
Wesley Earl Dunkle, The Years for Stephen Birch 1910-1929

Charles Caldwell Hawley

Note: The spelling "Kennicott" is used for a place, the former mine headquarters and concentrator town in the Wrangell Mountains, Alaska. The town is next to the correctly spelled Kennicott Glacier. "Kennecott" is used for the mines above the town or the mining company, Kennecott Copper Corporation (KCC). It is sometimes difficult to be consistent in use of the alternative spellings.

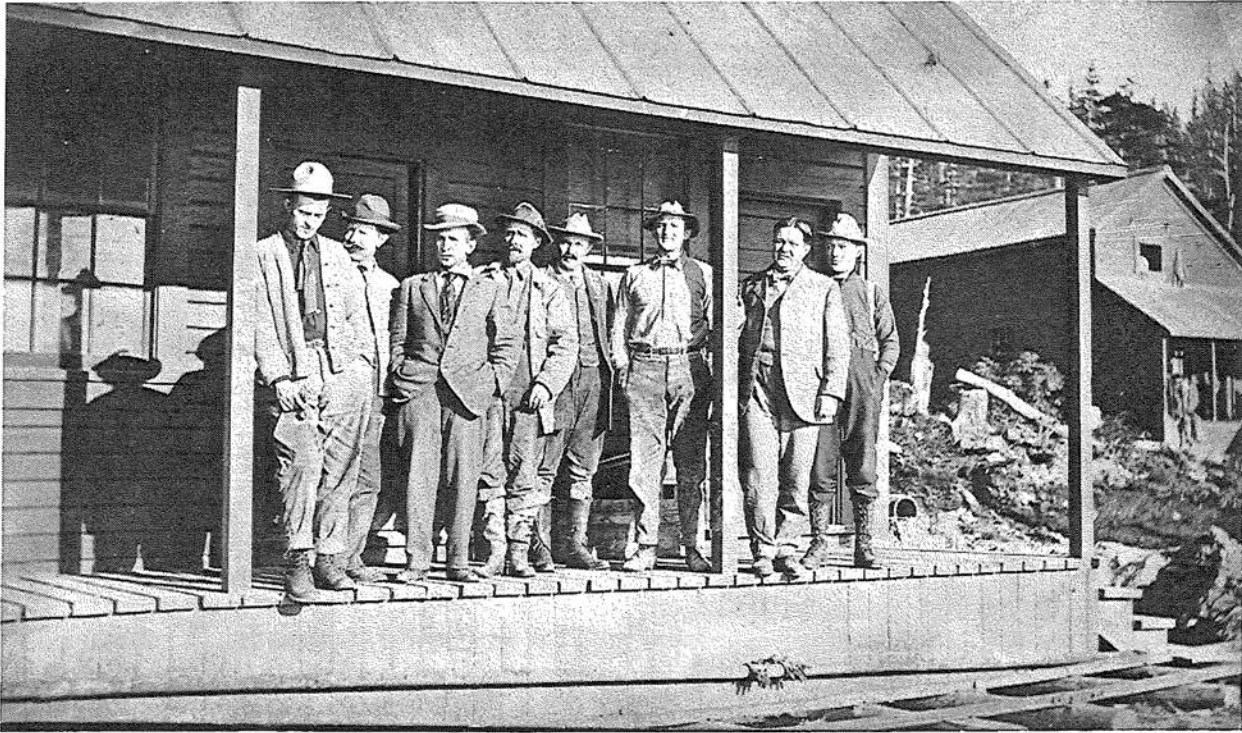
In late February of 1915, Earl Dunkle and his bride of about two months, Florence, *nee* Hull, mushed across the ice of upper Cook Inlet into the village of Knik, Alaska. Earl was a geologist and engineer. Before her marriage, Florence had been the secretary of Stephen Birch in Cordova and Kennicott, Alaska. Earl was on his way to the Broad Pass region, at the head of the Chulitna, to make a mining examination for his employers, the Alaska Syndicate. The examination seemed warranted: By the previous November, twenty-five prospectors or companies had staked claims sufficient to blanket a strip of land eight miles long by one-half mile wide. The promoters were describing the belt as the "Rand of Alaska." About four tons of equipment and supplies, some shipped the previous fall, awaited Dunkle at Knik. Certain critical items, perhaps assay or mining gear, were, however, missing. The deficiency was serious enough that the Dunkles decided to return to Seward for the missing items.

Earl and Florence mushed a few miles down the inlet to ice-free Goose Bay and Captain Sam Cramer's gas boat *Traveler*. The trip began easily

enough. The first stop was only across the inlet to a cabin at the mouth of Ship Creek (present day Anchorage). The next day the *Traveler* was caught in pack ice at the restriction in the inlet at the Forelands. It moved in and out with the tide for the next five days, making only a few miles progress each day. After escaping the ice trap, the *Traveler* should have taken only two more days to round the Kenai Peninsula and motor up Resurrection Bay to Seward. Instead it took five more days under gale conditions. Once, Captain Cramer, only comfortable in the protected waters of Cook Inlet, tried to pull into a shallow bight thinking it an anchorage. Dunkle talked him out of the attempt. Again, after turning the corner toward Seward, Dunkle convinced Cramer to hold a course into Port Dick, a calm anchorage, through tidal rip seas running to thirty-five feet. On the last part of the trip, Florence was able to keep only a "couple of oranges" down.¹ Such travails were a normal part of Dunkle's life. He survived ship and train wrecks, at least eight forced aircraft landings and made many more solo crossings of frigid glacial streams than anyone should have attempted.

From 1910 to 1929, Wesley Earl Dunkle's primary employer was Alaska Development and Mineral Company, the exploration arm of the Alaska Syndicate and, later, Kennecott Copper Company (KCC). At times, he worked for the related Beatson Copper Company, Midas Copper Company, Bering River Coal Company, and KCC or its direct operating predecessor, the Kennecott Mines Company. Some of the work for KCC was for its wholly owned subsidiary, the Alaska Steamship Company. Newspapers of the time often reported that Dunkle worked for the Syndicate or the "Guggies" or Guggenheims.² In 1953, Dunkle recorded nine reel to reel tapes with a long time Kennecott friend, Henry Watkins.³ On the

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Kennecott Mine Staff, Ca. 1914. (Dunkle is third from right; Stephen Birch is to Dunkle's immediate left; W. H. Seagrave is next left to Birch. Frank Rumsey Van Campen is far left). Author's collection; same as University of Alaska -Fairbanks, Helen Van Campen Album UAF74-27-427.

tapes, Dunkle simplified his employment history: He worked for Stephen Birch. Birch was the man most responsible for the success of the Kennecott Mines in the Wrangell Mountains of Alaska. Later Birch was president, then chairman, of KCC. He was fifteen years older than Dunkle. At the time of Dunkle's arrival in Alaska, however, Birch was still deeply involved with the day-to-day operation of the mines at Kennecott, Alaska and often was in the field with his young mining and geological staff. Dunkle, and Dunkle's friend Watkins, had the highest regard for Birch, as a man and as a company leader. Dunkle, clearly, wanted to emulate Birch.

