

CHAPTER XII.

THE ALBEMARLE MAN-KILLER

Underground work was more familiar to me than mill work, because of my experience in the mines at Kelly. Taking over the Lone Star was like returning to a first love. It brought me, however, against an old, old conflict, — the young man with a technical education in a position of authority over older men of wider experience.

With the mine job I inherited a foreman by the name of Tom Flynn. Tom was of the old school. He knew the practical end of mining very well, but he viewed me and my "book learning" with some distrust. In talking over the problems of the mine, however, we were in agreement on one thing. The lowest level of the mine and the level just above it should be connected by means of a raise and a winze. The connection thus made would serve two purposes, furnishing needed ventilation for the lower level and at the same time providing an ore chute.

The levels to be connected were very crooked. In making the transit survey of the proposed connection, I had to triangulate on the surface around some ore bins. I spotted the points on the levels where the raise and winze were to begin, both nearly vertical.

There was a distance of 120 feet between the two levels when Tom started the work. As the raise and winze advanced to a point about twenty-five feet apart we could hear the sound of drills and hammers from the opposite faces through the intervening rock. It sounded very much as if we were not going to connect. Tom came to me one

day with a frown: "I've been sounding the raise and winze."

"What do you think is wrong about it?"

"I think your survey is off a mile."

As it was my first underground connection, I was uneasy myself. I made a resurvey and found my notes checked perfectly. I went to Tom and told him I was standing pat.

"OK", he shrugged, "You're the boss."

He started to walk away, but turned back with a grin and said, "Bet you a month's salary your survey is off at least twenty feet." I told him that I did not want his money. I had an explanation in mind which I was positive accounted for the sounds that convinced Tom we were not going to connect.

Not long afterward the miners holed through and the connection was made within a tenth of a foot. In other words our centers were off a little over an inch. Tom scratched his head.

"How do you account for the sound fooling us like that?" he wanted to know. I told him I thought a slip, or fracture in the formation, was serving as a cross-carrier of sound, thereby making all of us unnecessarily nervous.

I never had any more trouble with Tom's distrust of my "book learning." He became a staunch friend and supporter in all our work, helping me on more than one occasion with things outside the Lone Star Mine.

One day two prominent men came to Bland, W. S. Strickler, an Albuquerque banker, and J. D. Dort, president of the Dort Carriage Company of Flint, Michigan. They visited my office and asked if I were available to make a preliminary examination and

report on a mine adjoining the Lone Star, known as the "Washington". I told them I would be glad to make an examination, provided my employer, Mr. McFarlane, had no objections. McFarlane was just in from Chicago. I put the question up to him without delay.

"Did you ever make a mine examination and report, for a fee?" he asked me.

"No," I said. "To tell the truth, I never did."

"Well, then, why the hell don't you go and do it?"

I thanked Mr. McFarlane, made arrangements with Mr. Dort, as to the fee, and they left the following morning on the stage for Albuquerque. I called on Tom Flynn for assistance, the night foreman taking his place that day in the mine. It required the two of us only one day to sample the ore reserves in the Washington mine. While the Lone Star and the Washington were on the same vein system, the ore bodies were not alike. Shipping ore had been extracted, leaving low-grade bodies scattered throughout the stopes. We sampled them as representatively as possible, sealed the sacks in the stopes and kept them under observation throughout the day, particularly when the mine watchman was around. I knew then, as I know now, that the greatest danger of misrepresentation in a mine examination report lies in the risk of being "salted" - having your samples or your assay process tampered with by someone interested in having you report higher values than actually exist, possibly for the purpose of fleecing stockholders. I assayed the samples personally the next day in the mill laboratory, wrote the report and mailed it.

Shortly afterward I made the acquaintance of a mining engineer who gained my immediate respect. His name was Cary Wright, and he came to Bland from New York to examine another property adjoining the Lone Star on the east, known as the Iron King. When he had completed the underground inspection of this property, he came over and asked me to

go through our workings. I took him through myself, and also through our mill, where it happened the foreman was melting bullion from a cleanup and was about to pour the molten metal into a mould, as Mr. Wright and I passed by. We stopped to watch. Silver predominated in the bullion by weight, and there was a tendency of the surface of a hot pour to "sprout" during the cooling process, caused by rapid oxidation. In this particular case it happened there was an insufficient amount of flux to cover the bullion, and sprouting started. Quick as a flash Mr. Wright grasped the ^{wooden} box lid, laying it on top of the hot mould. I realized that by this simple expedient he had arrested the sprouting, the oxygen from the air being excluded, and at the same time the charring of the underside of the box cover consuming the oxygen already present in the space between the lid and the bullion.

