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*Robert Harris Talkin' Rocks in 1976:
An Interview with a Southern California Miner,
Metallurgist, and World War I Veteran*

Shelfmark

California State University, Fullerton (CSUF).
The Lawrence de Graaf Center for Oral and Public History (COPH).
Project: Science and Technology.
O.H. 1550.
Oral interview with Robert Harris, conducted by Debra Pierce,
October 24, 1976, Red Mountain, California.

Introduction

The oral history transcribed below belongs to a collection held in CSUF's Lawrence de Graaf Center for Oral and Public History (COPH), titled "Science and Technology." The interview with Robert Harris was conducted by Debra Pierce on October 24, 1976, in Red Mountain, California. It is 1 hour, 15 minutes, and 59 seconds long, and it is archived as a digital recording/audio file at COPH (see "Copyright Advisory" below). The verbatim transcript edited here was prepared in the fall of 2025 by Colin Ashe, Moses Albert Miranda, Ryan Mize, Brenna O'Toole, Jackson Giovanni Saieva, and Ben Wainscott.

The evidence from this interview, combined with data available through internet research (including FamilySearch.org and Findagrave.com), suggests that the Robert "Hard Rock" Harris of this interview was the assayer Robert Joseph Harris, born on April 3, 1895, in Ohio, and deceased on May 18, 1978 in San Bernardino County, California (i.e., two years after this interview). He was reportedly married to Lillian Mary Harris (1905–1992) from Pennsylvania, and they had two sons (Norman R. and Joseph G.). His 1942 World-War II draft registration card states his place of work at that time as the Morrow Aircraft Corporation in Rialto, California. His last known residence was Red Mountain, California. He was buried in the Rand District Cemetery in Johannesburg, Kern County, California.

According to the interview, Robert Harris attended St. Jerome's College in Berlin (now Kitchener), Ontario, flew various types of aircraft in World War I, but spent most of his career as a metallurgist in the American Southwest. He arrived in California's Randsburg district in 1930 as a mining engineer and, due to his expertise, had no problem getting hired at Atolia. Harris gives us an incredibly detailed account of his work with scheelite, a calcium tungstate mineral, and the pertaining assaying tests and processes of refinement. He includes anecdotes about a husband-and-wife team who struck it big, finding \$250,000 worth of gold nuggets in Goler Canyon; about various mining characters, such as "Ballarat Bob" and "Seldom Seen Slim," as well as Calvin Harrison "Slim" Riffle, the founder of the historic "Owl

Café" and various other enterprises in Randsburg; and about the challenges of living and working in these Kern County mining communities. Thus, this oral history should be of particular interest to historians of science and technology in California (especially mining), to scholars of social memory (including World War I and desert communities), and to metallurgists, geologists, and assayers curious about the history of their respective fields.

Only identifiable individuals, locations, and technical terms have been referenced in the footnotes, usually when they first appear.

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Verbatim Transcript (O.H. 1550)

LAWRENCE DE GRAAF CENTER FOR ORAL AND PUBLIC HISTORY
CALIFORNIA STATE UNIVERSITY, FULLERTON

NARRATOR: Robert Harris [RH]

INTERVIEWER: Debra Pierce [DP]

DATE: October 24, 1976

LOCATION: Red Mountain, California

PROJECT: Science and Technology

TRANSCRIBERS: Colin Ashe, Moses Albert Miranda, Ryan Mize, Brenna O'Toole,
Jackson Giovanni Saieva, and Ben Wainscott

DP: This is an interview with "Hard Rock" Harris¹ for the California State University, Fullerton, Randsburg² Project by Debra Pierce at Post Office Box 816, Red Mountain,³ California,⁴ on October 24, 1976, at 5:00 p.m. And, Mr. Harris, I'd like for you to start off telling me about your experiences in World War I,⁵ please.

RH: Well, I don't know as I care much about talking to that, I thought we were goin' to talk about mining.

DP: Would you like to do that? I thought—

RH: Yeah.

DP: —maybe you'd like to start off with it.—

RH: Yeah.

DP: —You don't? You just wanna start off with mining.

RH: Well, yes, I would, because World War I in 1930 is a long way off, uh, in other words to start this off, uh, I'd like to talk about the things I heard in 1930 about Randsburg, Johannesburg,⁶ and Red Mountain, see, which is a mining community, and me being an engineer of mining and metallurgy, why I was very interested, so I started out on 66 highway⁷ and, uh, when I got off to turn off to Red Mountain, I found a dirt road that was very, very rough for the car to get into. Well, I went along on that the first ten miles, I had to get out and put my shirt back. It was really that bad, see? And, uh, nothing with miners went over that particular road, and it took hours, well right now on a good road, which is 395,⁸ it takes you two hours on that same course, so you

¹ Robert Joseph Harris (1895–1978), miner, metallurgist, and World War I veteran.

² Unincorporated community in the U.S. state of California, east of Bakersfield.

³ Unincorporated community in the U.S. state of California, east of Bakersfield.

⁴ U.S. state on the West Coast.

⁵ (1914–1918).

⁶ Census-designated place in the U.S. state of California, east of Bakersfield.

⁷ A.k.a. "Route 66" between Chicago, Illinois, and Santa Monica, California.

⁸ North-south highway between Hesperia, California, and the Oregon state line.

- can imagine what it'd be on a rough road, see? Well, we re—ri—arrived at Atolia,⁹ right, which was the first mining project, and a very good one. Oh, they'd taken millions of dollars out of it, see? And, uh, I went in there, and I had no trouble at all getting employment, being a metallurgist and being a—uh, being able to assay¹⁰ materials and being so far from Los Angeles¹¹ and San Bernardino¹² and all of the ma—major towns that had materials you could buy. In other words, they couldn't buy a tee, uh, 2 by 4¹³ out here without going a hundred or two hundred miles—
- DP: Sure, yeah.
- RH: —well, I had no trouble at all getting a job, and, uh, I built the laboratory down there, and altogether I spent, uh, oh, say, nine and a half years in the laboratory, see?—
- DP: Mmm.
- RH: —And, uh, see, on the ore¹⁴ that these people were handling is a calcium tungstate, known as scheelite.¹⁵ Schee-lite, that's the name of it, see? Mineralogical name, see? And, uh, the, uh, chemical formula is calcium tungstate. So—we managed to get the laboratory all arranged for this particular ore, which is a chemical operation and takes about three days, see? Three long days of it, due to the precipitation of the, uh, tungsten,¹⁶ see, it's very hard to get out of solution. So, I spent, uh, three days. Now, then, I would get the sample, while that comes from a mill which is, uh, Barker Mill¹⁷ here in, uh, south of where we are right now and, uh—the, uh, tailings¹⁸ out there run about three tenths of one percent, which they're trying to do something with now, see, and they could, if they knew how, see, and, uh—the ore was put into the mill, and it went through a crusher. And from the crusher it went through a ball mill,¹⁹ right? A ball mill is a revolving tank like, a large tank that's revolving, and it has iron balls in it, so, it reduces this stuff down to any mesh²⁰ that you wanna put the screen on the end of it. There, the screen goes on the end. You can have it 16 measure,²¹ 20 measure, fly screen, which is 14 measure, see,—
- DP: Mmm. Okay.
- RH: —well, it all depends on how you're going to recover this material, right? Alright, from there it goes to a jeg.²² (pauses) The jeg concentrates all the heavy material out, see? In fact, you look at the jeg, which you can see it all the time and, uh, there's, uh, probably, uh, oh, anywhere to—eight to ten inches of, uh, scheelite, which is our

⁹ Former mining town in the U.S. state of California, south of Red Mountain.

¹⁰ Assess qualitatively and quantitatively the presence, amount, or functional activity of a target entity.

¹¹ City in the southwestern part of the U.S. state of California.

¹² City in the southern part of the U.S. state of California.

¹³ Piece of dimensional lumber with a nominal (not actual) size of 2 by 4 inches.

¹⁴ Natural rock or sediment containing valuable mineral(s), often including metal(s).

¹⁵ Calcium tungstate mineral, named after Carl Wilhelm Scheele (1742–1786), Swedish chemist.

¹⁶ Chemical element, metal (a.k.a. Wolfram).

¹⁷ Former mining place in the U.S. state of California near Randsburg, named after proprietor Clarence Barker.

¹⁸ Materials left over after extracting an ore's valuable fraction.

¹⁹ Type of cylindrical grinding machine.

²⁰ Barrier made of interlaced steel wires.

²¹ Openings per linear inch.

