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Pocket Mines
by Alex Quartz

To THE Editor:

When gold was first discovered in California, and for several years following, placer mining was the only branch of the mining industry practiced or known to the thousands who labored with pick, shovel and pan, to rob mother earth of her golden treasure; and, if any other branch of mining was known to a few of the great multitude of miners who rushed to the gold fields, they either forgot their knowledge of that branch or did not consider it worth bothering with, when gold could be obtained so easily in the placers as it was in those days. But, as the years rolled on and the best placers were worked out, many of the miners who had found quartz, rich in gold, in the gulches and ravines where they had worked, began to look for the gold in quartz. Their researches were rewarded, and that period marks the first step forward toward the development of the many rich quartz mines we have on this coast to day.

Ever since that period when quartz mining first attracted the miners attention on this coast, science has advanced with rapid strides in this industry, until today the Pacific coast, and California in particular, leads all other parts of the world in improvement and progress in this industry. The latest improved machinery and methods of working gold and silver ores are Pacific coast designs, and the Mining and Scientific Press has been the chief factor in bringing this stage of advancement about, by giving to the world, through its columns, a reliable and authentic account of all the different discoveries, processes, improved mechanical appliances, etc., which have been invented from time to time.

The three different branches, viz., placer mining, quartz mining and pocket mining, are each an interesting study and a science, so to speak, within themselves. At the present time, pocket mining is attracting more attention among prospectors and those in quest of knowledge pertaining to mining than either of the others, for the reason that it is new and has not yet reached the advanced stage which the other branches have; consequently there are more opportunities for the prospector to make new discoveries and realize a profit from such for a small outlay than there are in prospecting for placers or milling propositions in quartz.

All the capital the average " pocket hunter " requires is a pick, pan, shovel and grubstake; for, if he is successful in finding a pocket, he generally gets all the gold in a short time without further expense.

Pockets occur under certain conditions in a certain class of formation, hence the term " pocket formation." This pocket formation extends along the mineral belt from Fresno county in the South, in California, to Douglas County, in Oregon, on the North, as far as it is known and pockets have been found. This pocket formation also occurs in places through Nevada, Eastern Oregon, Idaho, Montana and Washington, and, in fact, in the most of the different sections where gold and silver are found, west of the Rocky mountains.

Pocket formation invariably carries the following named minerals besides gold, and sometimes silver: Iron, copper, lime, sulfur, and, in many places, lead. As a general rule, the formation is a soft porphyry, or gray slate, which slacks and decomposes rapidly by exposure to the air and sun. Pockets vary in size in different localities according to conditions.

But some people may ask the question. What is a pocket ? So it would be well to explain what a pocket is before we proceed further. A pocket is a mass of valuable mineral concentrated within a small space in a ledge, lead or vein; or, in other words, they are very rich spots in ledges, veins, seams, or feeders, while the rest of the ledge is either barren or very much lower grade ore than those spots or bunches which are called pockets. While the majority of the pocket ledges are barren except where the pocket occurs, yet there are many milling propositions that carry a paying quantity of gold all through, that are pocket ledges.

Pocket ledges generally cut or cross the formation, while in the same district the milling ledges run with the formation or course of the country rock. Throughout the coast mineral belt the course of the pocket ledges is nearer to an easterly and westerly direction, while the milling ledges, on the contrary, run nearer to a northerly and southerly direction. This is more particularly noticeable in the Northern districts, throughout Southern Oregon and Northern California, than it is in the other districts East and South. The chief minerals which predominate in the pocket formation through the first, named sections are iron and lime, and the formation itself is principally porphyry. The outer edge of this pocket belts so well defined in places that the experienced pocket hunter can tell within a few feet of how far it extends.

This statement may not be credited by some of our skeptical mining sharps, but nevertheless it is a fact, for there are several places in Jackson and Josephine counties, in Southern Oregon, where small pockets ranging from $5 to $100 have been taken out on the border, next to the granite and gneiss, and within 50 feet of those pockets in granite and gneiss formations small ledges or stringers, bearing gold their whole length, have been found.