That meeting was the beginning of a lifelong friendship between Cary Wright and myself. His specialty, strangely enough, was gems. At one time he was connected with Tiffany's of New York as a scout and appraiser of all kinds of precious stones. He knew diamonds so well that when blindfolded he could pick them out, cut or uncut, from all other types of stones, merely by feeling them. He would never tell me how he managed to do this, other than to give credit to a sensitive touch. He used the trick to mystify his friends. Years later I read somewhere that the diamond, by reason of its density, has a peculiar coldness which a sensitive touch can detect.

While I was working for the McFarlanes my personal arrangements took a turn for the better. I had been corresponding with my sister ~~Maria~~, who had just finished ^{together} a course in teaching at Stanford, and I was able to secure for her a position in the local school. We had not been together since the fire drove us out of our house at Palo Alto. We set up housekeeping in a little cottage at Bland and it was a comfort

to me to have her companionship and sisterly counsel. After six months, however, she obtained a scholarship in the Oread Institute of Domestic Science at Worcester, Massachusetts, where she attended for a year and finished at Teacher's College, Columbia University, New York, thus preparing herself for a long and successful career of teaching domestic science in both Massachusetts and California.

The rivalry for control of the Bland mining field was nearing a crisis. The elder McFarlane told me the Albemarle Company had approached him in regard to purchasing the Lone Star Mine and the Bland Mill, and asked what I thought of it. McFarlane was a builder of express wagons and similar vehicles at Chicago. He furnished Wells Fargo with most of their wagons used all over the United States. He was a shrewd Scotchman and he liked the mining game, but his business in Chicago seemed to be suffering while he and his son devoted their time and energies to their New Mexico mining interests. It seemed to me Mr. McFarlane was up against a choice of one business or the other, and I asked him if he had considered selling out at a price that would yield a fair profit on his investments in Bland. His answer, (being a Scotchman) was non-committal.

Following this interview, I had a visit from the general superintendent of the Albemarle interests, F. Milton Johnson. He wanted me to take the job of superintending their 500-ton dry crushing mill and cyanide plant. I could not see my way clear to accept the offer because of my relations with the McFarlane crowd. Eventually I learned that McFarlane had set a price on his Bland interests, - a price too steep for the Cochiti people to meet, and there was a deadlock. McFarlane finally weakened upon learning that the Cochiti Company had purchased minority shares in both ^{his} the Bland Mill and the Lone Star Mine and therefore had a voice in his company affairs. I had told him of Johnson's offer to me

He called me in.

"You might as well take that Cochiti proposition," he said. "I have decided to accept their offer and sell out. Good luck to you. You may need it." We grinned and shook hands.

I knew very well that I would need all the luck on the Albemarle job that anybody could wish me. In the mining camps and in town it was common talk about what a man-killing place the Albemarle mill had become. As I accompanied my affects over the hill to the Albemarle camp I could smell hydrocyanic acid gas fully a mile down the cañon, and upon coming to the mill a cloud of dust could be seen pouring out of the top while the smell of the gas was nauseating.

I took time to give the plant a thorough inspection. The gas problem was strictly chemical. There was an excess of free hydrocyanic fumes which not only fouled the mill solutions but circulated freely in the mill atmosphere and was slow poison to the employees, who looked thin and wretched. It was caused by latent acidity in the ore which could not be readily neutralized and so attacked the potassium cyanide in the leaching tanks.

The dust problem was entirely due to dry crushing of the ore. From the mine cars the ore passed through primary and secondary rock breakers, thence to a cylindrical dryer and from there into both narrow and broadtire high speed rolls which crushed to approximately twenty mesh. From the rolls the material was elevated to revolving trommels (screens), the undersize particles going to bins beneath and the oversize into steep launders (troughs), which carried the ore stream back to the dryer, thence to the rolls again for further pulverizing. Each step contributed its quota of fine ore dust to the atmosphere, so that in addition to hydrocyanic poisoning, the mill help was subjected to danger from the dread silicosis.

Dry crushing had not been extensively used up to 1900 for cyanidization and there were but few precedents to govern that type of mill. But the Albemarle Mill had been designed and built by one of the well known mine and mill machinery houses of Denver, was enclosed in steel buildings, and, with machinery, represented an investment of about a million dollars. It was strictly a case of using the machinery and chemical methods at hand with as few modifications as possible in order to avoid collapse of the venture. Two mill men had failed with the chemical problems before I appeared on the scene, devoting all their time to it. Considering the dust problem of secondary importance they had left that to shift for itself.

Since the mine laboratory was some distance from the mill much time had been lost in running back and forth for tests. My first step was to order a complete inorganic chemical outfit from a supply house at Denver. In the precipitation room there was some unused space which I partitioned off into a two-room laboratory ready to receive the chemical equipment as soon as it arrived. I put the foreman of the crushing department to work on the dust problem and told him where to get some information on how the problem had been solved in other mills. He sent a man to Colorado City, near Manitou, where dry crushing mills were working on Cripple Creek ore.