²² A.k.a.jig, apparatus for jigging ore (i.e., separating materials by gravity).

calcium tungstate that we were talking about in the beginning, see? Now then, from there, being a very fine mesh, it goes to tables. And these tables are oscillating back and forth, and they are probably, oh, say to—let's say ten foot long and, uh, five foot wide for the average individual to vi—visualize, see? Now then, as this material goes down there and is jiggling back and forth, the black sands that're in this ore go in one category, see? The quartz,²³ which is a white material and it goes in another category, and the scheelite and calciums go in another material, see, so it separates all these things, see? Now then, when it gets off that table—the mere fact that you can't—not get anything a hundred percent, see—it goes on another table, see? Which is, uh, a lot for efficient, see? Uh, sometimes, in some mills, they had to make a regrind in order to, to make the separation, but we sent it over five tables. Alright, right after it was over the five tables, right, it was ready to go to what we call the dry room, which was down by the main buildings, right? Alright, after it had gone in the dry room, why, they put it through the drying process and screened it all into different categories, see? Well, some of those categories would be richer than others you—due to the screening see? And that's one of, one of the methods they use in processing. In fact, sometimes, some of the stuff that don't assay correctly, that was my job to find out what all these pro—different screenings were, see?

DP: Mmm.

RH: Alright, some screens didn't go too high, went back to the mill, see? And they dump right in with the process, see. Alright, after, uh, after it went through the dry room it went through all the screening, see? And its separation, the stuff that assayed by my assays 60 percent that—was sacked in a hundred-pound sacks, so I used to buy high grade from miners, see, that, uh—itinerant miners would come around, you know, I would buy high grade from them, and we put six pounds of high grade in, so it'd be over the 60 percent, because if you were under 60 percent, they would fine you, the mill would, where you sent the final concentrates, see? Well, the same thing applied to gold. Now, in the old days, when gold assay was thirty-five dollars an ounce, see? Alright, they paid you 90 percent of the assay value at thirty-five, thirty-three dollars, see?—

DP: Mmm.

RH: —See, well, just about thinking about sending it there costs you money, see? Plenty, see? Now, this tungsten and everything else that you do in the mining business is the same way. They never if it, say, that, uh, gold was a hundred dollars now, you can't get a hundred dollars for it if you had the twenty-four carats, see.

DP: That's right.

RH: They would give you that deduction, see. All the, uh, deducts are in there, see? Now if, the—alright. (microphone static) See, in the Atolia laboratory, which was primarily built for tungsten, which is calcium scheelite, uh, we also had facilities for doing gold and silver assays, see. Uh, the mere fact that the company didn't pretend to do any gold or silver mining, while they stuck entirely to the, uh, the scheelite, which is a

²³ Hard mineral, a.k.a. silicon dioxide.

tungsten assay, but it was always, uh, necessary to find out whether these materials carried gold or silver for future reference, see? Well, when you come right "down to brass tacks"²⁴ around Red Mountain and Randsburg and Johannesburg, you can find almo—almost any there. In fact, I can take you to a place, uh, in Randsburg right next to the post office, which used to be the old post office originally in 1895. And there's a ten-foot ledge, runs right over that, or a hundred rather, pardon me, that nobody has ever even sampled—

DP: (giggles)

RH: —and there's gold in it, see.

DP: Is that right?

[00:10:20]

RH: Oh yes. There's gold in it, see, because it runs up towards the Yellow Aster Mine,²⁵ which was a big producer in the old days, alright? In this country, everywhere that you find quartz, which is no good, which is, uh, bull quartz, you find a mine near it, see? And if you haven't found a mine near it, it's because they didn't prospect it enough. Because everywhere you look, where there is bull quartz, which is the white silicate²⁶ coming out of the ground, you'll find a mine or a hole or something, see?

DP: Now, is that just in this area you're talking about, like in Randsburg,—

RH: Yeah, right.

DP: —not in other?—

RH: —Red Mountain, Johannesburg, and Randsburg,—

DP: —Now, this doesn't necessarily mean then in other parts of the country, but just here?—

RH: —right here, that's the geology of this area, see? Uh, uh, mineralogical conditions, see? Now then, uh, the Yellow Aster Mine from 1895 to, uh, World War I, see, it's necessary to quit gold and silver mining during a war. All you can have is strategic minerals. You can't have—see, gold and silver isn't strategic. You need something like Atolia, which has that material, see? That they have there, see? Now then, getting back to the Yellow Aster, from 1895 to World War I, it averaged, as I understand, about three dollars a ton. Well, in those days, three dollars a ton was alright, now it would be ridiculous, see? Alright, a miner made a dollar a day, and his mucker²⁷—the mucker is his helper, see, that's what they called—

DP: Okay.

RH: —mucker, see? Alright, the helper got fifty cents a day, see, and—alright, a lot of people are working right now, see. Uh, in fact, my wife²⁸ worked so many years for fifty cents a day that now that she's making seven dollars a day in the post office, she won't quit,—

²⁴ Idiom, meaning "cut to the chase," "get right into it."

²⁵ Gold mine, south of Randsburg, established c. 1895.

²⁶ Presumably sodium silicate.

²⁷ Person loading material into mining carts.

²⁸ Lillian Mary Harris (1905–1992) from Pennsylvania.

- DP: (laughs)
- RH: —yeah, it's ridiculous, isn't it?—
- DP: (laughs)
- RH: —She don't have to work, and here I am home all alone, and she gets me up at six o'clock in the morning, (laughs)—
- DP: (laughs)
- RH: (pause in recording) It's, it's, hard to say too much about that because it lasted so long, see, from 1895 to World War I. There is a whole lot of things that happened that—uh, in conjunction with the Yellow Aster, that was more interesting than the Yellow Aster, see. Like Goler Canyon.²⁹ Uh, Goler Canyon is, uh, a placer operation,³⁰ not a hard rock, see? Uh, hard rock mining was down in tunnels and shafts and, uh, very difficult stuff, required powder³¹ and everything. Well, we were, uh, a long way from Los Angeles and San Bernardino, where you could buy powder, see? Well, to give you some idea, uh, in those days powder wasn't too hard to get, but right now, if you went to San Bernardino, which is a hundred miles down and a hundred miles back, they would charge you for the box of powder, see? Now then, you would wanna take it out and put it in your car, and the man would say, "We're sorry, you can't do, we have to deliver it to you, and it'll cost you fifty cents a mile, round trip."—
- DP: Well, how about that?
- RH: —See?—
- DP: Yeah.
- RH: —That's one reason why it's pretty hard to mine right now, see? Because of the expense. Such is the miner: I'll, I'll just give this, uh, uh, union fee of forty dollars a day for a miner, and his insurance is fifteen dollars a day, see? And as you can see now, it's all pretty high to mine, see. Well, getting back to Goler Canyon, see. And this was in 1895, alright? And these people become friends of mine afterwards. A man and his wife who, uh, mined out at Goler Canyon—250,000 dollars, right? Now, he mined in the ground eighty feet below the surface on placer, see, placer ground is different than hard rock. In other words, anything that sits on the base rock, all the dirt above the ground is placer.—
- DP: Mmm. Okay.
- RH: —Alright, let's get back to—the mama's on top and the papa's down digging the hole, and he sends up a water bucket full. Well, a water bucket full is so many shovels to her, see? Alright, she had a canvas, and she dumped this bucket out on the canvas and picked the nuggets out. Now, I saw some of the nuggets—I didn't see 'em in 1895—but she held out all the big ones. Then she showed 'em to me ye—years later, see? And some of them was as large as my thumb, see?—
- DP: Isn't that something.
- RH: —And she'd pick out these large nuggets and then all the fine stuff and screen it, and then throw the tailings away. Now the tailings is stuff you don't want. See, I have to

²⁹ Gold mine, northwest of Randsburg and north of Goler Heights, established c. 1895.

³⁰ Surface mining.

³¹ Explosives.