Wesley Earl Dunkle was born on the 4th of March, 1887, at Clarendon, Pennsylvania. The Dunkles were a family of South German origin who had come to the New World in the 1730s. Just before the War of 1812, Earl's great-grandfather and three brothers crossed the Appalachians to the Clarion River region in the fertile Allegheny Plateaus of northwest Pennsylvania. Although earlier Dunkles were literate and English speaking, Earl's father, John Wesley, was of the first Dunkle generation to earn a formal collegiate education.⁴

Dunkle's family called him Earl. Friends, including his college classmates, used nicknames, "Dunk" or "Bill." Earl attended public schools in Warren, Pennsylvania, only a few miles from his birthplace. He entered Sheffield Scientific School of Yale University in 1905 and graduated with a Ph.B. degree, mining specialty, in 1908. Dunkle took general honors in his junior year, was inducted into the National Scientific Honorary Fraternity, Sigma Xi, and was his class vice-president in his senior year, 1908.⁵ At Yale, Dunkle excelled in athletics. His main sport was crew, but, with three other men, he annually sponsored and participated in a decathlon for the entertainment of his fellow students.⁶ Music was another interest. At Yale, he joined the Freshman Mandolin and Banjo Clubs. (In 1927, he played flute in duets with Florence's piano at Contact, Nevada. He still played flute in 1953 at Colorado Station, Alaska.)⁷

The class of 1908 was one of Yale's best mining classes. Fifty-one men entered in 1905 in either pre-mining or metallurgy.⁸ Based on their later careers several men, including Dunkle, were exceptional. Two of them, David D. Irwin and H. D.

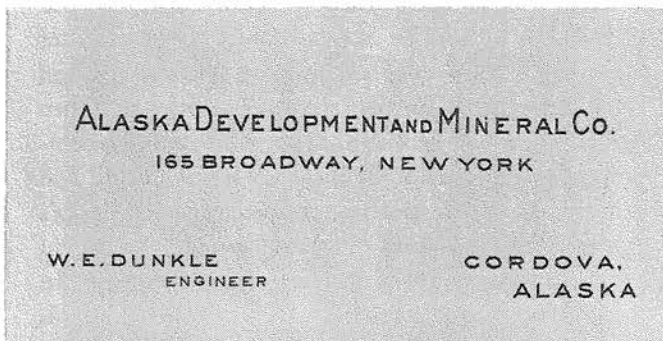
(Dewitt) Smith, worked with Dunkle at Kennicott before the zenith of their own mining careers in Africa, where they again met Dunkle. Henry Carlisle had a long and distinguished mining consulting career. Dunkle's best friend, Howard "Parker" Oliver, developed oil fields and mines in Mexico. After the properties were expropriated in 1922, Oliver stayed active in Mexican-American affairs for the balance of his life.⁹

Dunkle began his mining career in the iron mines of the Mesabi Range in Minnesota. As early as August, 1908, he found employment at the huge Canisteo mine.¹⁰ At Canisteo, Earl read a magazine article describing the construction of a railroad into the interior of Alaska to tap fabulously rich copper ore of the Bonanza lode.¹¹ He vowed, someday, to go to that northern territory. The opportunity arrived quickly. The following year, Dunkle made his way to Ely, Nevada to work at the McGill smelter. While there, he acquired the assayer's position at the Vet-

eran shaft mine. The assayer's job proved invaluable to Dunkle because the mine manager at Veteran was W. H. Seagrave. Seagrave, in turn, had connections to Guggenheim consultants John Hayes Hammond and Pope Yeatman. Seagrave had been one of Hammond's mine superintendents at the Robinson Deep mine in the Witwatersrand gold fields of South Africa.¹² The Guggenheims were the operating component of the Alaska Syndicate. The Syndicate had just purchased the Beatson copper mine in Alaska's Prince William Sound. Probably on the advice of Yeatman, Seagrave was sent to manage Beatson. In July 1910, Seagrave sent for Dunkle. Although his initial assignment was at the Beatson mine, within a few days of his arrival in Alaska, Dunkle had the opportunity to visit the Copper River project at Childs Glacier near the Million Dollar Bridge and meet Stephen Birch.¹³ In the fall of 1911, Seagrave was moved to Kennicott as general manager of the Bonanza mine.



Wesley Earl Dunkle (Dunk) and Dick Watkins(?) at Beatson, Latouche Island, Ca. 1911. Author's collection; Helen Van Campen, probable photographer.



Business Card, Wesley Earl Dunkle, Ca. 1912. Author's collection.

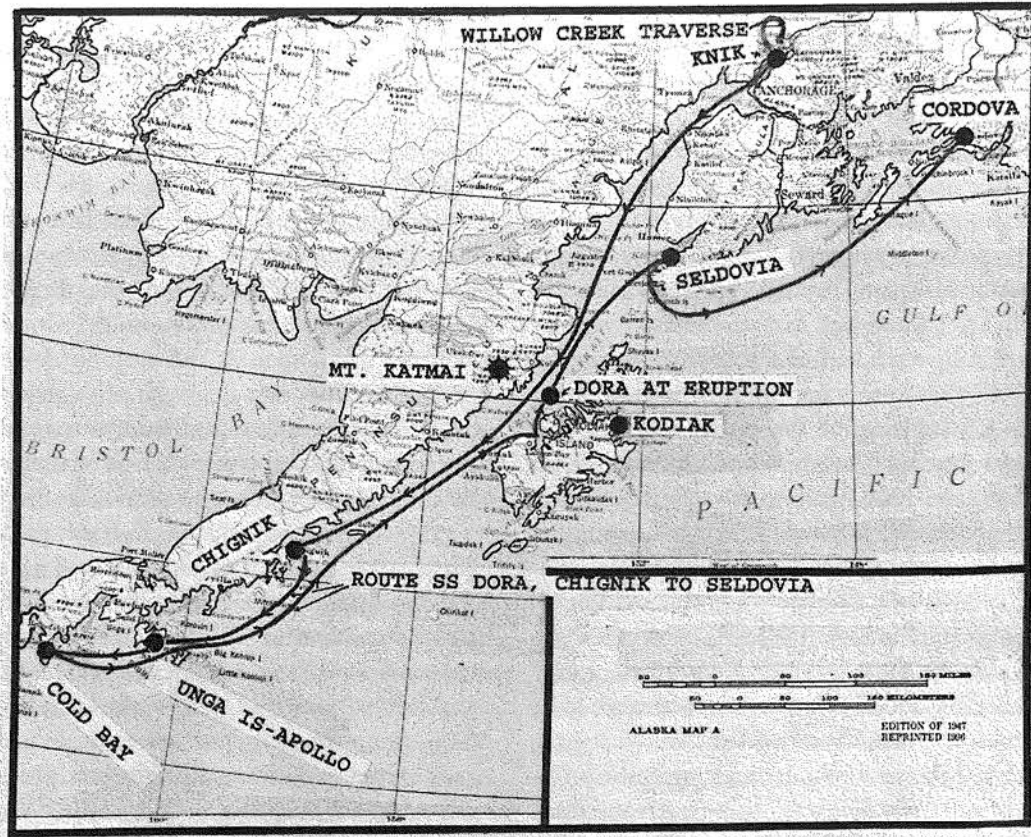
At the end of 1911, Dunkle received his first senior professional assignment. He succeeded J. F. Erdletts as engineer for the Alaska Development and Mineral Company. As the field exploration engineer, or scout, Dunkle examined properties for acquisition by the Syndicate and watched competitive companies. He also had responsibility for geologic studies at the Wrangell Mountain mines. In 1954, Dunkle wrote, referring back to his first mining job in Minnesota, "Four years later I found myself engaged in making the first detailed geologic study of the ore