But all search so far has failed to discover a pocket or bunch on any of those stringers, while in the porphyry on the other side, a few feet from the contact of the gneiss and porphyry, or the granite and porphyry, the veins carry no gold except in pockets.

The pocket belt through this section is very irregular in its width and course; in some places it extends several miles in width, while in other places it narrows up to less than a mile. The general course of the belt from Oregon across the Siskiyou range into California is almost in a Southeasterly direction, crossing the Kalamath River some eight or ten miles west of Hornbrook and Cottonwood, There has only been a few milling ledges which have been worked to pay within the limits of this belt, and none of them carried the gold to the depth of 100 feet, while outside of the border of this pocket belt, on the West side, we firmly believe that development of the ledges in time will prove that they become larger and richer as they go down.

In the series of articles to follow I will endeavor to illustrate, in plain language, the different theories of what causes gold to occur in pockets and what form them, and no

particulars pertaining to pocket mining on the coast from Mexico to Alaska will be omitted.

Pocket Mining
NUMBER II

To THE Editor;

A pocket, as stated in the first article about this subject, is a concentrated body of gold, silver or other valuable mineral occurring in certain spots within ledges, lodes, veins, etc., of quartz and mineral-bearing rock.

Gold pockets, upon which this series of articles is written exclusively, occur only in quartz or where quartz is present, for it is now known to be a proven fact that without quartz being present in some form gold does not exist in its original lodging place, where it has been precipitated from solution, or, in other words, congealed or transformed from a liquid state to a solid metallic state.

Minerals exist in three physical conditions, viz., solid, liquid and gaseous. It is well said that "quartz is the mother of gold," for it is always found with the gold. The gold is carried with the mineral quartz for quartz is a mineral in solution into cracks or fissures formed from various causes in the earth's crust, and there the solution becomes solidified from some peculiar action of nature and becomes what we term a ledge or vein. Now the question naturally arises, where does this mineral solution which comes in and forms veins in those cracks or fissures originate or come from?

It comes from the formation or earth in which they are diffused, in the vicinity of where the mineral bearing vein is formed. Those minerals being distributed throughout the formation in which they exist, are liberated gradually, mostly in a gaseous form, and are taken up by the water and transformed into solution and carried to those cracks and fissures and other lodging places, where they again undergo a change and are transformed into a solid state and form our mineral bearing veins or deposits.

In nearly all the districts on this coast the mineral bearing veins or ledges that run parallel with the formation of the country rock are almost invariably what is commonly called milling ledges, because they carry about the same amount of mineral all through the pay chutes, while on the contrary all the ledges that run crosswise of or cut the formation are pocket ledges. The pocket belts, or streaks of formation which are prolific in pockets, are mostly porphyry or of a porphyritic or quartz-porphyry nature running parallel with the slate, granite, lime, etc., and are readily detected by the professional and experienced prospector owing to the chemical and mineral composition and general appearance to the eye.

This pocket formation does not always exist in belts, but sometimes occurs in spots or patches through-out the mineral belts of the coast. In fact, there is hardly a mineral district west of the Rockies in which those spots do not occur.

The chemical or mineral composition of this pocket formation is generally silica, lime, soda, alumina, potash, copper, lead, magnesia, iron, gold, quartz and water, although these conditions differ in each locality.

What forms the pocket, or, in other words, what causes the gold to concentrate in a small space at certain points, is owing to a peculiar combination of other minerals which exist at or near that point and form a magnet, as it were, and some of the minerals in this peculiar combination having an affinity for each other naturally concentrate and in turn combine to form an affinity or attraction for the others contained in the same formation, and so on until the combination is complete and possesses the affinity for the gold, quartz and other lateral properties.

What those minerals are and how to detect them, and a thorough explanation of my theories and the facts upon which they are based, will be given in future articles of this series.

Pockets occur in three distinct and different conditions, viz., decomposed or free pockets, intact or specimen-rock pockets and pay-chute pockets, and they each form from separate causes and under different conditions.

The first, decomposed or free pockets, occur upon ledges, seams, feeders, etc., and are generally near the surface and throw out a strong trace, and as a rule are easily found. Those pockets are generally small compared with the specimen rock or intact pockets and rarely exceed over $2000.