- explain that because, lest you people know what tailings are, like in the mill, you have the heads,³² which is the ore going into the mill, see? You have the mediums and concentrates, and you have the tails,³³ which is the material you throw away, see. Very understandable, see? Because it's an impossibility to obtain a hundred percent. Can't be done, right? No matter what kind of equipment we've had over all these years, we've never, well, in some lab where a guy got as high as 80 percent, which I figured was very good, see?—
- DP: It really is!
- RH: —Yeah, I, uh, I have a book here that, uh, is very precious to me, and it's some of the work I had done on the Atolia mill,—
- DP: How interesting.
- RH: —yeah. Now this, this explains all of the processes, see, to recover this ore. Now, uh, this will show you, uh, who the test was run by and all of the material and its screen (unintelligible) (paper rustling) See? Uh, here's another page. This was in 1956,—
- DP: Mmm.
- RH: —and, uh, there's something wrong when I reported down here to repeat the test, see? And, uh, here's another one, run at 35 mesh. And, uh, well, let's see, what was the test on this? Page five. That—this book here will give you an idea of what you have to go through. These are all—this takes months to do,—
- DP: Oh sure it does.
- RH: —yeah. Uh, (pauses, paper rustling, talking under breath) uh, we'll get back to this thing in just a minute, when I locate it here. Uh, plus 10 mesh was 8.9 percent, see? And minus 10 mesh was 1,211 pounds of 91 percent, see?—
- DP: Mm-hmm.
- RH: —that's, that's good work,—
- DP: Yeah, it certainly is.
- RH: —awfully good work, see,—
- DP: That's right.
- RH: —yeah. Uh, all of the reagents, see? Alketan, oleic acid,³⁴ all the stuff that was necessary to run the mill down here, was flotation, (paper rustling) uh, this book has a lot of work in it. Recovery of 61.9 percent on this test, see?—
- DP: Mmm.
- RH: —It's awfully hard to get a hundred percent,—
- DP: Sure.
- RH: —even in a laboratory, now then, let's say, we were out in the mill with a lot of men that don't care, they're getting so much an hour and, well, they don't care whether they got the right amount in there, or whether they (mumbles)—
- DP: They're not that particular.
- RH: —yeah. They're not that particular, see? But in the lab, we made 61 percent on that, see?—

³² Large, uncrushed rocks.

³³ Tailings, materials left over after extracting an ore's valuable fraction.

³⁴ Naturally derived fatty acid used primarily as a mineral collector in froth flotation.

DP: Mmm.

RH: —All—maybe out in the mill, they would only make fifty, see? In fact, I had one occasion, the day before I left down there, which is one of the reasons why I left, was because the heads went in at three-tenths of one percent, and the tails went out at five percent. Material we threw away went out at five percent. Well, somebody in the mill goofed off.—

DP: (laughs)

RH: —I mean, that's, that's it, see?—

DP: Yeah, sure is.

[00:20:01]

RH: —Well, let's get back to Goler, see, which is awfully interesting because the two people, made 250,000 dollars, see, they built a, they built a beautiful home in San Bernardino, all with—and being mining people the way they were, they lived in the garage, hey. Alright, everything was fine, they had it all furnished, beautiful, see? The—this basement was all concrete and had five rooms, I saw it, it was wonderful, see. And, uh, that night, before they moved in the next day, the husband died, see. Very sad, because it was—they were awfully nice people and hard-working people. And all the time he was over here, he was the recorder for the county, see? In other words, you wanted to stake a mining claim, see? And he acted for the county and for the government by recording the claims at Goler, right. Now, another very interesting thing about Goler is the fact that there is a place by the name of Summit,³⁵ eight miles away, which is the foot of Goler. In other words, Goler was a canyon, still is a canyon, but it was a canyon at one time that was running down. Well, the Garlock Fault³⁶ runs through there, and it's a horizontal fault. And uh, I wou—I would say maybe over a million years or two million years of it, it moved eight miles, see? Well, at Goler, that we've just been talking about, there is a real rich deposit, see? Now then, Summit is the tailings from Goler. And the best we've ever found was a dollar a yard. Now, a yard is a ton now, see? Twenty, Twenty-seven cubic feet, something like that, see. And, uh, to this day, when a little miner goes over there with a dry-washer,³⁷ which is, uh, some of 'em are handcranked outfit and others has a little one-cylinder engine on 'em, and, uh, at their best they'll recover about 50 percent. I showed you in here—tried to show you, uh, roughly, that it's hard to get a hundred percent, see? It don't happen, unless it would happen by accident, see. And that's because we'll say that we ground this ore to 14 mesh, that would be like a fly screen, so people will understand that we'd go down as high as two hundred mesh,—

DP: Mm-hmm.

RH: —now then,—

DP: Wow.

³⁵ A.k.a. Summit Diggings Placer, gold mine, south of Searles.

³⁶ 160-miles-long fault along the north margins of California's Mojave Desert.

³⁷ Apparatus separating free particles of placer gold from dry sediments by using air and vibrations.

- RH: —in that tailings from that mesh there, there might be five more dollars, see? That makes it a very understandable and—
- DP: Mmm. Yes.
- RH: —Yeah. Well, so you see why it's not possible at any time to make a hundred percent unless it's by accident. (pause in recording) Now, we, uh, we were talking here about the wet screen test on minus 30 mesh material. Five hundred grams in the tailings, uh, three hundred and thirty-three of lake water. In other words, while you're milling, you have to use the same ma—water in your test laboratory that you use in the mill because, uh, water—the specific gravity of water and the different chemicals that are in water—have effect on these particular ores because, as I mentioned today to a certain party that everything is moving in this world, no matter whether it's wood or stationary, or bolted, and everything has a chemical action to it, see? So, during the process of all these tests, we have to use the water we're going to use—
- DP: Yeah.
- RH: —in the particular mill, right? Alright, the grind was ten minutes in a ball mill. Now, this is a laboratory ball mill, a small one. A ball mill is seven inches by seven inches. The charge was 6,585 and a half—balls in the mill, the iron balls that was going to crush the ore was that weight, see? Now, if you change that weight, you have something else happen to it, see?—
- DP: Mm-hmm.
- RH: —The rpm³⁸ was seventy-seven rpm's, see? Result weight plus three twenty-five wet, equals 234.4 grams. 46 and a half percent. Uh, the weight of minus three hundred twenty five wet, 268.5, which is 53.5 percent. Now those two added together makes a hundred percent, see. So, you see, everything was worked out in accordance. Now then, the, uh, grams weight of, uh, the different perc—percentage, like minus 48, uh, plus 48, plus 65, minus 65, plus a hundred, and all these different ones went down to run this test, see? And we can probably pick out another one here that, uh—
- DP: Well, um, would you mind if I asked you an—another question about—as far as, how many years did you spend, um, like, you would work in the lab, you would go out on the field—
- RH: Yeah.
- DP: —and then do your research there, and then bring it to the lab, and then really do the testing there, right?
- RH: Yes. In other words, at Atolia here, I sampled the tailings. Now, remember the tailings is what we throw away, see? It's those big, beautiful dumps that you see down there now that do the high, uh, percentage of, uh, exchange right now, that dump runs three tenths of one percent, well, uh, when we used to get five and ten dollars for twenty pounds. Now we're getting, uh, eighty and ninety dollars for twenty pounds,—
- DP: Mmm.
- RH: —see? Well, that makes sense, doesn't it?—
- DP: (laughs)

³⁸ Abbreviation, meaning "revolutions per minute."

- RH: —The tailings that we threw away years ago are worth, uh, quite a bit of money,—
 DP: Mmm.
- RH: —providing that you have a man or personnel that can work out the process to get it out of there, see? Now, there are a lot of times in the old days that three-tenths, we'll say, was thrown away in the tailings because it required a little too much money. And back, back in those days, money was quite a thing.—
 DP: Mm-hmm. Sure.
- RH: —Money, money was the thing that operated all these processes, see? Now this one here. The recovery was 78.6 percent.—
 DP: Mmm.
- RH: —Alright. Treated with lake water. Now, that's water pumped from east of Atolia down on the dry lake down there. See, there's subterranean water down there, and most of the subterranean waters around here carry arsenic, see? In fact, uh, when I was down in number one³⁹ at Atolia at the six hundred level, the water was up to the seve—to the five hundred level, and I could down in the water a hundred feet, while ordinary water I couldn't do that, but in that arsenical water, it makes it like a lens,—
 DP: How about that?
 RH: —and it's beautiful! I could see the nails in timber and all that stuff—
 DP: Mmm.—
 RH: —underwater, which is very hard to do, see? Well, this, uh, this particular test here (paper rustling), uh, let's see, there's calcium oxide⁴⁰ in this ore, there's sodium carbonate,⁴¹ and we precipitated all the—filtered it all out, see? Five hundred grams of tails. 3.333 percent of treated lake water. A half gram of sodium carbonate, see. Try salt water, see. The grind was ten minutes. Now, with salt water, we got 78.6 percent, see?—
 DP: Mmm.
- RH: —That's pretty good!—
 DP: Mm-hmm.
- RH: —Because, uh, you don't have the selection of water, it comes—it comes with the mineralization that happens in that area, see? And some of it's, uh, charged awfully heavy in lime.⁴² In this case down here it's arsenic. Very poisonous. If you drank a cup of that water that—
 DP: Mmm.
- RH: —that would be it, see? See, well, there's five hundred grams a tail. Tails, and three hundred and three cc's⁴³ of lake water. A half a gram of sodium carbonate, see? Alright, uh—it worked out for 20 percent solids and five hundred cc's of water, see? Uh, sodium silicate,⁴⁴ uh, pelletan and oleic acid was used for the flotation, see?

