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"STARTING AT THE BOTTOM IN NEVADA'S RIO TINTO"

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At the end of my sophomore year at the Mackay School of Mines, at the University of Nevada, the time in my education had come for me to acquire practical mining knowledge. This was made evident by the facts, first that our mining course required a summer's work in actual mining, and second, a personal financial recession was evident.

A benefactor of the School, Mr. S. Frank Hunt, had met success at the Rio Tinto Copper Mine, Mountain City, Nevada. His success, and a gracious foundation gift to our School, made me curious as to the origin of the source of wealth that made this possible, and so Mountain City was my goal.

Correspondence with the personnel department of the mine proved discouraging, as hiring was scarce, and advice was negative as to rustling at the property.

Having already secured the promise of gratis transportation to within 90 miles of the property, and having my curiosity whetted rather than squelched by the unfavorable correspondence returns, I decided to satisfy myself by at least having a look at this sensational mine of which I had heard so much.

My "hitch hikers" tour took me across the State to Elko, Nevada, which is in the northeastern corner of Nevada.

about 90 miles south of Mountain City and the Idaho boundary. Being from California, the desert country, consisting chiefly of cattle range, peopled with jack rabbits and covered with sage, interested me greatly.

From Elko the mail truck was the only means of transportation to the mine that I could find, so I promptly procured the right to a corner of the truck, where I might ride with the rest of the parcel post, for the 90 mile journey. The ride cost me $5.00 and many a bump, for the road was rough and rutted.

Having never before traveled in a mining country, and having ample time to observe, I was greatly impressed by the abandoned tunnels, shafts, trenches, and pits that were promiscuously scattered over the hillsides.

The truck stopped at a junction of two desert roads, during the middle of the very warm afternoon, and I was informed by the truck driver, that by following a long winding, steep, graded road, off to the left, I would find the mine at its end. Incidentally, this was the third driver that had inquired into my entire history during the trip, for I had changed trucks and drivers at the post office of both Tuscarora, a ghost mining camp, and Deep Creek, a ranching community.

Thanking the driver for his information, I shouldered my sleeping bag, and started up the long dusty grade, very

warm, and covered with desert dust, but feeling like a typical pioneer "hard rock miner". I had that exhuberance taken out of me, however, long before I covered the 5 miles to the mine.

Applying at the time checker's window, I was informed that one, "Red" Stephens, did the hiring and firing for the mine. Having found Mr. Stephens the next day, all optimistic I asked for work, giving my verbal reference,---Mackay School of Mines.

Mr. Stephens, a big friendly looking man, asked me what I wanted to do. Being very "green", and thinking a "Mucker" was a crude slang term, I replied, "I would like to work as a laborer".

The next day I found myself digging a sewer ditch along side the hot dusty road that I had wearily traveled the day before.

That night, rather timidly, I again approached Mr. Stephens, asking to be given work underground.

Two days later I was again in the "office of employment", receiving instructions as follows: be at the shaft at 6:00 P. M.; report to Roy O'Brien; work with Bill Crabchman as mucker; purchase a hard boiled hat, hard toed boots, carbide lamp and gloves; get a credit check to make purchases; go to the bunkhouse and get some sleep,---night shift!

Nine men to a cage, lights out, we were lowered to the 300 foot level. This was the first time that I had been lowered down a shaft into a mine. I felt as insignificant as a single atom, being engulfed by the very earth upon which I had stood a minute before. I felt panic and fear, but as four husky miners pressed on each side, I stood just as I was, counting the impulses of the cage and guide rails. As I wondered where the bottom was, there came a slowing down of the cage, lights flashed on, and a hasty exit of us all from the cage ensued. Carbide lamps were "popping" into action around me. I followed suit by "popping" my lamp into action too. The immediate report and light was gratifying. I was glad I had practiced lighting my "Justrite" earlier in the day. Feeling much like a small gangling pup, I faithfully followed at my guide's heels, along a narrow tunnel, better termed a drift. I felt very awkward and rather out of place and had all I could do to keep up with my master. I was not used to the illumination emanating from the carbide lamp on top of my hard boiled hat, and the narrow drift, low headroom, track and track ties, and uneven ground, all of which I could not see plainly, were doing their best to trip me and make me look, in the eyes of the seasoned crew, as new as I really was.

Having gathered tools along the way from the "dog House" we started up the vertical ladders into a stope.

The mine by this time had grown in size, to me comparable to an underground city of the Book of Oz, fairyland type.

During the ascending, I, of course, removed the hair from the back of my hand with my carbide lamp. I sensed the danger of falling, but the noise of the other miners and muckers ascending beneath me, quelled the latter fears.

Upon arriving at our destination "Big Bill", the miner I was assigned to work with, handed me a shovel better known as a "muck stick", and set me to work on a pile of rock, warning me to keep under the timbered roof, while he proceeded to tap the walls.