occurrences at Kennecott and was holding down the job of field exploration engineer for the Morgan-Guggenheim interests".¹⁴

Either job, mine geologist or scout, would have been sufficient for most men. From 1912 through 1916, Dunkle examined at least 106 mining properties for Alaska Development and Mineral Company. In addition to properties in the Prince William Sound and the Wrangell Mountains, Dunkle examined properties in southeastern Alaska, in Cook Inlet, and the Kenai Peninsula. In 1913, he examined twenty-five properties in three districts in British Columbia with commodities ranging from iron and coal to silver and lead-zinc as well as ten properties in different parts of Alaska. Dunkle's examinations included the expedition to Broad Pass, briefly noted at the start of this account, and a two-month long solo trek through the newly discovered Chisana goldfield. He examined one gold property, the Thomas, in the Culrose district of Idaho.¹⁵ On his travels, Dunkle went by foot, boat, horseback, and in winter by dog-team or snowshoe. The KCC owned Copper River and Northwestern Railway provided a railway pass, or, occasionally, a track for Dunkle's own locomotion on a tricycle "speeder," as captured on film by a long time friend Helen Van Campen.¹⁶ (Helen was the wife of Frank Rumsey Van Campen, a mine su-



Wesley Earl Dunkle on Copper River and Northwestern Railway, Ca. 1915. Courtesy, University of Alaska -Fairbanks, Rasmuson Collection. Helen Van Campen Album Accession Number 74 -27-525N.



Dunkle Trip, Late May-June 1912. Author's map.

perintendent at Beatson.) It was an extremely active time in Alaska with hundreds of small prospecting ventures throughout the Prince William Sound and Wrangell areas. Typically, Dunkle's expenses were only about \$10 per month because someone was always willing to feed and house him, if he did not sleep on the trail.¹⁷

Some of the early property examinations remained in Dunkle's mind because of concurrent happenings. He was at W. A. Dickey's copper prospect in Landlocked Bay when word came of the sinking of the *Titanic* in April of 1912.¹⁸ Six weeks later, he made a quick trip to the Willow Creek District north of Cook Inlet, then headed out the Alaska Peninsula to Chignik. At Chignik, he boarded the 390 ton steam-sailer *Dora*, nicknamed the "Bull Terrier of Alaska," to return to Cordova by way of Unga Island. At one o'clock on the afternoon of June 6, 1912, as the *Dora* made the turn towards Kodiak, Dunkle was on the stern talking to Captain McMullen when a volcanic mountain erupted at Katmai. By 7 P.M. the sky was totally dark and the *Dora* was covered by as much as eighteen inches of coarse

pumice. The vessel became the temporary home to thousands of exhausted birds confused by the volcanic storm. Back in Cordova Dunkle gave the first scientific observations of the eruption to a reporter for the *Cordova Daily Alaskan*.¹⁹

Between scouting trips, Dunkle's bases were Seattle, Washington, Cordova, or the mines in the Wrangell Mountains. Although Dunkle's later career had greater engineering and mining successes, the very productive period 1912-1915 was the highlight of Dunkle's career as a geologist. He was involved in the discovery of the Jumbo ore body, in the controversy on the origin of chalcocite, and in a strangely related problem, the acquisition of the Mother Lode property.

When Dunkle first went to Kennicott in the fall of 1912, the Bonanza was still the only known ore body. There were claims along the Jumbo fissure, but the fissure was essentially barren of copper on the outcrop. At the time, Stephen Birch wanted one more opinion on the geologic controls of ore, as it was important to claim location and assertion of extralateral rights.²⁰ (The earliest staked claims in the

Kennecott area followed the contact of the Nikolai Greenstone and the Chitistone Limestone, where there was common weak copper mineralization. The Bonanza, though, was well above the base of the Chitistone formation, and lay in a northeast fissure almost at right-angles to the contact.)

A young geologist-engineer, Ocha Potter, working for a small rival company, Houghton-Alaska-Exploration of Michigan, was sure the control was in the fissures: ". . . we made our way across a small glacier and over the mountain arriving at the mine about 1:30 A.M. The mine crew was sleeping and there were no guards. I had brought candles and we climbed down the one small shaft and thoroughly inspected the deposit, with consciences untroubled by the graduate mining engineer's professional ethics."

"The ore was rich beyond belief. . . I decided the ore body ran across the mountain range and not parallel to a limestone-greenstone contact as described in all the official literature on the subject. If I were right, then the Kennecott claims had not been properly staked and government mining regulations would limit mining to their side lines only, a few

hundred feet down."²¹

Dunkle quickly confirmed the Potter view: The ore bodies were controlled by nearly vertical north-east trending fissures, not the formational contact. Theory was applied to practice in the discovery of the Jumbo ore body. Because of the incredibly steep topography near the ore bodies, and the almost vertical orientation of the ore within the fissures, the most effective way to prospect was to drive openings parallel to northeast fissures and periodically drill or cross-cut over to the structure. At the Jumbo, the drive began in the wall of, and parallel to, the nearly barren fissure exposed at the surface of the Jumbo claim. At about 300 feet into the mountain, miners crosscut over to the fissure and found about a foot of chalcocite. Turning their heading back toward the outcrop, the crew blasted one round. The new blasted face exposed three-feet of chalcocite in the fissure. After a second round, the miners uncovered a face full of chalcocite, "and the place looked like a coal mine." Continuing their drive back toward the surface, the crew stayed in solid chalcocite for 120 feet where the ore terminated against a fault, nearly parallel to the bedding. Crosscutting at the fault disclosed an ore