³⁹ Presumably Union No. 1 Mine at Atolia, started mining tungsten in 1915.

⁴⁰ A.k.a. quicklime; white, caustic, alkaline, crystalline solid.

⁴¹ A.k.a. washing soda; white, odorless, water-soluble salt.

⁴² Inorganic material composed primarily of calcium oxides and hydroxides.

⁴³ Abbreviation, meaning "cubic centimeters."

⁴⁴ Chemical compound; colorless transparent solid or white powder, water-soluble.

Flotation time was ten minutes on 20 percent solids see? Uh, we used, uh, these materials are named like A eighteen and, uh, oleic acid and, uh, fun names like that that the manufacturers have. The assays of the tails was point 0625, and the con was 1.220, see? And that is very good, see? In other words, it worked out to 78.6 percent on that particular test, see? (chair creaks)

[00:30:49]

DP: Um, didn't you have problems there with the arsenic water? I bet people didn't realize—

RH: —Oh yeah, (talking over each other) that's, that's, uh, that's a separate chemical procedure to, to, uh, not—you can't eliminate it because it's there, but you have to put some reagent in that will counteract it, see? In other words, uh, uh, you'll have, will say, a solution of sodium chloride,⁴⁵ and all you want's the chloride so you gotta find out how to get rid of the sodium.—

DP: Mmm.

RH: —That's chemistry, see?—

DP: Mmm.

RH: —And, uh, it may take you a little time to work out some of the problems, but it's always, uh, it's always worked out. If it isn't worked out a hundred percent, it's worked out 50 percent. See, how it works? As I say, you never get perfect. That's the thing I had to learn years ago,—

DP: That's right.

RH: —although I try my best to do everything absolutely perfect, it's an impossibility, see?

DP: I would also like to go back, at the very, very beginning, and—did you get your training as a metallurgist—is that how you—

RH: Yes.

DP: —pronounce it? You got that training, um, when you got out of service? Or did you get it in service? Or how did you—

RH: Well,—

DP: —get that?

RH: —I, I, took chemistry in college. At, uh, St. Jerome's College⁴⁶ in—it was Berlin,⁴⁷ t—Ontario,⁴⁸ but it's Kitchener⁴⁹ now, see?

DP: Mmm.

RH: And, uh, in my time that was a little different. In fact, I was in the first grade, and I knew the multiplication tables, see?—

DP: My goodness.

RH: —Yeah,—

DP: Mm-hmm.

⁴⁵ Ionic compound, transparent or translucent; in its edible form a.k.a. table salt.

⁴⁶ Now St. Jerome's University in Waterloo, Ontario, Canada (1865–present).

⁴⁷ Former name (until a 1916 referendum) of Kitchener, Ontario, Canada.

⁴⁸ Province in the east-central part of Canada.

⁴⁹ City in the southeastern part of the Canadian province of Ontario.

- RH: —I had to know. Even nowadays, to, uh, of course I'm getting older and, uh, it's much harder to memorize, see. But, there was a time here in the, oh, say back in the fifties, I could memorize this, this whole page here, see? And, and nothing flat, see? Because I understood the chemistry and, uh, the mathematics of the thing, see? Uh, now this one here—did I answer your question alright?
- DP: Well, okay, so you did go to a college in—
- RH: Oh yeah.
- DP: —in Ontario, alright. And then from there, you just came down again, as you said, and found this area that you wanted to work in?—
- RH: —Yes, (talking over each other) after I graduated, I, well, not only here, I went a lot of places. See, I used this, this trail right here, and, uh, I traveled all over, uh, Nevada,⁵⁰ Arizona,⁵¹ and California to different mines. I worked for hundreds of 'em,—
- DP: —Oh, see, I—
- RH: —and, uh—
- DP: —didn't know that, okay.—
- RH: —Of course, they don't say you work for one. Say, that I went to work today for you in your mine, and you work in a mine, and you go broke two weeks from now, well, I have to move on,—
- DP: (giggles) Mm-hmm.
- RH: —see? That's, that's how the thing worked. The mining—mining industry is an entirely different than anything else because of so many failures, right. There's so many smart men that go all about it, see, and they find out in two weeks or a month or maybe it's six months, if they don't know. In other words, tests like I'm showing you on this paper here. Now, this particular one here is a sample of minus 35 mesh, using the lake wash—water, and the sodium carbonate, and calcium cyanide,⁵² and a few other chemicals like that. And our recovery was only 19 and a half percent, see. Everything was wrong on this particular page, but it's necessary for records, see?—
- DP: That's right.
- RH: —In order to say we don't do this because, why. On, uh, HFT⁵³ number six, we did a certain thing and we only got 19 percent, see?—
- DP: Mm-hmm. Mm-hmm.
- RH: —Isn't that wonderful? How—
- DP: Isn't that something? Yeah.
- RH: —I keep. Right? Like I mean, if you do there's a lot of people who don't keep records so they just go ahead and do things.—
- DP: —Well then you don't make the same—
- RH: —Sorry,—
- DP: —mistake again.—
- RH: —We didn't do so good, see?—

⁵⁰ U.S. state in the Southwest.

⁵¹ U.S. state in the Southwest.

⁵² Inorganic compound, highly toxic.

⁵³ Perhaps "Hydraulic Fracturing Test."

- DP: —That's right. (paper rustling)
- RH: Yeah, see. Alright, let's go to this one now. This one is interesting, see? Atolia tails. Five hundred grams of it was taken for sample. The lake water was 333, see? Uh, a half a gram of sodium carbonate. In fact, uh, salt water seemed to be, uh, hell, see? But it had to be in the right percentage, see? Well, all of these materials went in, and the float time was eight minutes. (banging noise in background) Uh, yes, as I was saying about the Atolia tails, uh, a sample run of five hundred grams and, uh, three hundred and thirty-three cc's of lake water, see? Well, the time on this particular assay was eight minutes. And there was two drops of oleic acid. And, two minutes later, there was two more drops of oleic acid. And then one cc of eighteen. That's, uh, a term for, uh, flotation materials, see? Which, if you wanted to go to a place where they sold these materials, you'd ask for so much of A eighteen and they'd give it to you, see? Well, and, uh, one cc of oleic acid, see? While the concentrate amounted to twenty-seven and a half grams, which was 5.5 percent. And the tailings amounted to four hundred and seventy-six and a half grams, which was 94 and a half percent, which the two added together represents a hundred percent. Now the recovery was 73.8,—
- DP: My goodness.
- RH: —see?—
- DP: Mm-hmm.
- RH: —Was using this particular method, see?—
- DP: Mm-hmm.
- RH: —Now, is there any more things you wanna ask me on, uh?
- DP: Um, can you remember some very, very odd tests happening that were very phenomenal? Or—
- RH: —You mean—
- DP: —real unusual?—
- RH: —in the mineralogical tests?—
- DP: Yeah. Mmm.
- RH: Oh, uh, oh, that happens at times due to, uh, to, uh, sometimes you purchase materials like nitric acid,⁵⁴ hydrochloric acid,⁵⁵ and different chemicals that are so old that they have no reaction, see? So, you go through all the tests, which might require as much as two days, see? Or maybe more. And you—you get no answer. You get a nullification because, due to material that wouldn't react chemically, it wouldn't precipitate, see?—
- DP: Mmm.
- RH: —And, uh, that's—you've lost, see? You've lost a couple of days' work,—
- DP: —That's—
- RH: —and you have to then go to find out what is wrong, see? What's happened? see?—
- DP: Mmm.
- RH: —See?—

⁵⁴ Inorganic compound, highly corrosive, used for explosions.

⁵⁵ Aqueous solution of hydrogen chloride.

