CONTACT INFORMATION
Mining Records Curator
Arizona Geological Survey
416 W. Congress St., Suite 100
Tucson, Arizona 85701
602-771-1601
http://www.azgs.az.gov
inquiries@azgs.az.gov

The following file is part of the Kelsey Boltz Mining Collection

ACCESS STATEMENT

These digitized collections are accessible for purposes of education and research. We have indicated what we know about copyright and rights of privacy, publicity, or trademark. Due to the nature of archival collections, we are not always able to identify this information. We are eager to hear from any rights owners, so that we may obtain accurate information. Upon request, we will remove material from public view while we address a rights issue.

CONSTRAINTS STATEMENT

The Arizona Geological Survey does not claim to control all rights for all materials in its collection. These rights include, but are not limited to: copyright, privacy rights, and cultural protection rights. The User hereby assumes all responsibility for obtaining any rights to use the material in excess of "fair use."

The Survey makes no intellectual property claims to the products created by individual authors in the manuscript collections, except when the author deeded those rights to the Survey or when those authors were employed by the State of Arizona and created intellectual products as a function of their official duties. The Survey does maintain property rights to the physical and digital representations of the works.

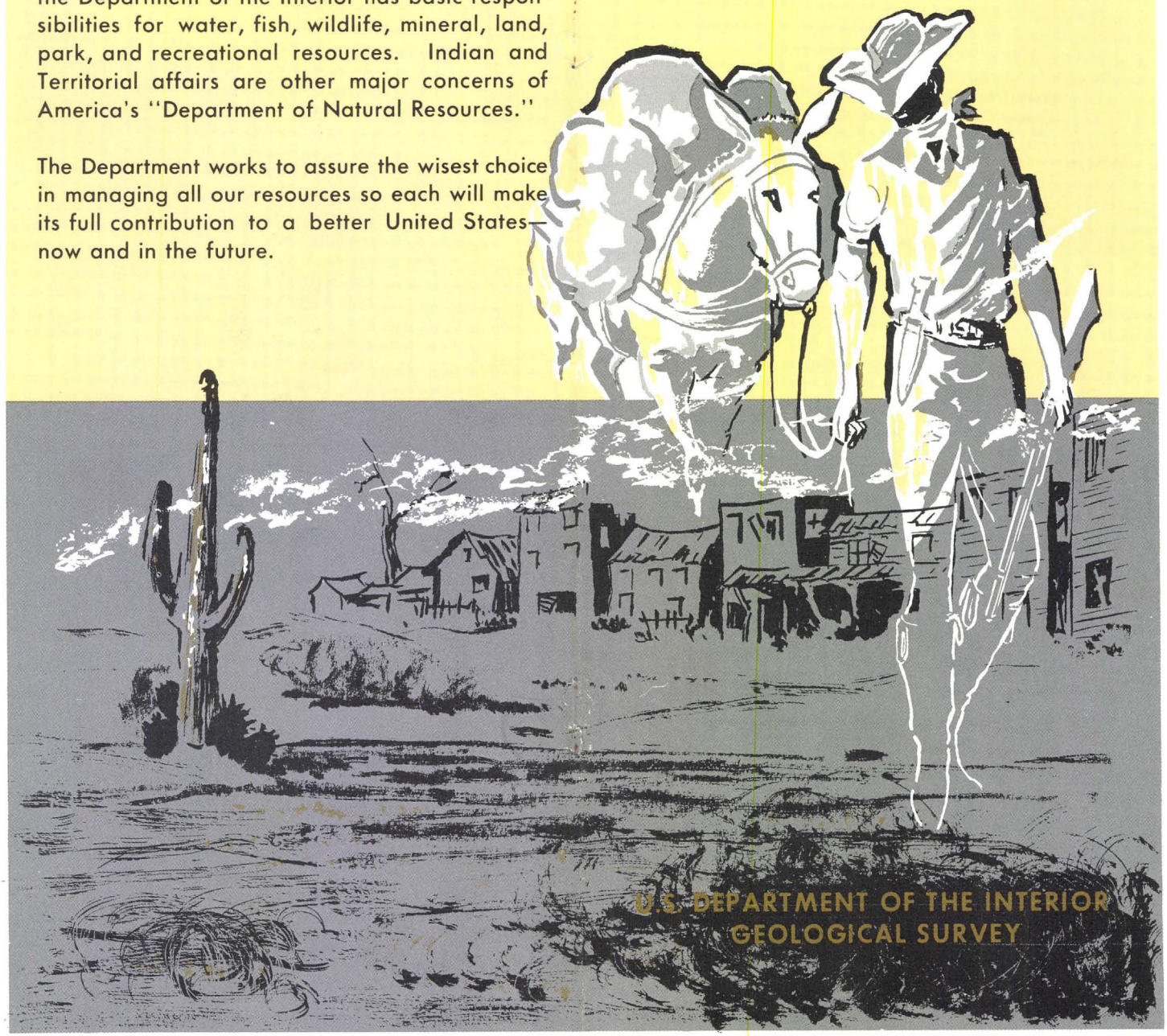
QUALITY STATEMENT

The Arizona Geological Survey is not responsible for the accuracy of the records, information, or opinions that may be contained in the files. The Survey collects, catalogs, and archives data on mineral properties regardless of its views of the veracity or accuracy of those data.

