candelaria in Chile; Phelps Dodge Magnet Wire plants in Fort Wayne, Indiana; Hopkinsville, Kentucky; and El Paso, Texas; Phelps Dodge High Performance Conductors plants in Trenton, Georgia; Inman, South Carolina; and Elizabeth, New Jersey; Phelps Dodge International headquarters in Coral Gables, Florida, and plants in Venezuela, Ecuador, and Chile; and the Columbian Chemicals Company headquarters in Atlanta, Georgia, and the Moundsville, West Virginia, plant.

During mid-1997 I visited the Accuride Corporation plant in Henderson, Kentucky, which at that time was still part of Phelps Dodge Industries. I'll not soon forget the periodic plant-shaking "whump" of a massive press that stamped out wheels for trucks and buses; during one of the interviews it caused me to think of the hulking dinosaurs in the movie *Jurassic Park*. It was only one of many memorable sounds and sights I recorded on tape or film. All together I amassed hundreds of hours of interviews and thousands of photographs that served as research notes later to jog my memory. There are, of course, many more offices and plants composing Phelps Dodge, but to complete this book in timely fashion meant visiting only these representative landscapes. Each tour of

mining or manufacturing facilities enabled me to understand the corporation that much better.

Because it would require a full chapter to be more specific, permit me simply to list in alphabetical order (and without reference to job titles or locations) the names of all who contributed in a major way to this project. Most are current or retired employees, but some people listed here never worked for the corporation, and a few actively opposed it on the picket line during labor disputes. If I have omitted anyone, please forgive. At Phelps Dodge there is a tradition of addressing colleagues formally in correspondence, but here I will use familiar first names because each of these individuals became part of an ever-widening circle of friends.

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Vision and Enterprise benefited greatly from the suggestions offered by three peer reviewers selected by the University of Arizona Press: Richard Francaviglia of the University of Texas at Arlington, Bob Spude of the National Park Service, and one anonymous scholar. I will take full responsibility for picking and choosing from among their comments.

Other Sources

Four substantial histories of Phelps Dodge Corporation have been written to date. Those include the unpublished manuscript called "Men and Mines: The Story of Phelps Dodge," by Arthur Train, Jr., and John L. Lawler, who took the story to 1945. Building on the foundation provided by their largely anecdotal account, Robert Glass Cleland wrote *A History of Phelps Dodge, 1834–1950* (New York: Alfred A. Knopf, 1952). In the mid-1990s, James R. Kearney completed six chapters of a manuscript history, "Phelps Dodge Corporation: A Twentieth-Century Business Odyssey," with an emphasis on economics. In addition, the commemoration of its first hundred years in the Southwest yielded a lively newspaper account by William Epler and Gary Dillard, *Phelps Dodge, a Copper Centennial, 1881–1981* (Bisbee: Copper Queen Publishing, 1981). Also invaluable for the early years is Phyllis B. Dodge's *Tales of the Phelps-Dodge Family: A Chronicle of Five Generations* (New York: New-York Historical Society, 1987); William E. Dodge, *Old New York* (New York: Dodd, Mead, 1880); and Richard Lowitt, *A Merchant Prince of the Nineteenth Century: William E. Dodge* (New York: Columbia University Press, 1954).

I have used all those sources, including some of their original notes and interviews, to write *Vision and Enterprise: Exploring the History of Phelps Dodge Corporation.* I originally wanted to emphasize what has happened at Phelps Dodge since publication of Cleland's history in 1952, but I soon found myself revisiting vital details of the corporation's story since 1834 to make sense of post-1952 events. It also made sense to provide a new one-volume history of the corporation, a book far more heavily illustrated than any of its predecessors.