- DP: Mmm.
- RH: —Well, you might run it again and get the same results, so then you know that it's in chemistry and you have to find the category. Is it in the acids? See? Or is it in the sodium silicates, or the oleic acid, or what, see? So, you have a standby, what I call a standby. I used to use these things, see? And they were materials that I knew was perfectly alright, see.—
- DP: Wow. Mmm.
- RH: —Couldn't go wrong, see? In other words, when I was running an assay, say, I was running twelve of them all nicely bunched out on the hot plate, see? Alright, right in the center, I had my standard, see? A—An assay that I had run a thousand times, as I knew was absolutely right, see?—
- DP: Mmm.
- RH: —And if that didn't come out right, something was wrong. But if it come out right, I could go home and sleep.
- DP: (laughs)
- RH: Does that answer your question?
- DP: Yes, it does.
- RH: —Yeah, yeah,—
- DP: —It's interesting—
- RH: —all these things are, uh, are very particular. I mean, uh, most of the assays that I run against the government assays, see? Now the government assays at times would be a sample split ten ways and sent one to Chicago,⁵⁶ one to New York,⁵⁷ and all over the country, and then they'd bring 'em together, add 'em up, and divide 'em by, uh, ten, see? Well, I had one assay that I brought against 'em, and,—
- DP: Oh.

[00:40:12]

- RH: —and at the most I wasn't anymore than a hundred to two hundredths of a percent off, see?
- DP: My goodness.
- RH: —Very, very, uh, exact see? So, I had a very good process that I was working—
- DP: That's interesting.
- RH: —and good materials because, if some of them got too old, well, I'd order new materials and renew them, see? And work a standard, uh, a standard I was telling you about, see? That couldn't be any different. Uh, the material in the standard is taken down to way—minus two hundred mesh. And it's—say I had ten pounds of it. Well, I have a splitter, a metal splitter that you put that ten pounds in, and it divides that into ten different portions, see?—
- DP: Mmm. Okay.

⁵⁶ City in the northeastern part of the U.S. state of Illinois.

⁵⁷ City in the southeastern part of the U.S. state of New York.

- RH: —See? Well, then you take that tenths and divide it again, see, until you get it down to, well, I told you one here, I took, what, five hundred grams or something like that.—
- DP: Mm-hmm.
- RH: —Alright, take first sample, whatever you want, a hundred grams, five hundred, whatever it is, see? Well, running it through those splitters make an ideal mixing, okay. You can't, you can't go wrong, see? The splitter does the, does the job, see? And every good lab has one, no matter whether they're running organic materials or what it is, even if they were assaying salt, they would split the sample to a small quantity, very sys—systematically, see? Instead of just grabbing a handful out, see?—
- DP: Mm-hmm.
- RH: —Now, to give you an example of how, how hard it is to—and how you can a mistake. You see these big dumps, down here, the tailings dumps with the—
- DP: Yes.
- RH: —level ground on 'em. Say, the level ground was covering five acres, see? Alright the winds, the prevailing winds, go over this ground, and they loosen up all of the very light materials. Now, the heavy materials carry values, but the light materials don't. And these materials go off into space. If you go to Randsburg, you can see 'em spread out for two miles. The light materials, see? Alright, on, uh, top of that material, the black sand don't move, see? Or the scheelite, which is heavy, see? Scheelite is very heavy, you tried that yourself, see. Alright, all of those light materials are gone, and the heavy materials there, so they come along, and they sample right on top. Well, it's richer than what's down below because of the natural concentration.—
- DP: How about that?
- RH: —The heavy materials that carry the values are left right up on top of the ground. So, what do you do instead of sampling that way? You dig down about five feet, see? And take a sample down there where the wind can't get at it. And—even the rain, moisture, and water going on down through it, see? Now, two particles, let's say one is gold, and one is a very light material. They will stay in the same place for thousands of years until they are moved. Minute they're moved, the heavy particle goes down,—
- DP: Mmm.
- RH: —see? Unless it had happened to be on concrete or something like that. But in natural sequences, all of the material underground there, if it becomes wet, things settle down, see? It wants to go with the water, the heavy particles, see? Light particles stay up on top. I guess we can—(pause in recording). Yes, in Red mounting—Mountain, it's necessary to acquire the liking of the individual you are talking to, see? Alright, if he's an Englishman, well, you try to put on a little accent, see?—
- DP: (laughs)
- RH: —Like, it's not the 'opping over 'edges what is 'urts the 'orse's 'ooves, it's the 'ammer, 'ammer, 'ammer on the blinking 'ighway.⁵⁸
- DP: (laughs)

⁵⁸ A Cockney rendition (i.e., the traditional working class accent of London, which famously drops the letter "h" at the beginning of words): "It's not the hopping over hedges that hurts the horse's hooves; it's the hammer, hammer, hammer on the blinking highway."

- RH: —And so, if you, uh—
 DP: Now what did you say?
 RH: (laughs)
 DP: (laughs)
 RH: So it,—
 DP: Uh.
 RH: —it's necessary to talk to some of the miners who don't have any kind of education, see? The pick and shovel men, see? If you don't talk in their sense, they dislike you, see?—
 DP: Sure.
 RH: —If you're at a bar, and they're there, and you don't buy 'em a drink, they, they also dislike you. (laughs)
 DP: Could you tell me some things about some of these characters,—
 RH: Characters? Oh,—
 DP: —some good stories about some of them,—
 RH: —yeah, about "Ballarat Bob."⁵⁹—
 DP: —Yeah, he—
 RH: —I'll tell you about him, see.
 DP: —sounds good.
 RH: He was a character, lived here, he come from Ballarat,⁶⁰ and, uh, he was here with, uh, his partner. And it was three o'clock in the morning. This is a short story because it ends very rapid,—
 DP: (laughs)
 RH: —see? It was three o'clock in the morning, and he had a bottle of whiskey. You know, I, I don't know how much was out of it. Maybe a half full, see? And his partner dropped it. Well, he shot him and killed him, see?⁶¹ (laughs)—
 DP: (laughs)
 RH: —(talking over each other) Well, that, that's about as exciting as you'd want it, see?
 DP: It certainly is.
 RH: Yeah.
 DP: Oh my goodness.
 RH: Yeah.
 DP: How about, um, did you ever hear any, know, uh, "Seldom Seen Slim?"⁶² Was that his name?—
 RH: —Yes,—
 DP: —Now, did you meet, uh—
 RH: —yeah, "Seldom Seen Slim,"—

⁵⁹ Robert Bernard "Ballarat Bob" Dunlap (1922–2010), prospector.

⁶⁰ Unincorporated community in the U.S. state of California, just west of Death Valley National Park in the Panamint Valley.

⁶¹ "Ballarat Bob" was convicted of voluntary manslaughter in 1973 for shooting his friend and fellow prospector, Martin Dale Erman.

⁶² Charles "Seldom Seen Slim" Ferge (1889–1968), prospector.

- DP: —now—
- RH: —“Crooked Neck Tony,” and all those fellas see? The old timers, see?
- DP: What were they like?
- RH: Well, they, they were mining people, see? Just like the sheriff we had here. It was , um, quite a big individual and, uh, well capable of handling the toughest miner that’d come along, see? And, uh, we had a minimum of trouble due to the fact that he was able to handle ‘em, see?—
- DP: Mm-hmm.
- RH: —It wasn’t just talk. He would go in there and clean out the whole s’loon. And “Slim’s” s’loon⁶³ down here at times had as many as a hundred people in it—
- DP: Wow.
- RH: —all, all drinking from beer, wine, and everything else, see? Well, another very interesting thing is that I lived in number one here in Red Mountain. That’s a little cabin, one room and a kitchen, see? And I had bachelor quarters in there, uh, (laughs) when I went to work in the morning, which was down in Atolia, a lot of times I’d pull as much as five drunks over in the shade, see? Go over and grab ‘em by their arm and pull ‘em in the shade. Well, they’d pass out during the night, and when the sun come up, why, it was too bad, see?
- DP: (laughs) Sure.
- RH: Oh, that’s some of the, some of the things I would say was a little bit exciting.
- DP: That’s right.
- RH: Yeah.
- DP: For sure.
- RH: Yeah. Most of these, uh, men that were really alcoholics, a, a quart a day was nothing,—
- DP: Oh yeah.
- RH: —quart a day, that, and some of ‘em would drink wine and beer, along with it, see?
- DP: Mm-hmm.
- RH: Well, then, something happened to an individual like that, it’s just a matter of, uh, hauling him away, and he didn’t come back again, see?
- DP: Mm-hmm.
- RH: Of course, they hauled them away a lot of times. We have a few now; right now, that are alcoholics that, uh,—
- DP: Is that right?
- RH: —every now and then, they go to the hospital and. Oh, I think, during—people like that, uh, uh, the intelligent amount is alright, see? But, uh, in excess of, uh, a quart a day, that’s—there’s, uh, bothering their health, see?
- DP: Mm-hmm. What would you account for the drinking problem? Were they just kind of bored at times and wanted to get away—
- RH: Well,—
- DP: —from it?