Headline, Cordova Daily Alaskan, June 10, 1912. Author's collection.

body eighty feet across of nearly pure chalcocite.²² Dunkle calculated an apparent value of the ore as \$26 million.²³

Shortly after making this prediction, Dunkle was back in New York having lunch with Birch at company headquarters when Murry Guggenheim arrived. Dunkle began discussing the discovery of the Jumbo, soon realizing that Guggenheim had not heard of it. In retrospect, Dunkle was awe-struck about a mining enterprise so large that the discovery of one of the great ore bodies in the history of mining—the Jumbo—was not considered particularly newsworthy at headquarters.²⁴ The discovery was, however, noticed by others. The discovery of the Jumbo ore body occurred a short time before the organization of KCC from the holdings of the Alaska Syndicate. The existence of a second rich ore body at Kennicott, and the high World War I price of copper, upheld the price needed by the original incorporators to recoup their original investment.²⁵

The Jumbo discovery was the result of a good geologic theory and diligent work by practical miners, led by W. H. Seagrave and general mine foreman, Melvin Heckey, a miner for whom Dunkle had the highest regard. The chalcocite and Mother Lode problems had both scientific and human roots. Up until about 1915, the mineral chalcocite, a mineral containing almost eighty percent copper, was almost universally regarded as a secondary mineral. Secondary or supergene minerals form near the earth's surface: Copper and other metals are dissolved above the water table and reprecipitated as they react with the ore below the water table. Chalcocite forms as a replacement of bornite or chalcopyrite, minerals with appreciably less copper, below the water table.

At Bingham, Utah and at Ely, Nevada chalcocite was secondary. As the mines deepened, the copper ore grade dropped. The primary ores underneath the chalcocite blankets at Bingham and Ely were, then, too lean to be mined. Would the same thing happen to the rich chalcocite ores at Kennicott?

Stephen Birch engaged one of the leading geologists of the time, L. C. Graton of Harvard University, to find out. Graton, in turn, used the new technique—examination of polished opaque minerals under reflected light—to make the determination. Graton's conclusion was that the chalcocite at Kennicott formed by the replacement of bornite, and that it was secondary.²⁶ The implication was that the

mines would become much leaner with depth. Graton's view was a bombshell, as the economics of the Kennicott, Alaska mines depended upon shipping almost pure chalcocite ore or concentrate to the remote smelter at Tacoma, Washington.

The young geologist, Dunkle, did not use microscopic science. His observations underground suggested that there was no change in mineralogy with depth. The chalcocite looked like a "primary" vein mineral. He assumed the grade of ore would hold with depth.²⁷

Graton's bomb was dropped just as another problem, that of the Mother Lode, was emerging. The Mother Lode was about 4,000 feet northeast of the Bonanza, and on the same apparent trend. It was discovered in 1906 by Warner and Smith, the discoverers of the original Bonanza. The deposit was claimed by Warner and Smith and a partner, Oscar Sale. Soon afterward, Sale had a freak accident in which he was washed under the ice on the Chitina and only saved by luck when he found a hole downstream. The accident affected Sale mentally; shortly thereafter, Sale disappeared and was never heard from again. His disappearance affected the title to the Mother Lode over the next seven years, when Sale could be declared legally dead.²⁸

About this time, Dunkle began to work seriously on the geologic factors, the so-called ore controls, that influenced the distribution of ore at Kennicott. Empirically it was agreed that the ore occurred along steep northeast fissures; also that the bottom of the ore was generally 80-100 feet above the base of the host formation. The lowermost part of the formation was generally so barren of copper that it was called "the unfavorable lime." Although the barren and mineralized limestones were similar visually, Dunkle determined analytically that the barren limestone was nearly pure calcium carbonate, but the mineralized unit was a dolomite, containing magnesium as well as calcium.²⁹ A few months later, Dunkle observed that the base of the ore, and other enlarged shoots along the veins, occurred where a broken, or brecciated, zone crossed the fissure at a high angle.³⁰ These broken zones were nearly parallel to the sedimentary layering of the formation. The base of the ore almost always was a brecciated zone that was first called "The Bedding Plane" and later, at times, the "Flat Fault."

At the time that Dunkle determined the relation

of ore to dolomite, he was still on good terms with the mine crew at the Mother Lode, although Birch was not. Dunkle was allowed underground to look, and, at the Mother Lode, the ore also was in dolomite. By the time he had deduced the relation between ore and the "bedding plane" fault, Dunkle was also *persona non grata* at the Mother Lode and was refused underground access. He had to return to Kennicott without the hoped for observations, unfed, and at 25 degrees below zero. In the spring of 1913, Dunkle was able to make surface observations that showed wide low-angle breccia zones on about half of the Azurite claim, owned by Birch, and the Marvelous claim of the Mother Lode.³¹ He calculated that the small ore body then being mined at the Mother Lode was about 1,100 feet above the base of the copper host formation. He thought that there could be a huge ore body below.

Correspondence between Birch and Dunkle in late 1913 and early 1914 indicates that the Mother Lode matter was of significant concern at headquarters. In a confidential letter sent to Dunkle early in 1914, Birch requested: "On this same map I wish the workings of both the Jumbo and the Bonanza; and where the Mother Lode people are working. Give courses and distances wherever you can. After you have made this map I would like one showing where the workings of the Bonanza mine would intercept the Mother Lode location if it continues on the same strike and dip as the present workings indicate, and at what depth below the Mother Lode workings . . . Keep this information to yourself and only consult Mr. Seagrave as to what you are doing."³²

The uncertainty caused by the chalcocite problem caused Kennecott to temporarily hold a conservative course on property acquisition—in effect, to minimize losses if Graton was right. The purchase of the Mother Lode was deferred. During the early years, especially before the adjudication of the Sale estate, Mother Lode shares were freely available at 10-15 cents per share. By the time Kennecott acquired a controlling 50 percent interest in Mother Lode in about 1919, share prices had escalated to \$18.³³

Dunkle next saw Mother Lode in 1924, after the formation of the Mother Lode Coalition Mines joint venture: ". . .an orebody about one thousand feet long and up to 80 feet wide of almost solid glance [chalcocite] had been exposed there. It extended to

hundreds of feet above the base of the dolomite and, I believe, was the largest single body of such high grade copper ore ever discovered anywhere."³⁴