At the point where the pocket occurs in the ledge or seam the combination of minerals at that point decomposes the ledge and leaves the gold free so that it can be panned out, and often it is so well freed from the quartz, iron and other minerals that it does not require crushing in a mortar to make it salable as free dust.

In this class of pockets there is always another cross seam or ledge which cuts, crosses or comes in contact with the ledge or seam at the point where the pocket occurs. This cross or contact ledge or seam always carries or is entirely composed of a different mineral from that which predominates in the ledge which contains the pocket and is often very small, sometimes not more than a fourth of an inch in thickness.

This ledge or seam which is composed of or carries the mineral that is required to complete the combination which decomposes the ledge at the pockets and causes the pocket to form at the point where it comes in contact, always runs at an angle to the general course of the main ledge.

There is always a feeder or loose place from the pockets of this class to the surface of the ground somewhat resembling an old gopher or squirrel hole which has settled or caved in, and through this aperture or feeder the gold is forced out to the surface of the ground by the action of gas generated in the pocket; or the gold is forced from the pocket in a gaseous form and becomes condensed as it passes through this opening or feeder and when it comes in contact with the atmosphere.

By either action it reaches the surface of the ground, and by its specific gravity it naturally works down hill. There are invariably two of those feeders or "spire holes," as the pocket hunters call them, one leading up and the other down the hill in a curving course from the pocket to the surface. This accounts for gold being often found plentifully as much as 25 feet and over above the pocket, when it occurs on hillsides, which very often misleads the prospector and causes him to pass over the pocket and miss it entirely.

The trace from a free or decomposed pocket is always on the top of the ground, in

the grass roots as it is termed, and rarely if ever is found down any depth in the soil unless it be of a very loose nature so that the gold can readily sink down into it. But if the soil be firm and compact and the hill or mountain side steep, the biggest prospect will be obtained by scraping the loose dirt and gravel on top down, say an Inch, to where the ground is hard and compact, for very little of the gold will work down into the solid ground if it has any chance at all to work down hill.

I have panned on traces where other prospectors, who were in the habit of going down to bedrock for their dirt to pan, had worked, and where they could not raise a color on bedrock where the soil was not more than 14 inches deep, I have got as high as 25 cents to the pan by taking the loose dirt on top of the ground.

It may be well to explain what a pocket trace is, for the benefit of the novice and those who are inexperienced. A pocket trace Is the gold and other minerals which are liberated or forced out from the pocket and by their specific gravity gradually work down hill, naturally spreading out over the surface more or less in its downward course, until it finds its level or works into some gulch or ravine.

In the case of pockets of this class which have been capped over by slides and locked up, as it were, from longer giving a trace, or where a great space of time has elapsed since the gaseous action ceased to throw out the gold from the pocket, the gold in the course of time works down into the soil and finally reaches bedrock. But in the majority of cases the gold and the mineral that comes with it from the pocket are in the surface dirt.

I invite the criticism of practical experts on this subject whose theories, views and experience differ from mine, so that the different theories and views expressed upon this most important branch of mining may result to the general good of all the miners and prospectors on the coast, and especially to the readers of the Mining and Scientific Press.

Pocket Mining
Free or Decomposed Pockets
NUMBER III

To THE Editor :

The professional pocket hunter, when he finds a trace from a free or decomposed pocket, goes to work tracing it up in the following manner: He first ascertains by panning where the gold lies; whether on top of the ground in the grass roots, or down deep in the soil, or on bedrock. When he finds out where the gold lies, or, in other words, where he gets the biggest prospect, he then pans across the trace to find the center.

Gold, on account of its great specific gravity, will work down hill in the same course from the pocket as water would from the same source, and when he finds the center of the trace, which he determines by the prospect he gets in the pan, the largest prospect always being in the center of the trace, he then closely examines the gold in order to find out whether he has more than one kind or not.

When he is satisfied that he is getting only one kind of gold he tries a pan-full from the center of the trace farther up the hill. If the trace is a slim one and he only gets a very light prospect in the center of the trace, say three or four small colors to the pan after panning carefully to save everything that has greater specific gravity than the dirt,

particles of broken rock, etc. , he closely examines the result in order to find out what goes with the gold.