⁶³ The historic “Owl Café” (701 US-395, Randsburg, CA 93554), established in 1921 by Calvin Harrison “Slim” Riffle (1890–1978), pioneer, entrepreneur, and proprietor of multiple businesses in Randsburg.

- RH: —yeah. Here's what would happen, see? They would work all day, uh, say, the eight-hour shift, see? And a lot of 'em wouldn't even clean up. They'd be dirty and have sand in their ears and everything—
- DP: (laughs)
- RH: —they'd lined up to get a drink, see? And it—they'd bunch up, four or five of them. Well, I'd buy you one, and you'd buy me one, and the first thing you know, why,—
- DP: That's right.
- RH: —that's how it started, see?—
- DP: Okay.
- RH: —and in the meantime, old "Slim" Riffle⁶⁴ become a very rich man—
- DP: Mmm.
- RH: —because he'd run "The Owl" garage⁶⁵ and he'd also run "The Owl" saloon⁶⁶ and "The Owl" barber shop,⁶⁷ see,—
- DP: Right.
- RH: —so did out—he made out pretty good. Of course, now "Slim" is, uh, pretty old and not very well, and he's been going down to Mexico for treatment, see?
- DP: Mm-hmm.
- RH: I'd like to see him, uh, uh, make out but, uh, I don't know. I doubt it, see?—
- DP: Mm-hmm.
- RH: —Yeah. You have any more that I—
- DP: It's all real interesting. Um, how did you get the name "Hard Rock?"
- RH: Well, it's, it's funny thing out here if, uh, if you work at, uh, definite material and the people, uh, don't know your name or can't remember your real name they—
- DP: (unintelligible)

[00:50:11]

- RH: —they give you one, see? And, uh, the mere fact that all my work was in hard rock, see? All of the mechanical work, the assay works, everything was in that. So they christened me "Hard Rock."
- DP: Okay. (laughs) Mm-hmm.
- RH: Yeah, that's, uh, "Dry-wash Beck" over here. Why, he makes dry-washers, see?—
- DP: Okay.
- RH: —And he sold 'em for years, alright. Everybody said, well, Beck, who's he? Let's call him "Dry-wash."
- DP: (laughs) Mm-hmm.
- RH: (laughs) That's how those things happen.

⁶⁴ Calvin Harrison "Slim" Riffle (1890–1978), pioneer, entrepreneur, and proprietor of multiple businesses in Randsburg.

⁶⁵ Riffle owned a car dealership across the street from his saloon.

⁶⁶ The historic "Owl Café" (701 US-395, Randsburg, CA 93554).

⁶⁷ Riffle's saloon featured a barbershop as well.

- DP: Okay. Mm-hmm. That's neat. (pauses) I would like to, um, know what your feelings are about the mining in this area now? Do you feel that someday another big strike⁶⁸ might happen? Or do you have any idea?
- RH: Well, uh, the economy, as I told you before on this thing here—about how much a miner makes a day and how much his insurance is and how much the powder costs. Well, those are just incidentals, see? Uh, now, in the old days, in the underground mining here, it was pretty hard because they had 'em mine in the sense of protecting everybody underground without having timbers, twelve by twelves.⁶⁹ Can you imagine back in, uh, 1895, what it'd cost to bring a twelve by twelve from Los Angeles, see?—
- DP: Yikes!
- RH: —It'd be impossible, see? Now that is one thing, see? Right now, it's the same thing, see. Due to our inflation and the high costs of labor and money and everything. I wouldn't give you ten cents for all the mining in Red Mountain,—
- DP: —Johannesburg.—
- RH: —Johannesburg. (simultaneously) Yes. In other words, it'd be a struggle, uh, if you had something that was really good.
- DP: Okay. So, in other words, the minerals are here?
- RH: They're here, but you can't do anything due to the economy and the high wages and so on, see? See, it—it's just impossible. Now, there's a lot of people that is, uh, fooling around here see? But they're promoters. They're not people that are wanting to get in and bring the actual ore out and put it through a mill, process it in every sense, and get the money for the stockholders. They can't do it because of the expenses.—
- DP: Okay.
- RH: —It's an impossibility, yeah. Uh, now then, I, I—here's the answer to the thing. I find men around here now that are supposedly a company, I think they're a company, but they're a stockholding outfit that are trying to mine stuff that was thrown away fifty years ago, see?
- DP: Mm-hmm.
- RH: Now, if the wages they had then—they couldn't make that pay, how are they gonna do it now? See, doesn't it sound impossible?
- DP: Yes. Mm-hmm.
- RH: Yeah.
- DP: Sure does.
- RH: Good, see? Can't be. Anyone, anyone that has a knowledge of mining or engineering of any sense, they'll tell you the same thing that it's awfully hard, see? To make money when, when—it's the expenses are like they are now, see?
- DP: Mm-hmm.
- RH: Yeah. Now, I think I told you, forty dollars a miner gets. I think he gets more than that due to the union.
- DP: Probably so.

⁶⁸ Presumably a highly profitable discovery.

⁶⁹ Used for structural purposes to stabilize mine shafts.

- RH: They, they keep bumping it up see? Alright, the consequences that, uh, if I wanted a miner to do something for me, I couldn't go out and get one here in all of the three towns, see?
- DP: Mm-hmm.
- RH: Because anyone that is any good at mining has gone somewhere else, see?
- DP: Oh, I see.
- RH: They're going somewhere else to make a living, but they're not making it in mining because it's the same all over.
- DP: Mmm. That's too bad.
- RH: Yeah.
- DP: It really is.
- RH: It's a sorrowful thing, see, that here's all the stuff lying around out here, see?
- DP: Yeah.
- RH: I could go out, I know, I could go out, all I need is a helper, and I'd go out for two hours and, uh, picking it up right off the ground, I could have a, a nice amount of money, see.
- DP: Isn't that something.
- RH: There was a time—one time, another fellow and I went out. When we were out, two and a half to three hours, it was—and, uh, we picked five units. A unit is twenty pounds, see? Well, right now it's selling for around eighty dollars, see?—
- DP: Mmm.
- RH: —Somewhere around there, I don't know just what the market price is now, see, but there was a time that it was only five dollars a unit, and—
- DP: Mm-hmm.
- RH: —it went right on up. And it's gone up and kept going up, see?—
- DP: That's a lot of money.
- RH: —In fact, the market—if you, if you, uh, checked the market, why, you'd find out that it changes every day, see? It's like any other stock, market stocks.—
- DP: That's right.
- RH: —Yeah. This, uh, oh, I saw a time it was only five dollars a unit,—
- DP: Well, that's something.
- RH: —Yeah. Five dollars a unit was nothing to compared to now, see,—
- DP: Mm-hmm.
- RH: —but, at that time the school kids were rich. Yeah. They'd pick it up off the ground. They knew, they understand the weight, and they'd a feel of it, everything,—
- DP: Sure.
- RH: —they'd pick it up, and they'd sell it to these miners, huh,—
- DP: Mm-hmm.
- RH: —and they'd make money. A lot of them made money.—
- DP: Sure, they would.
- RH: —Yeah. Now, there's another very interesting story about the "Pit Man," see, there's a name for you, see,—
- DP: (laughs)

- RH: —which you wanna know about, see? And his real name was Alexander, see? Now, to every miner down at Atolia and all the leasers⁷⁰ and everything—he was a dope, see? He didn't know anything, see,—
- DP: (gasps)
- RH: —Well, I ran all the assays and all of the material, and I knew what each man made, see? Alright, our dope—who was the "Pit Man," see, and his real name Alexander—was making, in 1957, he was ma—(laughs) making seventeen to eighteen thousand a year.—
- DP: How about that?
- RH: —Yeah. All alone. Now he didn't use modern tools like a compressor, see? Or any of the things that're real modern—he used hand tools,—
- DP: How about that?
- RH: —all hand-picked. Well, he was what we call a real high grader, see? In fact, when I told you in the beginning of this program that, uh, I bought high-grade from some of the miners—well, he was a man I bought high grade from, so that we could boost up this material we were going to ship over 60 percent, see?—
- DP: Mmm. Is that right?
- RH: —Now, we'd have these sacks, and they were all ready and sealed and everything. And there was hundreds of them, see. Alright, a lot of 'em, a hundred pounds in each one, see? Well, they let everybody know that they were gonna ship the next day, well, no one would show up, see,—
- DP: Mmm.
- RH: —'cause all those sacks weighed a hundred pounds a piece, and they had to load them on the trucks. (both laugh) Oh, it's all interesting.—
- DP: Oh, it sure is.
- RH: —The company knew, if they let it out they were gonna have a shipment, that they wouldn't get a soul on the premises. (both laugh) Well, they could do it in those days, because they were the only people that, uh, could handle the material. Right now, if you handle mine, that was very rich, see—I, I mean immensely rich—you couldn't go out and get men enough to handle, that knew what they were doing. That's another thing on your question that answers why you shouldn't do it.
- DP: Yes.
- RH: Very few of them understand or know. In fact, if you walked up to a miner on the street anywhere in these towns here and say, "What's calcium tungstate?" They wouldn't know, see?
- DP: Isn't that something.
- RH: Yeah, that's right. (pauses) Finished (unintelligible) (pause in recording) Uh, just say, a rough idea. I was down at "The Owl" one night, that's "Slim's" place that I was telling you about, see? And there is a woman there that fell off of her stool,—
- DP: (laughs)

⁷⁰ Presumably meaning "lessees."