Trouble seems to breed trouble. Additional responsibilities kept pouring on me as I became immersed in the work of solving that chemical problem. Immediately after McFarlane sold his control in the Lone Star Co. and the Bland Mill Company, a new subsidiary company was formed by the purchasers, my employers, to handle it. They named it the Navaho Gold Mining Company, with headquarters at Boston, and put me in charge as manager, with orders to begin a comprehensive development program. Part of my salary was to be paid in stock of the Navaho company.

My superiors had projected a long cross-cut tunnel to intersect the Lone Star vein about 200 feet below its then lowest level. I drew their attention to the fact that inasmuch as exploration had gone only thirty feet below the lowest level, of the Lone Star, they were taking a long shot and might not strike the ore shoot at all. They countered with the argument that the tunnel would serve two purposes and was worth driving on account of either one. It would provide first a drainage tunnel and second a working tunnel if ore were found. Actually they were just rationalizing, for a drainage tunnel would be useless unless ore were found; but they ^{had} convinced themselves and almost convinced me that it was impossible not to find ore there.

The proposed tunnel was to be about 1,000 feet long from portal to intersection of the vein, and absolutely straight; eight feet high and ten feet wide. A covered drain ditch was to run through the center on a grade of half of one percent. A double track of eighteen inch gauge was to parallel the drain, one track on each side, using twenty-pound rails, so that loaded trains could run down one track by gravity while trains of empties were being hauled up the other track by mules.

That tunnel was a beautiful job and a bitter disappointment. No payable ore at all was found at the intersection of the vein. It was a barren vein filling and showed a heavy leaching action. It had that "hungry" and "dead" appearance which anyone familiar with payable ore soon learns. I drifted on the vein both ways (following the vein matter with tunnels) and still no commercial ore was found, - most disconcerting to all parties!

The question was, what had become of the ore shoot so well defined in the level 200 feet above? Inasmuch as geological theory was that of leaching, (the values leached out by hydro-thermal agencies) it was also reasonable that a precipitation of values would be found at water level. Many ore bodies have barren zones, the values reappearing at lower horizons. We decided to raise and sink on that barren material and ascertain the facts. First we put in the raise and found that payable ore extended less than

fifty feet below the lowest level driven by the old Lode Star Company, the rest being barren. Now what would the winze show?

Back at the Albenarle the gas was getting in its work on us collectively. Most of the mill employees broke out in large sores over their arms, legs and bodies. With me it attacked my alimentary canal, resulting in an acute case of gastritis. I could not digest what I ate, and my weight went down from 175 pounds to 145. Hydrogen peroxide was used freely on an antidote by all of us, but without appreciative results. At that time there was precious little medical lore on the subject of antidotes for poisoning from potassium cyanide, and its derivative, hydrocyanic acid gas. Potassium cyanide was feared generally as one of the quickest-acting of poisons on victims who swallowed either the salt or a solution from it.

Moreover, at that time there was very little published on the subject of hydrocyanic acid gas evolution from potassium cyanide mill solutions, with the exception of a method of testing for the acid in solutions which I found in the appendix of a volume of "Fuhrman's Methods of Assaying", just then off the press. The test was based upon converting the hydrocyanic acid back to potassium cyanide by means of potassium carbonate. I had been using this test for several weeks and had all the sources of the gas in the mill located. I knew the character of ore coming from the mine and which of it had the highest degree of latent acidity. I was about to enlist the cooperation of the mine superintendent to keep that kind of a ore out of the mill, which would eliminate some of the gas, but not all of it. As that class of ore was the richest coming from the mine, I had to abandon that line entirely.

I had also developed a series of curves from the various sump and stock tanks to see what they would reveal in high and low percentages, but got no where in particular.

During this period I had a number of laboratory leaching and agitating tests under way to see what minimum sized mesh could be used in the mill

without causing the solutions to channel in the leaching tanks. I felt that finer grinding and agitating of the pulp, instead of leaching, might do the trick. That meant, however, abandoning the McArthur-Forrest system which we were then using for the new development, whatever it might be. The financial loss in equipment was too big, so that plan went overboard. It is a fact, however, that I was on the right track there, as finer grinding has in the meantime cured all, or nearly all the woes of the mill man in the early development of cyanidation of gold-silver ores where the values were locked up in refractory combinations, either with or without latent acidity.

The miners and mill men at the Albermarle camp were good workmen when on duty, but liked to whoop it up at night in the saloons, finally becoming such a nuisance and menace, that we were informed we must have a justice of the peace appointed at the camp. Over my vigorous protest, that turned out to be me. I claimed I was much too busy to take over the work, but my protest accomplished nothing. I expected to have some run-ins with the boys, but strange to say, as soon as it became known that the camp had an officer of the law, the offenders quieted down and no action had to be taken. The fact that the law was there was enough.