He does this so that he can follow that mineral, which comes from the pocket also, should the gold give out entirely in the trace before he reaches the pocket. To find out what mineral comes from the pocket with the gold, he pans across the trace the same as he did to find the center. If he gets a considerable amount of any mineral substance or crystals in his pannings in the center of his trace and does not get any on either side, it invariably comes from the pocket or from the ledge that gives the pocket, so by following what comes with the gold, when the gold gives out, it will lead to the ledge at the point where the pocket exists.

When there is one or more kinds of gold in the trace it shows that there are two or more traces run together, or lapped over each other, and coming from as many different pockets. Sometimes the second gold found in the trace comes from a seam or ledge running parallel with the trace, which gives out a little gold all along, and on which the pocket exists.

Oftentimes prospectors who are inexperienced and cannot always tell pocket gold, work on what they suppose is a pocket trace when in reality it is gold thrown off from one of those blind ledges or seams that run in an up-and- down-hill course and give out a little gold all along, and does not "pocket" at all.

When there is sufficient gold in the trace to follow, and the largest amount is on top or in the grass roots, the prospector follows the gold until it gives out and then drops back and finds the feeder or "spur hole," or where the gold goes into the ground as it were, which leads him to the pocket.

If he fails to find the feeder without disturbing much of the ground in the vicinity of where he thinks the pocket is, he then cuts a trench down to bedrock, up and down hill, at the end and in the center of the trace, commencing a little below where the gold gave out and extending it up above where he got the last gold. By doing this he cuts across the ledge or seam which gives the pocket, and then it is an easy matter to find the feeder on the ledge.

Should he fail to find a ledge or seam in his trench, which should extend up and down hill far enough above and below where his gold gave out, to cut the ledge if it runs crosswise of the hill, then he digs another trench at right angles with the first one, a short distance below where the gold gave out, and in this trench he will cut the ledge if it runs parallel or nearly so with his trace. In this manner he is sure to find the ledge, and when once found it is an easy matter to find the spot where the pocket is.

I have seen places where prospectors had followed up traces until the gold gave out, and then dug hole after hole and tore up the earth in such a manner that it would be almost impossible for the next prospector who came along to find out where the gold gave out. When such prospectors fail to get the pocket, it is a soft snap generally for the professional who comes after him, for half the work is already done for him and he goes to trenching and soon finds the ledge which the first man has dug holes on both sides of, but did not happen to dig one on the ledge.

In many places the ledges crop or give out considerable float, and in such cases the pockets are more easily found. At the point where the pocket occurs the ledge is

generally more or less decomposed, and in most cases it carries a large amount of iron oxide. The stringer or ledge that invariably comes in through the country rock and contacts with the ledge at the point where the pocket occurs, is generally largely composed of lime, iron, copper, or manganese. If it is composed largely of quartz, or is a quartz ledge or vein, it will be found to carry one or more of those minerals in large quantities.

In the Northern Counties of California above Shasta, and throughout Southern Oregon, the contacting seam or stringer is generally lime. It is invariably white and often in a chloride form than any other. This combination of minerals which exists in pockets of this class only decomposes the ledge where the pocket occurs, and the ledges in nine cases out of ten are barren of gold eighteen inches and two feet on either side of the pocket. Sometimes a color of gold cannot be found six inches on either side of where the decomposition ends. Those pockets mostly occur in soft, yellow porphyry which contains a large percentage of lime and iron and is prolific in small stringers of quartz and lime.

When the prospector is hunting for a trace, and he finds this soft porphyry formation, he forms his ideas as to how the ledges run. Then he commences panning around the base of the hill, point or ridge, taking his panfull's about 25 or 30 feet apart until he pans around the base of the hill. It he does not find a trace then, and still believes that there are pockets above, he goes a hundred yards or so farther up the hill or rising ground and pans around the same as before, so that if there should be a trace above that did not reach down as far as the foot of the hill or point, he will catch it in his second panning around the hill.