- RH: —and the fella next to me picked her up and took her out in his car and took her home, see?—
- DP: (laughs)
- RH: —Well, when he came back, he had two black eyes, see. Her husband was home, see? (both laugh) It'll give you an idea of some of these things, see? Now that's a mild one, see? (both laugh) Oh yeah, I mean—I don't know if I told you about the storm and "Slim" Riffle, the owner of "The Owl." See, there was a terrible storm outside and, uh, lightning and thunder, oh, a brutal thing, see? And everything was quiet after this big crash, and "Slim" says, "I guess I better shut that TV off," and he got about five feet in front of it, and the whole front blew out. See, lightning hit the antenna.—
- DP: Oh my goodness!
- RH: —Yeah, so, if he had touched that TV,—
- DP: —He would have,—
- RH: —yeah,—
- DP: —oh dear, the shock of his life, huh?

[01:00:04]

- RH: —yeah. He'd have, he'd have had it, see?
- DP: Oh my goodness.
- RH: Oh yeah, there is, oh, there is a, a lot of things that happened as I told you, uh, I, I don't care to tell them on here, because—
- DP: Mmm. Sure.
- RH: —I know a bunch of miners that would be awfully funny, see. (both laugh) Oh yeah, us, we had some accidents here due to mine, uh, leasers who failed to buy the proper materials like—(pauses) or stuff that holds the ceilings up.—
- DP: Mm-hmm.
- RH: —See, the ceiling of a mine is called the backs, see. It's another expression, see? Alright, it takes material, and some of them are twelve by twelves. Well, the twelve by twelves cost a lot of money, see? Especially if you have to ship it a hundred miles see? Alright, this boy went in there, and a piece come out of the backs—which is the ceiling—and flattened him out till he was only about two inches high, see?
- DP: How horrible.
- RH: Yeah, see.
- DP: How horrible.
- RH: Well, that's, uh, now, now the government has come in, and the state has also come in, and, uh, they've put a lot of these under restriction due to improper mining, see?—
- DP: That's right.
- RH: —So there'd be a big percentage down there that you couldn't mine, see, if you wanted to. You couldn't mine 'em legally, you could do it other ways, but not legally, see? You think we got it? (pause in recording)
- DP: (unintelligible) area. At one time were there just a lot more people here?—
- RH: —Oh yes, see. See, according to the, uh, estimate now, there's about three hundred people, but I would say that, uh, at, uh, one time there was thousands of them here,—
- DP: Right.

- RH: —uh, in other words, the—uh, everybody that was doing some mining had a partner, see? Or his helper was his partner, see. And there's quite a few houses around here, see. And, uh, oh, some of them has four or five people to, to a house because they didn't care much how they lived then, and a lot of them even slept on the floor. Just throw a mattress on the floor—
- DP: Is that right?
- RH: —and slept, see? And, uh, even now some of these houses, there, there is a shock if you go in. The way people live, see? In fact, these old buildings we didn't care to live in, that's why we live in this trailer, see?—
- DP: Mm-hmm.
- RH: —And I've had the trailer a long time, and I used it to go from one mine to another—
- DP: Mmm.
- RH: —during the employment, see. And, uh, it was decent living. It wasn't,—
- DP: Right.
- RH: —it was—started, uh, eight by thirty, and it's all dural metal,⁷¹ see.—
- DP: Mm-hmm.
- RH: —And, uh, right now—it, uh, was built in 1950, see. So, uh, it's, uh, what, twenty-six-years-old, see?
- DP: Mm-hmm.
- RH: —Right now, it's in pretty good shape. The mere fact that it's out here in the desert, see,—
- DP: Yes, it is.
- RH: —and, uh, you can start, you can clean it up, you start at one end and just eliminate, see, and everything goes out the door, see?—
- DP: That's right.
- RH: —Yeah, and, uh, far as moving, the reason I selected a trailer in the beginning was that, if you don't like your neighbors, you can—
- DP: (laughs)
- RH: —hook on and pull away. I've got that Chevy⁷² out there, see.—
- DP: —(both laugh) You could just go.
- RH: —Oh, as the neighbors are terrible, see?—
- DP: Oh, they are?
- RH: —Yeah, that's uh, that's the thing.—
- DP: Oh that's,—
- RH: —We just got over a siege year where, uh, we had neighbors that, uh, pretty hard to live with,—
- DP: —that's too bad,—
- RH: —two or three hundred feet away from them.
- DP: —that's too bad.
- RH: Yeah. Now the people that are moved there is pretty nice, see. At least they mind their own business, see?

⁷¹ Duralumin, age-hardenable aluminium-copper alloy.

⁷² Chevrolet, American automobile division of General Motors (GM).

- DP: Mm-hmm.
- RH: All, all these things that, uh, happened around here. Oh, there's troubles, there's, in the old days there was plenty of, uh, fighting, see.—
- DP: I'm sure.
- RH: —Of course we had, we never had any, uh, in—which you call a real constable, right, see,—
- DP: Mm-hmm.
- RH: —see, or a sheriff or anything, but now, uh, you can pick up the phone and call Barstow⁷³ or any one of those towns, and they, they send a sheriff right over.—
- DP: Mm-hmm.
- RH: —But local police or anything, we don't have here, see. And, uh, mere fact that it's government ground, uh, you're a squatter, see? Now, we have three buildings, and according to the law, we're allowed, when we buy this property, an acre and an eighth, see. So, we'll have three and three-quarters acres if they ever get to it, see.—
- DP: Mm-hmm.
- RH: —In fact, for a little town of three hundred people, why, uh, it's before Congress now to settle it since it's been so long.—
- DP: Is that right?
- RH: —Yeah. And course, uh, I would rather lease it from the government. Let it be government land, see. Then everything there remains just as it is, see? But, if we buy it, the county's gonna come out and condemn all these buildings.—
- DP: That's right.
- RH: —They're gonna say, "Each one has to have a cesspool."⁷⁴ Well, a cesspool, now, the cheapest one you can buy is about fifteen hundred dollars, see?—
- DP: My goodness.
- RH: —Right? Now I got one here that I built myself years ago but, uh, it's worked perfectly for, uh, oh, let's say fifteen years, see? But still, they won't pass that, they want me to put in a brand new one, see.—
- DP: How about that?
- RH: —It's ridiculous because I know how to treat 'em chemically, see,—
- DP: Mm-hmm. Sure.
- RH: —so that the thing will operate properly.—
- DP: Mmm.
- RH: —Now the average person around here don't, so they have to pay to have these people come and pump 'em out.—
- DP: That's right.
- RH: —Now I don't know if this is alright on there, but,—
- DP: It's interesting, sure.
- RH: —yeah, see. But that's some of the things that, uh, that happens around here, see. Now, up on the hill, there's a party up here, a man and his wife and their son, see. And they have nothing. They have kerosene lamps. They have to haul their water see.

⁷³ City in the southeastern part of the U.S. state of California.

⁷⁴ Underground container for raw sewage and household wastewater.