Dunkle left Kennecott for a period in early 1916, indirectly because of problems in recovery of the copper ore at Kennicott. As mining got underway, it became evident that there was a great deal of copper carbonate ore, brilliantly colored malachite and azurite, even in the deeper workings. The earliest built mill at the mine concentrated so-called disseminated ores by gravity. Dense chalcocite was separated from less dense limestone and dolomite with jig and table concentrators. Almost all the copper carbonate ore, however, went through the mill to tailings. The loss was on the order of twenty-five percent of the total ore. A brilliant young mill man (metallurgist), E. T. Stannard, had been working on problems at the concentrator at the Guggenheim mine at Braden in Chile. Birch proposed to bring Stannard to Kennicott at a salary of \$500 per month to work on the concentrator. Seagrave asked Dunkle for his opinion: Earl thought, "He'd be a very poor mill man if he couldn't save that much in this mill."³⁵

Stannard came to Alaska and solved all milling problems. He installed the new process of oil flotation at both Kennecott and Beatson, and discovered two ways to solve the copper carbonate problem. He reacted the carbonate fines with sodium sulfide and ammonium polysulfide, which formed a thin copper sulfide coating on the carbonates, in effect fooling the flotation circuit. More importantly he designed and built the first successful ammonia-based copper leach plant. Total recovery in the mill went from seventy-five or less to more than ninety-five percent.³⁶

Stannard had definitely paid his way, and also had moved closer to Stephen Birch. Although Stannard did not have Birch's management ability and style, Birch respected Stannard's meticulous planning and record-keeping. Moreover, in many respects Stannard was a capable administrator, as well as a brilliant engineer. Birch selected Stannard to groom as his successor. By 1916, Stannard was in a strong enough position within the company to make a power play. In part using the tremendous wartime demand for copper, Stannard convinced Birch that the old practical miner Seagrave should be replaced by a younger technically educated manager, Stannard himself, who would increase the productivity of the mines. At that time, Seagrave was general mine man-

ager over the Jumbo and Bonanza at Kennicott and the Beatson Mine at Latouche. Stannard had risen to an equivalent position—in charge of the concentrators at Kennicott and Beatson. The mine superintendent under Seagrave at Kennicott was H. D. Smith, understudied by another 1908 Yale graduate, David D. Irwin. Beginning in late 1915, Dunkle had been moved back to Latouche Island as mine superintendent at the Beatson. In early 1916, Seagrave was dismissed and Dunkle was replaced by Stannard's man Stadtmiller. The miners at Latouche offered to strike to keep Dunkle, and he could have gone back to his scout position. As a long time Seagrave partisan, though, Dunkle left Kennecott with Seagrave and mine foreman Heckey to try mining at Contact, Nevada.³⁷

In 1916, Contact had its best year ever.³⁸

Dunkle was back in the Kennecott fold in 1920, but stationed at Pier 2 in Seattle. He continued to scout for prospects in Alaska, western Canada, and the northwest contiguous states.³⁹ In 1923, Dunkle moved to Anchorage to manage two Kennecott options, one the Mt. Eielson (Copper Mountain) District in McKinley Park, the second, the Mabel in the Willow Creek District.⁴⁰ In 1924, Dunkle was back, briefly, in the Wrangells⁴¹ and had the chance to go back underground to see what had happened at the Mother Lode.

What happened next is uncertain, but from 1925 to 1927, Dunkle was again in Contact, Nevada with Seagrave. Most of the copper production from their Nevada-Bellevue mine at Contact was won with conventional underground methods. Dunkle, however, also managed an experimental *in situ* acid leach operation, probably with at least tacit backing from the smelter at near Bingham, Utah which was supplying sulfuric acid for the experimental process.⁴² Letters of this period between Dunkle, Birch, and Stannard, mostly concerned with prospects in the Prince William Sound area of Alaska, read, essentially, as internal Kennecott correspondence.⁴³ At least, there was no loss of respect because, with the failure of the leaching experiment and losses from the conventional mining operation at Contact, Dunkle again returned to Kennecott in 1928. In that year, he examined prospects in the Kantishna and Broad Pass regions from Kennecott's base in Seattle and continued to push for acquisition of copper prospects in Prince William Sound.⁴⁴

In 1929, Dunkle undertook his longest and most complex examination for Birch. He was in Africa for nearly nine months. It must have been an incredible trip, traveling mostly by train from Cape Town to Johannesburg to Elisabethville (now Lubumbashi), back to the Transvaal, again north to Elisabethville, then probably to Okiep north of Cape Town, before returning to America in December.⁴⁵

The trip was partly a Kennecott and Yale reunion. At one mine he saw A. B. Emery, who briefly preceded Seagrave as general manager at Kennecott. He also met his old Kennecott and Yale friends David D. Irwin and H. D. Smith. Irwin was opening the Roan Antelope in the Belgian Congo (now the Democratic Republic of Congo). Smith was beginning a career with Newmont to take over African mines, first at Okiep.⁴⁶