Joining me a little later, Bill started the task of acquainting me with the mine, mining methods, and what I was supposed to be doing there.

We were working in high grade copper sulphide ore. The muck is very heavy; that obvious conclusion I reached after mucking the 40% copper ore a very short time.

Bill explained that we were working in what was known as a stope. Gradually I comprehended that in this stope square set timbering was being used. This type of timbering acquired its characteristic name from its square shaped units used on each floor, to fill the voids left by the extraction of the ore. To me the nearest analogy of the square set method of timbering is the bee hive.

The drilling, according to my partner, was accomplished with jackhamers. These drilling machines are the lightest of their type, weighing about 25 pounds, and held to the face physically, by nestling the machine against the pit of the stomach, directing the steel with outstretched arms, and vibrating sympathetically with the hammer, like the chassis of a model T Ford and its engine. On bottom holes, lifters, the jackhamer is pushed with the feet, "rode", along a piece of lagging laid on the floor.

A "round", or an advance of one set, is put in per shift. The miner drills the round, while the mucker clears away the "muck" or broken rock, from the previous shift. Before blasting, the miner and the mucker erect a square set in the space made by the previous blasting. I soon found out that the miner's round normally consisted of nine holes, three top holes, three breast holes, and three lifters, to a depth of approximately 5 feet.

My job was to start in the first part of the shift to move as much muck as possible into the chute, either by shoveling directly, or by the aid of a wheel barrow, or if still further away, by using a mine car, with the distance from the muck pile to the chute being the determining factor. In the mean time, the miner would be picking down loose rock from the blasted face, for safety purposes, and to make room

to stand the new set. When sufficient room had been made by the miner for the set, I would join him, and we would hoist the required timber from the main haulage drift below, which would consist of one post, one cap, and one girt., and a fair supply of lagging. Together we would put the square set in place, block it tight, and lag the sides to prevent possible pieces of ore from breaking loose and possibly injuring anyone in the stope. I would then return to my muck pile, while Bill drilled the next round, loaded the holes with blasting powder, and connected the proper wires for blasting. Upon leaving the stope at the end of the shift, final wires were connected and fuses put into place. Actual blasting of the prepared face was done from the main level drift. No blasting was done until all of the men were accounted for on the shaft station. Each miner would then place his individual fuse in place and blast the face that he prepared.

After a few days at the task of "making good" at my job, which consisted essentially of moving about 25 tons of broken ore, I could take time to watch my partners work and become familiar with his duties. Gradually I became acquainted with the manner and reasons for a thorough picking down of the loose rock on the exposed faces before working directly in front of, or below them. This was indelibly impressed on me after visiting some of the fellows in the hospital, that I had worked with the day before, who were careless in this respect. The majority of the accidents that occurred while I was working in the mine, were caused by relatively small

pieces of rock breaking loose and falling from the roof or faces. The extremely high specific gravity of this black ore made it quite dangerous, by virtue of its kinetic energy.

Gradually I became acquainted with operating a jack-hamer, and often Bill allowed me to drill the entire round, under his supervision and direction. I learned how to hold the dynamic drilling creature, to adjust its supply of water so as to drill a clean hole without getting the drill stuck and how to scoop and blow the hole clean after drilling was completed. Later I had the thrill of placing the electric cap in the powder, splitting the sticks, and loading the holes with this 40% powder, subsequently tamping the explosive home with a wooden ram rod. This placing of the delays, and the wiring, was always checked by the miner before leaving the stope at the end of the shift.

As the stope was advanced upward, the lower square sets were filled in with waste rock. The purpose is to insure the future safety of the mine. This is accomplished by leaving one or two square sets on each level open, and linking them with heavy logging, thus forming chutes, down which waste rock can easily be dropped to the lower sets, ready to be filled. Another chute is left open down to the level, for the purpose of removing ore from the stopes to the level below. This chute is offset at intervals, to break the otherwise long continuous fall of the ore.

All of the timbers used in the mine are framed on the surface. Each seperate stope extended approximately 25 to 30 feet along the strike of the vein, and from wall to wall across the vein, being at times over 50 feet wide, and upward 100 feet from level to level. Between stopes pillers of ore are left that will be mined in the future.

For a couple of weeks time I was shifted to a development drive, leading from the end of the main level drift. This work was somewhat more difficult, as the muck was wet; there was inadequate elbow room; and dripping water from the top legging was annoying.

The drilling was done with a drifter, mounted on a vertical column, and during drilling I would assist the miner to handle the machine.

The timbering, when necessary, were drift sets, each consisting of 2 posts and a cap, with 2 spreaders reaching back to the previous set. The top and sides of the drift were lagged, and often we spiled the roof beyond the last set, to protect us while working at the face of the drift.

Another slightly different assignment which I was placed on, was being sent with a miner, to check the entire air and water pipe system in the mine for leaks and loose connections. This was very interesting to me, as it gave me an opportunity to travel over the entire underground workings, and to observe carefully enough to retrace my steps, as the magnitude of the workings amazed and confused me very much.