Many pocket hunters follow this method. They find out where there has been a short gulch that paid well to placer mine, and, when they find out at what point the pay quit, they pan on either side of the gulch on the side hill until they find where the gold came into the gulch and then follow it up to the pocket or to where the pocket has been. In most cases, where the short gulches have been rich, the pockets which fed them are all out and gone; but if the pocket hunter once finds the ledge where one of the principal pockets came from, he then has the main key to the situation. He follows along the same ledge, for it is likely to pocket in another place.

Then, again, it often occurs that where the pocket is broken away and gone down into the gulch, there is one or more still existing underneath where the first one was. If he does not find a trace on either side of the gulch, and there is a little gold still in the gulch, he follows the gold until he finds where it leaves the gulch and follows it up the hill until it leads him to where it originally came from.

I know where traces, and what would be called slim ones at that, have been followed for over half a mile to a pocket amounting to no more than $50; and in one particular case in southern Oregon, I followed a trace over three-fourths of a mile and found the pocket.

Pocket Mining
Free or Decomposed Pockets.
NUMBER IV:

To THE Editor :

The ore found in free or decomposed pockets is of a magnetic nature, or, in other

words, each separate particle of the gold has a slight affinity for the other. In order to prove this, it is only necessary to take the flour gold from one of these pockets and corner it down in a pan until it forms a string of an inch or so in length in the crease of the pan; then take considerable more water into the pan and by a sudden jerk movement try to scatter the flour gold by the action of the water carrying it over the bottom of the pan. No matter how fine your gold may be, you will find, try whatever way you may, that you cannot completely distribute and separate the particles of gold.

You can always see it with the naked eye; and, if you will take a small magnifying glass and examine the bottom of the pan, you will find that the particles of gold lie in bunches or clusters and not completely scattered with each particle laying separate by itself.

The flour gold from a milling vein, or, in other words, from a vein or ledge that carries an equal amount of gold all along, when treated in this manner will completely separate, and it will be found by examining the bottom of the pan closely with the glass that each particle will be seen lying by itself and not gathered in clusters or bunches the same as the pocket gold. This proves that the particles of this class of pocket gold have an affinity or attraction for each other which causes them to bunch together. All of the minerals found in the pocket in a metallic or solid form have the same attraction or affinity which the gold has, and all of them play an active part in concentrating the gold and forming the pocket.

There may be several other minerals found in this class of pockets, but a pocket without lime, iron, copper, lead and sulfur has not yet been found. They are always present in free or decomposed pockets. They may not always occur in the same form, but they are generally in either a chloride or metallic state. These five minerals are the key to the pocket and are what cause the pocket to form. Of course gold is included and makes the sixth mineral.

Should any one of these minerals be lacking, besides the gold, in a ledge and the ledge or seam that comes in contact with the ledge proper, there will be no pocket found, or at least there never has been a pocket found without this combination of minerals.

Several other minerals may be found in pockets besides those five above named, but they do not play an important part in forming the pocket. Wherever this combination of these five minerals is found in a ledge, and there is any gold, there is generally a pocket on the ledge, although, either from some curious action of nature or from the peculiar action of some other foreign mineral upon this combination of five, it sometimes occurs that no pocket forms even when those five necessary minerals are present, but this seldom happens.

Those free or decomposed pockets invariably occur near the surface, for this reason: The necessary minerals required to form the pocket, if not already contained in the ledge, must be carried there or drawn to that point by those in the ledge, and as most minerals are deposited by solution near or on the surface, consequently they concentrate and "pocket" near the surface.

It is nearly always safe to count on finding a pocket on a ledge near the surface where those five minerals exist at one point, no matter in what form they may occur so long as they are there. The size of the pocket can very often be determined by the size of

the ledge proper. A large ledge nearly always gives a large pocket, while small ledges and seams do not appear to have the body to support a large deposit of those minerals, consequently the pockets are small.

The rim, ledge or seam which comes in contact with the ledge proper, at the point where the pocket occurs, is as essential to forming the pocket as the combination of the five minerals; and in every pocket yet found, of this class, this contacting seam or ledge has always been found. It appears to be the feeder through which the minerals are carried to the pockets, although sometimes the pocket occurs on this feeder instead of the ledge. Those cases occur oftener where the ledge is barren quartz than where the ledge is more mineralized.