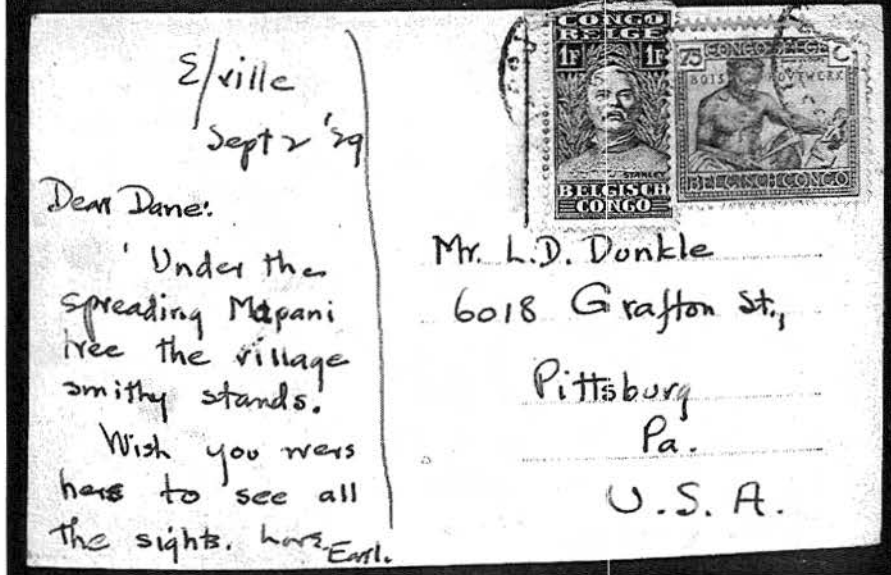
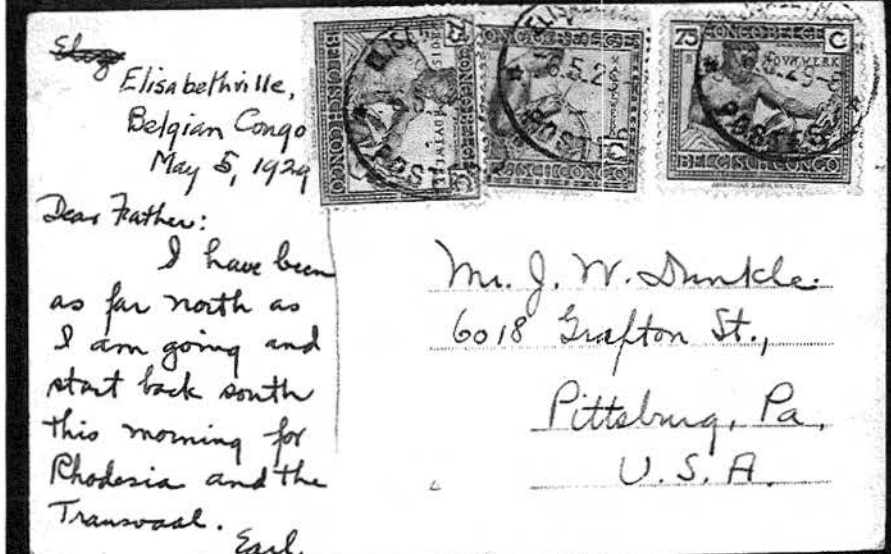
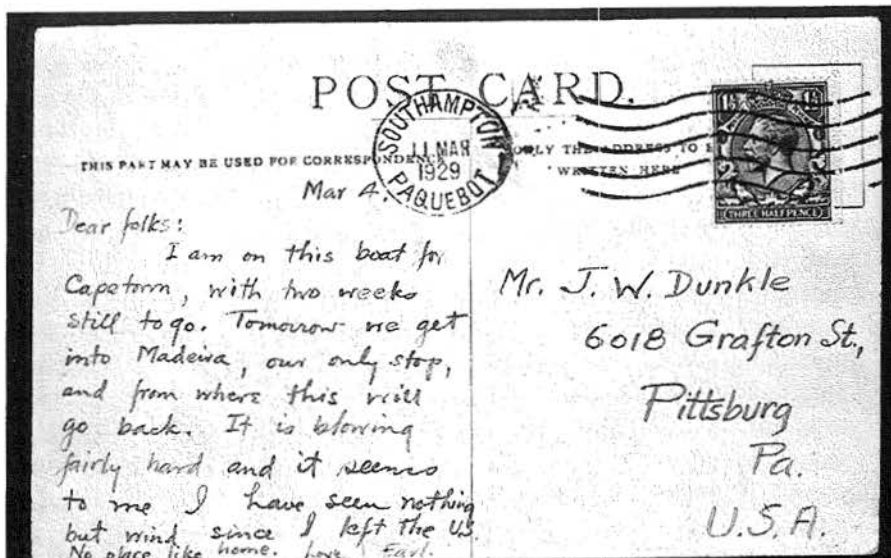
On Dunkle's return to New York, in addition to recommending investment in some of the promising mines that were in the construction stage, he urged acquisition by KCC of early-stage chrome, copper, and gold prospects in Rhodesia (Zimbabwe). Murry Guggenheim and Birch generally favored expansion and considered the acquisitions favorably. Stannard did not want African operations but favored buying into African operating companies and forming a copper producer's cartel.⁴⁷ Stannard's plan won out, although the effects of the depression made everything moot for years in Africa and Kennecott ultimately disposed of its unprofitable depression-era African investments.⁴⁸

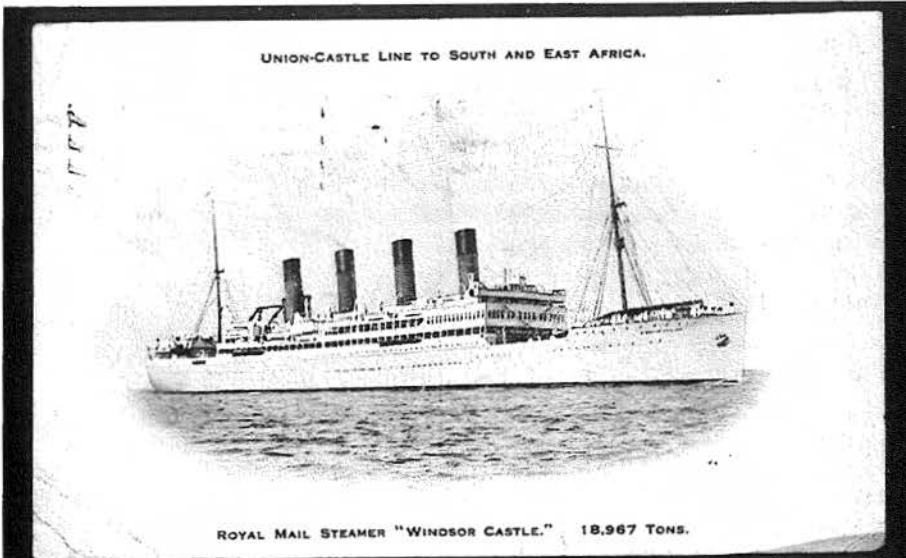
In 1930, Dunkle permanently severed his ties to Kennecott and went on his own. He maintained a friendship with Birch until Birch's death in 1940, while continuing a rather cautious relationship with Birch's successor Stannard until his death in 1949.

In the post-Kennecott years Dunkle had one great success at the Lucky Shot Mine.⁴⁹ This success led him into aviation, where with Steven Mills, Charley Ruttan, and Jack Waterworth, he founded Star Air Service, the direct ancestor of Alaska Airlines.⁵⁰ After the death of Florence in 1931, Dunkle married again, to Gladys "Billie" Borthwick Rimer whom he first met in Africa in 1929.⁵¹

The odds in mining always favor failure, and Dunkle failed with hard rock and placer operations at Flat, Alaska. Dunkle lost a small fortune in attempting to operate Golden Zone, the best prospect that he had found on the 1915 examination of the

Post Cards, WED to father, John Wesley Dunkle, and brother L. D. Dunkle, 1929, on board RMS Windsor Castle and from Elisabethville (Lubumbashi, Republic of Congo).





From top to bottom:

RMS Windsor Castle

Standard Bank, Elisabethville (?).

Native blacksmiths and forge



Broad Pass District. At Lucky Shot, Dunkle had almost perfect depression era timing, opening the mine in 1931. At Golden Zone, he collided with and lost to the economics of World War II. The mine opened in 1941. With partners Glen Carrington and L. C. Thomson, Dunkle had a moderate success in a placer mine venture at Caribou Creek in the Kantishna District, a mine that continued to operate for two years after the war.