The death of a barber caused me a lot of trouble. He appointed me, in his last moments, administrator of his "estate". He had a small cash account and a bit of real estate at Albermarle and Bland. Relatives in the East were convinced the deceased was a millionaire mining man and were not content with my appraisal of his personal effects. To many he was the rich uncle whose death they had been waiting for, and they caused all manner of trouble. Finally in disgust I told the probate judge at Albuquerque that I did not want to be bothered with the administration any longer. Thereupon he relieved me and appointed a successor who soon got his fill of trouble from the heirs.

One morning a young man came around to see me with his girl. They wanted to get married. I suggested they go over to Bland and have Judge Young tie the knot. The young man said no, he wanted me to do it.

"Go over to Judge Young," I told him. "I don't know the ceremony and don't want to botch up your romance."

"Don't you know, Judge, that I can force you to marry me?" was his reply, still holding the hand of his betrothed. I became a little annoyed.

"Young man, I am the law in the camp, and if there is any forcing to be done, I shall likely be doing it! Now go over to Bland." I went back to my chemistry and the young man and his girl went to Judge Young.

It is peculiar how simple a problem can become in retrospect. While I was testing a solution from one of the stock tanks in the Albemarle mill, the thought came to me: Now, if I can convert this hydrocyanic acid back into potassium cyanide in the laboratory, why can I not do it in the mill and thereby eliminate the gas? The thought was simple enough. The question was, would it work?

In the laboratory the conversion from hydrocyanic acid to potassium cyanide was accomplished (as stated) by using potassium carbonate. We had a barrel of pearlash in the warehouse and I sent for it without saying anything to anybody about what I intended to do. I dumped a weighed amount of the commercial potassium carbonate into the screen above the tank over which the pumped solution from the zinc boxes was flowing. After it had dissolved completely and was well mixed in the tank, I took a sample and tested it for gas. Not a trace of hydrocyanic acid was present!

I was jubilant and continued the experiment, still saying nothing to anyone about what I was doing. The solutions continued to be free from gas and the atmosphere of the mill cleared. It became noticeable to all of us. The Superintendent was elated. Mr. Coram was just in from

Boston and came to the mill to share in our delight. I showed them all my experimental results and how simple the solution was, after all the more difficult paths had been trod. Truly the simple things in life are the hardest to find.

The dust problem was solved also. At Colorado City our representative found exhaust fans at each machine, which we duplicated in our mill flow-sheet. The dust was conveyed through conduits to a settler. There it was received in bins and carefully redistributed in the leaching tanks where the contained gold-silver values were dissolved by the cyanide solution in the tanks. We used this system with success.

My stomach was giving me a great deal of trouble from hyperacidity and indigestion. Although the source of the trouble had been removed, my physical condition did not seem to clear up and I could not get back my lost weight. I applied for a leave of absence from the company and it was duly granted. One of my Stanford friends, Jack Rice, was called in to carry on the work of sinking the winze under the old Lone Star workings for the Navaho company, in search of pay ore at water level.

I went to the Jemez Mountains, west of the Cochiti district. It was my first real vacation since I had started in as tool nipper in the Kelly mine some fifteen years previously; the first undisturbed opportunity to indulge in introspection. I was not pleased with the results of a little quiet thinking. I found myself on the wrong track. I thought of the lesson H. Huber gave me on the fallacy of driving cross-cut tunnels without knowing what was ahead, the lesson that I was never going to forget. And here I was, almost at the beginning of my career, drawn into driving an unproductive cross-cut. And I a stockholder in the company at that!

Jack Rice put his winze down some 300 feet without striking ore. He did, however, strike a heavy flow of water, which he battled for weeks, putting in additional pumps and more boilers outside to furnish steam

until the winze was almost filled with sinking pumps and pipes. Finally he succeeded in getting one round of holes below the water level, loaded them with dynamite and fired them with an electric battery. The blast brought up only one chunk of good ore, all the rest being muck and waste similar to that on which the winze had been sunk, and like the valueless material on which I had drifted above the winze.

The one piece of ore did not seem sufficient evidence for the company to believe an enrichment had been encountered below the flow of water. Since it meant a working shaft to go deeper, heavier pumps, and greater steam and compressed air capacity, all running into large sums of money, the company finally decided to abandon the winze and close down the mine.

Not long after that the Albemarle was considered worked out. The mine was moved away and the entire district abandoned. That brought me back face to face with the problem of getting a new job.

As I was a stockholder in the Navaho company I received from time to time reports covering the annual meetings of the company showing the treasurer's cash balance, gradually dwindling from year to year until a liquidation of the property was authorized by the board of directors. The stockholders received only a few cents on the dollar per share at the windup. That is the inside story of the Nevaho Gold Mining Company, listed on the Boston Stock Exchange forty-odd years ago.

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V.V. Clark,
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