The first step that the prospector should take, who intends to follow this branch of mining, is to make a study of those five minerals, so that be can readily detect them in any form; and when he has acquired that knowledge he then has the main key to finding this class of pocket. I have known men who were so expert at detecting, with their eyes, those minerals and the different indications of a pocket, that, after a close examination of the ground, they would walk directly to the spot and mark the place on top of the ground where the pocket was, and upon digging down, the pockets were found directly underneath the spot they had marked.

Pocket Mining
NUMBER V:
Free or Decomposed Pockets.

To the Editor:

The reason why pockets of this class are always found in decomposed quartz is because the combination of the five minerals, mentioned in article No. 4, which are always present in this form of pockets, acts upon the quartz, and, being a strong decomposing agent, soon rots away the ledge at the point where they concentrate. The gold in those pockets Is generally rough and " scraggly," and pieces are often found all honeycombed like pumice stone where the quartz has decayed away and left nothing in a solid form except the gold. Sometimes in the larger pockets of this class there is smooth gold, similar to well-worn placer gold, found In the center of the pocket; but, upon examination, it will be found that those smooth nuggets have a coating or glazing of copper on the smooth surface and are more of an orange tint than the rest of the gold in the pocket.

Sometimes those nuggets or pieces which are found In the center of the pocket are rough and scraggly on one side and smooth and glazed on the other. Those smooth pieces are found only In large pockets, and in pockets where they are found there Is always a large percentage of copper In the mineral combination. Whenever the majority of the colors found in a free pocket trace are in the shape of needle points broken off or " arrowheads," as the pocket hunter calls them, the trace is seldom worth following up, for the pockets that give such traces are invariably small and seldom amount to over $5 or $6. They occur on small stringers of quartz not over a half Inch In width and often not more than six or eight feet in length, and generally occur In soft, yellow porphyry.

The best free pockets are always found in the porphyry or on or near the contact of

the porphyry and serpentine. The most of this class of pockets when laid bare are very deceiving to the eye, for the reason that little or no gold is visible, it being coated and concealed by the iron oxide, etc.; but, when washed thoroughly in a pan, the decomposed matter will be found to be very rich.

Then, again. In other cases, the gold being free from coating, will show so distinctly that the inexperienced pocket miner will think that the decomposed matter In the pocket is much richer than it really is. The flour gold is always in the top and bottom of the pocket; consequently, the flour gold In the trace will be found in largest quantities nearest the pocket when it is still in place, and, again, when the pocket is out and gone, the flour gold will be found In largest quantities near where the pocket originally was.

The experienced pocket hunter will soon detect by the flour gold he gets In his trace whether the pocket is still in place or not. He does it In this way: By carefully examining the flour gold. If he finds the most of it very light in weight as well as In color, which he can readily detect by his manipulations with the pan and by watching closely how the gold acts he soon finds out whether the majority of the flour gold came from the top or bottom of the pocket. His judgment is based upon the following facts: Say, for instance, that a free pocket contains 200 ounces of gold. The gold which comes from the top of that pocket we will say is worth or assays $17 per ounce; then It will be found that the gold in the center or middle of the pocket will be worth less, say $16.75 per ounce, and the gold in the bottom of the pocket will be worth still less, or about $16 per ounce, so thus it will be seen that the gold gradually diminishes In value from the top to the bottom of the pocket. Where the gold Is more alloyed, naturally, with silver than copper, this feature Is more plainly noticeable; and the prospector, finding the majority of his gold a light color and light in weight, and intermingled with white particles resembling gold coated with quicksilver, he naturally concludes that that gold came from the bottom of the pocket, and It is out and gone, and he is only getting the gold from the bottom of the pocket in the trace.

Free or decomposed pockets occur generally upon ledges that are barren except where the pocket exists, and the size of the pocket depends upon the size or width of the ledge and the amount of the mineral combination which concentrates where the pocket forms.

Alex Quartz.