In later life, Dunkle gathered material for a book about the early Kennecott days and his own life. He found support from Mt. McKinley explorer Brad Washburn. Washburn even lined up an editor and publisher for Dunkle,⁵² but in 1954 Dunkle post-

poned the book and embarked on a last project, the Broad Pass coal (lignite) field. At the end, in 1957, he was working on an innovative coal drier. On September 29th, Dunkle left his camp at Colorado Station to search for a water supply for a full scale coal processing plant. He did not return. After a massive unsuccessful search by civilian volunteers and troops from Ft. Richardson, two friends, Howard Bowman and Gren Collins, found Dunkle's body on the trail buried under a few inches of snow.⁵³

Dunkle left a rich legacy to Alaska. The legacy is more in a style of life, diligently pursued, than in material possession.

NOTES

ACKNOWLEDGEMENTS

The author is particularly indebted to Wesley Earl Dunkle's sons, the late John Hull Dunkle, William E. Dunkle, and Bruce Borthwick Dunkle, for discussing their father's life and unstintingly furnishing correspondence, photographs, and family memorabilia. Joe Antonson, State of Alaska Historian, Rolfe Buzzell, Section of History and Archaeology, State of Alaska, and Diane Brenner, archivist at the Anchorage Museum of History and Art, have encouraged and helped me, repeatedly.

REFERENCES CITED

Note: Dunkle tapes recorded in 1953 are cited as, DT and by original reel, tape, and, occasionally, side (A or B), for example, DT,R1,t2,sB. The tapes used are a cassette tape version from the Anchorage Museum of Art and History.

Abbreviations: AC-author's collection of Dunkle correspondence, photographs and memorabilia. The collection was mainly obtained from the Dunkle family and from mine property examinations since 1967. BBD-Bruce Borthwick Dunkle, SB-Stephen Birch, WED-Wesley Earl Dunkle, WmED-William E. Dunkle, JWD-John Wesley Dunkle.

1. DT,R6,t2,sB; also R1,t2; R8,t1,sA; also, see "Broad Pass is Booming." *Knik News* 1, no. 21, March 6, 1915, 1; "Who's who in the Broad Pass Region." *Knik News* 1, no. 24, March 27, 1915, 1. This issue of the *Knik News* noted "... Dunkle, the mining engineer, departed Tuesday for the Broad Pass Country. Jack Cronin, with his dog team, is taking him."; "Many outfits in the Broad Pass." *Knik News* 1, no. 26, April 10, 1915, 1; "Broad Pass has Future", *Knik News* 1, no. 29, May 15, 1915, 7; "Broad Pass ma k-

ing Good." *The Cook Inlet Pioneer* 1, no. 4, June 26, 1915.

Florence Hull Dunkle was a 1908 graduate of Oberlin; she was a class officer and president of a women's literary society (Oberlin College, Ohio, alumni records).

2. "W. C.[error]Dunkle, engineer for the Alaska Syndicate." *Cordova Daily Alaskan*, June 10, 1912, 1; "W. E. Dunkle, M.E., Guggenheim engineer." *Fairbanks Daily News-Miner*, February 23, 1923, 1; "Guggies inspect copper property." *Fairbanks Daily News-Miner*, July 10, 1924, 2; "W. E. Dunkle, engineer for the Guggenheim interests..." *Fairbanks Daily News-Miner*, July 24, 1928, 8.
3. The Dunkle tapes were recorded in the winter of 1953 at Mrs. W. E. Dunkle's house in Washington, D. C. The major voices on the tapes are W. E. Dunkle and Henry Watkins. Watkins came to Alaska in 1900 on the same vessel as George Hazelet's Chisna mining group (Tower, Elizabeth A., *Icebound Empire: [Anchorage, Elizabeth A. Tower, 1996], 52-53,302*). Watkins was hired by Stephen Birch in 1908 for the Bonanza mine project, and he stayed at Kennicott until the fall of 1914, thus bridges a time gap in the tapes before Dunkle's arrival in Alaska in 1910 and at Kennicott in 1912.
A reel copy of the Dunkle tapes is at the Section of History and Archaeology, Dept. of Natural Resources, Alaska, Anchorage.
4. Page, Clara Adella Dresskell, *Dunkle-Dusk-Twilight-Evening*, (Manuscript genealogical report, 1977); the genealogy includes Dunkle, Peter Snyder, *Thirty six feet of boys, Tradition and Times, Oil History and Discovery, Lumbering in West Virginia*. AC.
5. Church, H. E. (ed), *Class History, 1908, Sheffield Scientific School, Yale University, V. I.* (New Haven, 1908), 102.
6. Obituary Article, Wesley Earl Dunkle, *Yale Alumni Magazine*, December 1957.