- DP: He was a miner?
- RH: No,—
- DP: Oh.
- RH: —no, he works for the water company, see,—
- DP: Mmm.
- RH: —and, uh, very nice people they are. But, that's one way, see. Now, we've been here, uh, well, I, I, I guess I've lived in that one since the thirties, and I've never paid a cent rent.—
- DP: Mm-hmm.
- RH: —We pay taxes, though. But the ridiculous part of it is, on the three buildings, the tax reads buildings and our land, and we don't own one square inch of land, see?
- DP: Isn't that, isn't that ridiculous? (both laugh)
- RH: Every one of them is that way, see,—
- DP: That's right.
- RH: —see?
- DP: So, you have enjoyed your work, haven't you?
- RH: Oh yeah.
- DP: All through the years, you wouldn't trade it for anything?
- RH: No, I wouldn't select any other profession. Uh, in fact, I quit all my flying to go into this—
- DP: Is that right?
- RH: —natural process, which is mining, see? And, uh, I would rather go and, uh, be a, an operating engineer on a mine than I would go back flying,—
- DP: Is that right?
- RH: —and I could go back flying, see. Although I'm pretty old now, I, uh, still maintain all my, uh—well, for instance, like this, see? I have perfect coordination, see,—
- DP: Mm-hmm.
- RH: —and do all of those things that a, that a, a left-hand man can do or a right-hand man can do, see.—
- DP: Mm-hmm.
- RH: —Fly left-handed or drive a car. Of course, anybody—they, they naturally come to that, driving left-handed and right-handed, but airplane's a different thing, see?—
- DP: Mm-hmm.
- RH: —'Cause the way they're built now—in the old days, the throttle was on the left side, but now their throttle is in the middle, see?
- DP: You flew during World War I, is that right?
- RH: Oh yeah, all through World War I,—
- DP: Okay.
- RH: —yeah. And, uh, course the aircraft, now, as you see, these up here. There's, uh, what they call a Fokker fighter⁷⁵ in World War I,—
- DP: Mm-hmm.

⁷⁵ Fokker D.VII, German World War I fighter aircraft.

- RH: —see,—
 DP: That's right.
 RH: —had a BMW⁷⁶ engine in one. Well, BMW is still operating today—they make motorcycles—and, this was a six-cylinder overhead valve engine. Richthofen,⁷⁷ see, German ace, flew that type of airplane, see.—
 DP: Mmm. Isn't that neat?
 RH: —Yeah. And, uh, all of these different ones. There's, uh, the S.E.5.⁷⁸ And, uh, SPAD⁷⁹ and, uh, Jenny.⁸⁰ So, Jenny was a train—a training plane, JN4.⁸¹ That had Curtiss⁸² eight-cylinder engine. In fact, just like you're having an eight-cylinder engine in a car now. There's no difference in them. Only that these were overhead valves, and they were out in the open. Now, if they have overhead valves they're all covered with a sort of metal cover to keep the lubrication inside, stuff like that, see? But the old Curtiss engine in the Jenny—which was this one there by that old hangar, see,—
 DP: Mm-hmm.
 RH: —and there's here, on my seventy-fifth birthday,—
 DP: (giggles) That's cute.
 RH: —one of the boys drew a picture of a Jenny with me in it see?
 DP: (laughs) Isn't that cute?

[01:10:06]

- RH: Yeah.
 DP: So that is what you flew then?
 RH: Yeah, I, I flew Jennys and, uh, S.E.5.s and, uh, SPADs and Nieuports,⁸³ and all those old timers, yeah.
 DP: I do have a question. I was wondering, then, you did do some of your, um, mineral work in—during the war years?
 RH: Oh yes,—
 DP: —Okay,—
 RH: —yes, (talking over each other) I was always interested in mineralogy.—
 DP: —you flew, you flew, and then, yet, you did like work in a lab, too.—
 RH: —Oh yes. The geology and the mineralogy was an interesting factor to me, see?—
 DP: —And in the war, they really needed that, of course, too, didn't they?—
 RH: —Well, yes,—
 DP: —The information—

⁷⁶ Abbreviation, meaning "Bayerische Motoren Werke."

⁷⁷ Manfred von Richthofen (1892–1918), German World War I fighter pilot.

⁷⁸ Royal Aircraft Factory S.E.5, British World War I biplane fighter aircraft.

⁷⁹ S[ociété] P[our L'] A[viation et ses] D[érivés] S.XIII, French World War I biplane fighter aircraft.

⁸⁰ Curtiss JB "Jenny," American series of biplane fighter aircraft (1915–1927).

⁸¹ America's most famous World War I aircraft.

⁸² Curtiss Aeroplane and Motor Company (1909–1929).

⁸³ French World War I fighter aircraft.

- RH: —in the war, uh, all of the strategic minerals. Ah yes, strategic mineral is those minerals that is not gold or silver or diamonds or anything like that. Something that you can use in the production of aircraft or tanks or something like that, see? Now, scheelite, which is a tungstic acid that we were talking about down here, is one of the prime things. Tungsten, see? In fact, uh, there's one thing that I missed, uh. With one outfit that I worked for down here. Uh, when we had, uh, a low steel market—in other words, the price of steel was very low. We used to take those six-hundred-pound, six-hundred-and-six-pound sacks that I was telling you about, and put 'em down the hole in number one mine on the six-hundred level, see? Then, when the market price of steel went up, they'd bring 'em out and sell 'em, see, —
- DP: Mm-hmm.
- RH: —which was a clever idea for those people,—
- DP: Yes, it was.
- RH: —because, uh, they were very rich, and they had plenty of money, and they, they would store this stuff down there, and they could bring it out when the market was right. Which is a crazy thing in a lot of people's ideas, but they didn't realize that those people had plenty of money down there. Well, the one outfit I worked for was three young fellas. And we, we took out—each one of 'em had a million dollars when they left there, see?—
- DP: My goodness.
- RH: —They took out three million dollars, see? With tax paid and everything, see?
- DP: Wow.
- RH: Sounds ridiculous, but—to look at that place down there now with all the buildings collapsed and everything's neglected, see?—
- DP: Mm-hmm.
- RH: —In other words, the man that has it now could, uh, maintain a, a crew of say, oh, once a week for—every month, see, to keep that place in first-class shape, see? Get, uh—at least keep the roofs on the buildings instead of letting them blow off, see. 'Cause all of this stuff is very expensive, see,—
- DP: I see.
- RH: —especially when you have to haul it a hundred miles. San Bernardino, see? Los Angeles is ridiculous. They don't even think of going there, see? Bakersfield⁸⁴ and San Bernardino is the supply point, see, for this area.
- DP: So, the main product or mineral here is tungsten, right?
- RH: I would say "yes." I would forget all about the gold and silver, see. Because the Kelly Mine,⁸⁵ just a little south of here, (recorder noise) was operated years ago and, uh, they got shy on ore. Now when they started this mine, it was a gold mine, and after they got down a ways, it turned to a silver mine, which changed all of their e—equipment, see?
- DP: Mm-hmm.

⁸⁴ City in the south-central part of the U.S. state of California.

⁸⁵ A.k.a. California Rand Silver Mine, south of Red Mountain, established c. 1919.

- RH: Well, they worked the thing down to where it was, uh, what they thought was more ore, see? Well, they went out, here, to the northeast and they put a, you see, a big mining dump up here east of here?
- DP: Yes.
- RH: You see one out over here, and you see one back over here. Well, they were looking for an extension to the Kelly Mine, see? Well, there were no extension,—
- DP: Mm-hmm.
- RH: —see, it wasn't possible, uh, to locate anything that was ore, see. Well, in my estimation, what really happened, they failed to get down more,—
- DP: Oh.
- RH: —see, mine, mine went down instead of elongating, yeah? That was, uh, what happened to that—
- DP: Mm-hmm.
- RH: —beautiful silver that'd come out of there,—
- DP: Mm-hmm.
- RH: —see, plenty of it, see? In fact, I would say that the Kelly and the adjacent mines that were associated with the Kelly was built better than the Yellow Aster.—
- DP: Is that right?
- RH: —Yeah, being silver. And silver didn't have the price of gold then, just 'cause, in the old days gold was twenty dollars and sixty-seven cents an ounce. Then it went to thirty-five dollars. Yeah. Now it's ridiculous. It's controlled by the stock market.
- DP: Mm-hmm. (pauses) Well, this has been extremely interesting, and do you have anything else that you're just burning to tell about, or anything else you'd really like to share?
- RH: Oh, I don't know, I'd have to have some starter, see.
- DP: Yeah, I think that, um, we've covered most everything you wanted to and I wanted to, I think.
- RH: Yeah, well, here's the thing: if you, uh, uh, read this over and, uh, there's something else you want us to put in, why—(recording stops).

[01:15:59]

END OF INTERVIEW

END OF INTERVIEW