Once a shift, the chief engineer, Mr. Lofquist, the assistant engineer, Mr. Stephens, and the shifter, Mr. O'Brien, made a tour of inspection of the mine. On these daily trips each one of the working men in the mine was given a friendly salutation, and often a brief conversation ensued. At one of these meetings Mr. Lofquist asked me to come to his office at some convenient time. Upon changing to night shift for the second time, my days were left free, so I went to see the boss.

Mr. Lofquist showed me a letter from the Mackay School of Mines, asking that samples of the ore and minerals be sent to the School for museum display purposes. He told me that if I was interested I might fulfill this request of the School. I expressed my willingness, and my collection started immediately, when he gave me a few specimens of native copper that were taken from the mine at an earlier time in its development. The next shift I started my collection, being known from then on as the "High-grader". Before I left the mine I had everyone on that shift, numbering about 35, bringing me all sorts of rock that was the least bit out of the ordinary, along with a lengthy description of what it was, or else expecting a long oration from me on what the rock might be. I soon realized how little I did know of practical mineralogy, and at the same time my knowledge and understanding of the minerals of a copper mine began. Minerals like chalcocite, malachite, cuprite,

hematite, limonite, pyrite, chalcopyrite, azuirte, and brocanthite, were the minerals that comprised most of my collection. I had various combinations and crystals of the above mentioned. From time to time Mr. Lofquist would come to the bunkhouse and look over my collection and discuss, and help me determine, some of the more difficult minerals.

There was a graduate student from the University of California, Glenn Mustee, with whom I chummed, in the same bunkhouse. Often we would start quite a "bull session" during leisure hours, over minerals, which drew in the majority of the younger men.

I did not have a very complete conception of the mine, even after I left, but I understood the mucker's and miner's work very well. I had pointed out to me the original, inclined shaft that was put down through 250 feet of barren iron oxide gossan on the property, in 1915 by Mr. Hunt. Also the fact that this shaft hit the secondary chalcocite ore body at its highest elevation and its richest point, having a copper content of well over 50%. The remarkable feature of this ore body's discovery is that there are no apparent surface indications to have lead Prospector Hunt to believe that beneath the surface was one of the richest copper deposits of the world. Yet, naming it the Rio Tinto, in prophecy, he sunk the original inclined shaft,

under discouraging and poverty conditions. Tribute is surely due him for having the proverbial "prospector's seventh sense", to be able to "smell" an ore deposit, or for having an uncanny ability to recognized leached chalcopyrite from leached pyrite.

Before I left I learned that the ore body was in a quartz vein in shale country rock. I was told that a mere clay slip adjacent to the new shaft was an important fault, terminating the vein on the east end. To the west the drifts remained in the ore for several hundred feet. From the offset of the floors in the stopes, I judged the vein to dip steeply to the north. The above was my visualization of the ore body.

Three levels were being worked with stoping being carried on between the 200 and 300 foot levels, and development work on the 300 and 400 foot levels. The deeper levels disclosed the primary chalcopyrite ore, while above the 300 foot level secondary chalcocite predominated. On the 200 foot level the iron oxide gossan prevailed.

The ore considered as high grade ranged in copper content from 10% up to 50%. This high grade chalcocite was hauled by auto truck to the railroad at Mountain Home, Idaho, a distance of over 100 miles, for shipment to the Salt Lake smelter. Ore having a copper content of below 10% was being "gobbed" in the square sets for future mill ore, as the flotation mill was under construction at that time.

When I had collected several pay checks, and with the security imparted by them to myself, and feeling a secret longing for home and mother's cooking, I decided to terminate my summer's interesting experiences by spending the last couple of weeks prior to the opening of school at home.

With the aid of a carpenter, who built a substantial box for my mineral collection, I carefully packed my specimens, which amounted to over 100 pounds. I then turned in my last time card and received my last pay check. I paid my respects to my superiors and thanked them for the kindness and consideration that they had shown me.

The miner that I worked with on my last shift, Frank Greevy, offered to drive me to Ely, Nevada, and with a "so long, High-grader" in my ears, I left the Rio Tinto mine. I regretted leaving the boys that I had worked with, for they were all, without exception, a fine lot. To one young fellow, about my own age, I gave my working clothes, for he needed them.

Shortly afterwards I read with dismay of six accidental deaths at the Mountain City mine. The story is that out of curiosity two new men descended into a gaseous winze. In a hurried attempt to rescue the two men, four other brave men, whom I knew and had worked with, also met their inevitable fate. As one of the four was the receiver of my working clothes my shirt was probably on this boy's back. With all reverence I thank God that it was not my back that the shirt was upon that unfortunate day.

Now, with added mining experience, and a good many more mining courses "under my belt" I have a realization of what a risk and liability I was to this Company and of what a responsibility my superiors had in caring for this green, ---very green, mucker.