7. Church, *Class History*, 102, also, Communications WmED and BBD, April, 1997.
8. Chittenden, Russell H., *History of the Sheffield Scientific School of Yale University, 1846-1922, V. II.* (New Haven, Yale University Press, 1928) 378,610.
9. Carlisle, Henry, "David D. Irwin." *Mining Engineering* (June, 1964), 88-91; see, also, Belin, G. d'Andelot (ed), *Thirty year history, Class of 1908, Sheffield Scientific School, Yale University.* (New Haven, 1940), Henry Coffin Carlisle, 129-130, David D. Irwin, 225-227, Howard Taylor Oliver, 305-307, Henry Dewitt Smith, 371-372.
10. Letter, WED to JWD, August 31, 1908. AC.
11. Dunkle, W. E., "Economic geology and history of the Copper River District, Alaska." (1954). Report No. MR 87-4. Alaska Dept. of Natural Resources, Division of Geological and Geophysical Surveys, Fairbanks, Alaska. 2,25.
12. DT,R5,t1.
13. *Ibid.*
14. Dunkle, "... Copper River," (1954), 2.
15. Richelsen, W. A., "List of Reports on Properties Examined, Alaska Development & Minerals Co." (Seattle, March 28, 1945), Report in Kennecott Exploration Company files, Anchorage, 19; also, see, Dunkle, W. E., "Letter report to Stephen Birch, Report on Chisana district, December 14, 1914", Kennecott Exploration Files in Anchorage, Alaska, 6. Dunkle noted, "I arrived at Chisana on July 3d and left on September 9th."
16. Helen Van Campen Album, Rasmuson Collection, Archives, University of Alaska, Fairbanks, Accession Number 74-27-525.
17. DT,R8,t1,sB
18. DT,R8,t1,sA
19. "Darkness, Lurid Light and Thunder, Volcanic Eruption Continues Three Days." *Cordova Daily Alaskan*, no. 115, June 10, 1912, 1.
20. Dunkle, "... Copper River," (1954), 12.
21. Potter, Ocha, "Alaska", (Copy of typescript, ca. 1940.) Manuscript in private collection of Warren McCullough, Helena, MT, 39.
22. Dunkle, "... Copper River," (1954), 18.
23. DT,R8,t2,sB
24. *DT,ibid.* Also, this story was first told to me by Hugh E. Matheson, mine engineer and executive originally from Alaska now in Denver; Mr. Matheson heard the story from his father, also an Alaska mining man. Hugh could not remember the punch line; he thought it was something like "I didn't know that we had one of those [copper mines] up there."
25. Dunkle, "... Copper River," (1954), 18; also, see, Graman, Melody Webb, "Big Business in Alaska: The Kennecott Mines, 1898-1938." (Fairbanks. Cooperative Park Studies Unit, National Park Service. Occasional Paper No. 1, 1977) 22-23,56; also, see, Navin, Thomas R., *Copper Mining & Management:* (Tucson, Univ. of Arizona Press, 1978), 262,426.
26. Bateman, Alan M., and McLaughlin, D. H. "Geology of the ore deposits of Kennecott, Alaska." *Economic Geology* 15, no. 1, 66-67,80. Also, Dunkle, "... Copper River," (1954), 3.
27. Dunkle, "... Copper River," (1954), 5.
28. Dunkle, "... Copper River," (1954), 24. Also, see Letter, WED to SB, December 26, 1913. Letter in Packet C, Doc. 7, Kennecott Copper Company, Doc. Inv. List, Salt Lake City; also, "Early Days of Kennecott, Alaska", as told to H. C. Carlisle by L. A. Levensaler, (Ca. 1960). Typewritten (copy) in Rasmuson Library, Levensaler Files, Univ. of Alaska, Fairbanks, 5,7.; also, see, Potter, "Alaska" 26,39.
29. Dunkle, "... Copper River" (1954), 12-13.
30. *Ibid*, 14-15.
31. *Ibid*, 17.
32. Letter, SB to WED, January 6, 1914. Letter in Packet C, Doc. no. 9, Kennecott Copper Company, Salt Lake City. Note: The Kennecott files show this letter as from C. T. Ulrich to WED. C. T. Ulrich was Birch's secretary; at this time Ulrich had not been to Alaska and Ulrich was not an engineer or geologist. I assume that the letter (which is one of two letters mailed on the 6th of January to answer WED's letter to SB of December 26, 1913) was from Birch, with a copy bearing Ulrich's signature.
33. Dunkle, "... Copper River," (1954), 24.
34. *Ibid*, 17.
35. DT,R5,t2.
36. Douglass, W. C., "A history of the Kennecott Mines, Kennecott, Alaska," (Special Publication, Division of Mining, State of Alaska 1964-1971, reprinted 1971). Available Division of Geol. and Geophysical Survey, Report MP -21, Fairbanks, AK, 10,12; also, see Dunkle, "... Copper River," 24-25.
37. DT,R5,t2
38. LaPointe, Daphne D., Joseph V. Tingley, and Richard B. Jones, *Mineral Resources of Elko County, Nevada.* (Nev. Bur. Mines and Geology, Bull. 106, 1991.) In 1916, Contact yielded about 689,000 pounds of copper; it approached that figure again in 1929, see table 20.
39. Richelsen, "... properties examined, Alaska Development & Minerals Co." (1945),3,4,10,14,16.
40. "Engineer arrives in Anchorage to start exploring." *Fairbanks Daily News-Miner*, February 23, 1923, 1.
41. "Guggies inspect copper property." *Fairbanks Daily News-Miner*, July 10, 1924, 2; see, also Dunkle, "... Copper River" (1954), 17.
42. Dunkle is placed at Contact, Nevada from 1925-1927 by various sources. He is identified as manager of the operation at the Nevada-Bellevue in an internal memorandum, December 9, 1925, Hirst-Chichagof Mining Co. The memorandum is in v. 3, only box of Hirst-Chichagof records, Rasmuson Library archives, University of Alaska, Fairbanks. Wm. E. Dunkle and the late John Hull Dunkle remembered being in Contact, Nevada in 1927 when Charles A. Lindbergh landed at Paris; communication, April 1997.
43. Correspondence between Stannard, Birch, and Dunkle on the Rua Cove and other prospects in Prince William Sound, Alaska: Files of Kennecott Exploration Company,

- Anchorage, especially letters of October 31, 1926 and February 14, 1927 are written like internal memos, as if Dunkle was only seconded to Contact, Nevada.
44. In "Local jottings," *Fairbanks Daily News-Miner*, July 24, 1928, 8; see, also, letter, WED to SB, November 11, 1928. Letter in Kennecott Exploration Company files, in Anchorage, argues for acquisition of Rua Cove, partly to forestall competition from Consolidated Smelting and Refining (later Cominco).
 45. DT,R5,t3. Also, detailed timing on the African trip is provided by a Letter of Indication (Credit) issued in New York in February 1929 and by post cards from Dunkle to his family from London, Cape Town and Elisabethville (AC). Company correspondence also shows that Dunkle was in New York in January 1929.
 46. DT,R5,t3. See, also, Citation no. 9 regarding Smith and Irwin.
 47. DT,R5,t3.
 48. Navin, *Copper Mining & Management*. (1978), 266-267, 355-356,426.
 49. Baragwanath, John (G.), *A good time was had*. (New York. Appleton-Century-Crofts, 1962),142-44,245; Stoll, William M., *Hunting for gold in Alaska's Talkeetna Mountains*. (Ligonier, PA, William M. Stoll, 1997), 105 -115,301.
 50. Dunkle and Steven Mills, Jack Waterworth, and Charlie Ruttan founded Star Air Service; Dunkle was its largest shareholder, and was president of successor Star Airlines which was Alaska's largest air carrier in 1937. Star Air Service is the direct ancestor of Alaska Airlines. Part of the airline history is in Satterfield, Archie, *The Alaska Airlines Story*. (Seattle. Alaska Northwest Publishing, 1981); also, see Dunkle, Wm. E., *A Birds Eye View*. (Camarillo, CA, Julie Sellers Press,1988), 7-9.
 51. Dunkle met Mrs. Rimer in Africa in 1929. They were married in 1935 in Valdez, AK. As Gladys Elizabeth Grey Borthwick, "Billie" graduated with first class honors in 1924 in zoology from St. Andrews University in Scotland. She taught at the University of South Africa in 1925 -1926 and, in 1931, earned a Ph. D. in zoology from the University of Cape Town. (Alumni records, St. Andrews and University of Cape Town.)
 52. Letters, Brad Washburn to WED, February 20, 1953; WED to Washburn, March 20, 1953; WED to Washburn, March 23, 1953; Washburn to WED, March 30, 1953; Howard Cady, editor-in-chief, Little Brown & Co. to Washburn, April 6, 1953; Washburn to WED, April 8, 1953, WED to Howard Cady, April 11, 1953, and WED to Washburn, April 11, 1953; Washburn to WED, April 19, 1953, and WED to Washburn, April 25, 1953.
 53. "Search Widens for W. E. Dunkle." *Anchorage Daily Times*, October 4, 1957, 1; "Searchers find Dunkle's Body." *Anchorage Daily Times*, October 5, 1957, 1.