Earlier accounts together with archives compiled by Phelps Dodge Corporation and other institutions, including the New York Public Library and the Huntington Library, proved invaluable—but so too did personal travel outside Phoenix to study firsthand the many landscapes Phelps Dodge created. Landscape study provided a form of insight that books and other documents alone couldn't. As much as we might wish it, we cannot travel back in time; but by visiting historic landscapes like the one preserved at New York's South Street Seaport area, where Phelps Dodge originated, an observer can experience a place and in an odd sort of way make emotional connections with the past. Such landscapes should be viewed as complements to books and articles. They should be read in conjunction with the printed word. To those who care to study them, the

defining landscapes of Phelps Dodge Corporation are themselves chapters of an open book, revealing key aspects of its proud heritage.

Suggestions for Further Reading

THE FOLLOWING BIBLIOGRAPHICAL essay seeks to guide readers to my major published sources and suggest various opportunities for further study. Some sources, such as interviewees, are mentioned only in the notes or in the acknowledgments above.

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Color images by Carlos A. Schwantes follow page 80, those by Kenneth Malloque follow page 208, those by Bob Carey Photography follow page 208.

The dust jacket painting of the "Morenci Mine" is courtesy of Merrill Mahaffey. The image also follows page 80.

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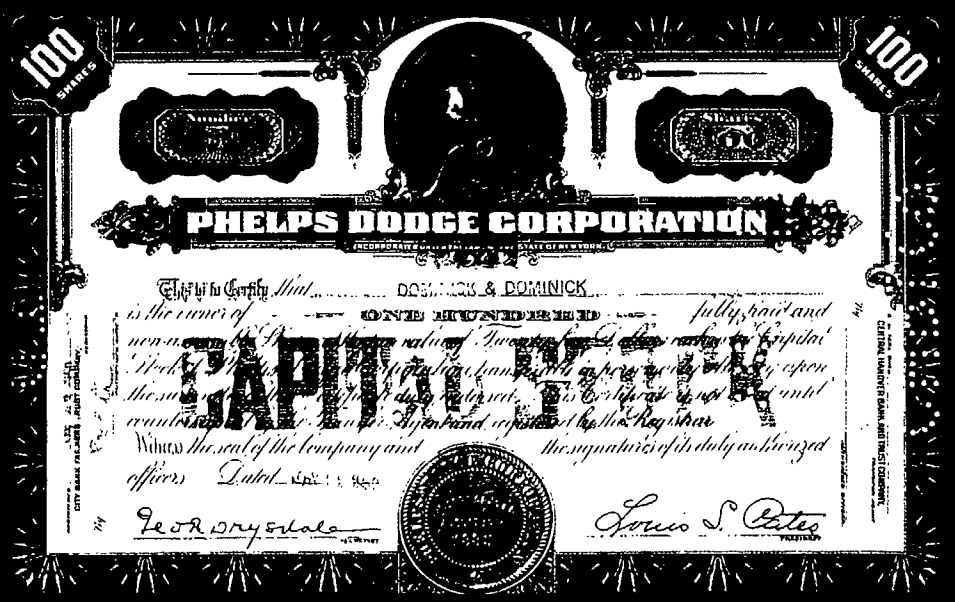
About the Author

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Schwantes received his doctorate in American history from the University of Michigan in 1976 and has been a faculty member at the University of Idaho since 1984. He is an avid photographer and had a collection of his images published in 1996 as *So Incredibly Idaho: Seven Landscapes That Define the Gem State.* Schwantes has served on the editorial advisory boards of five history journals.

"We have waited a long time for a history of Phelps Dodge—an important company that has transformed the landscape and economy of the Southwest and many other places."

Richard V. Francaviglia, Director, Center for Greater Southwestern Studies, University of Texas at Arlington



Explorations in the History of Phelps Dodge Corporation

Cover: The painting of the Morenci Mine, which hangs in the boardroom of Phelps Dodge Corporation, was painted by noted Southwest artist Merrill Mahaffey. The massive landscape he portrays illustrates the impressive feat of engineering which represents the initial link in a chain of copper connections that Phelps Dodge forged from mine to market.

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