GOLD

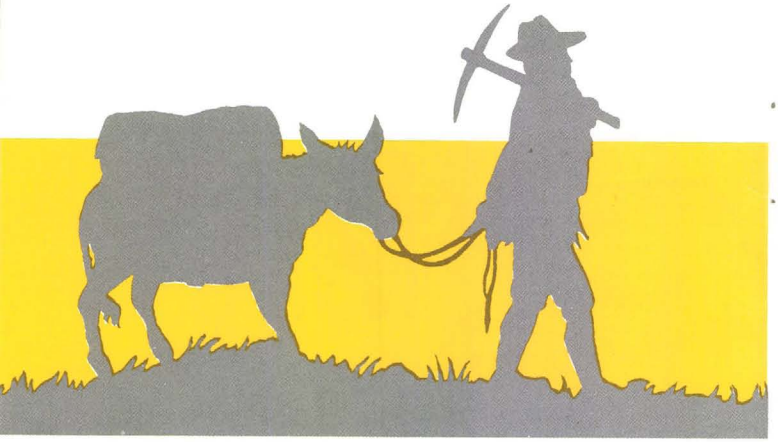
As the Nation's principal conservation agency, the Department of the Interior has basic responsibilities for water, fish, wildlife, mineral, land, park, and recreational resources. Indian and Territorial affairs are other major concerns of America's "Department of Natural Resources."

The Department works to assure the wisest choice in managing all our resources so each will make its full contribution to a better United States—now and in the future.



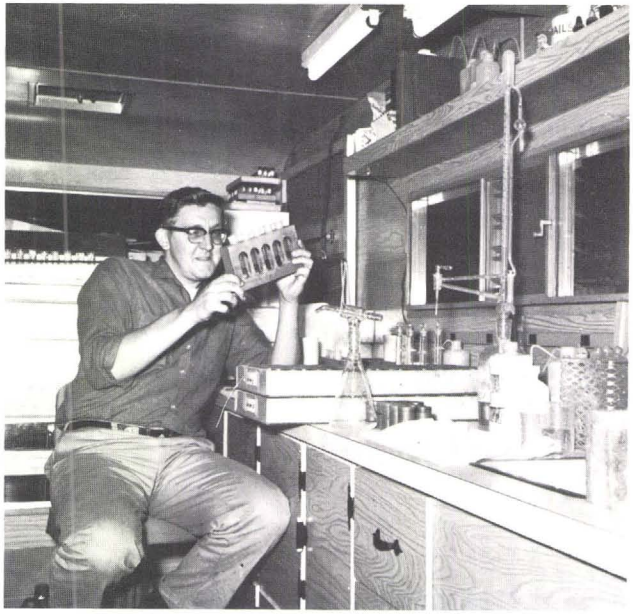
U.S. DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

GOLD



Surely there is a vein for the silver and a place for gold where they fine it
–from Job 28:1

The popular expression, "Gold is where you find it," may have originated in a misunderstanding of this Biblical reference. Yet, the author of this ancient text was specific: the place to obtain gold was where it was fined, or *refined* as we would say now. But gold occurs in so many different kinds of rocks and in so many geological environments that a haphazard occurrence—where you find it—could readily be inferred. Actually, gold is widely distributed in the rocks of the earth's crust, but generally in very minute quantities. It can be mined profitably only where it is present in unusual concentrations. Such deposits are classed as *primary* if the gold occurs where it was originally introduced into the rocks from mineralizing solutions, and *secondary* (or placer) if the concentrations of gold were the result of weathering and erosion of rocks.



On-the-spot analysis of rocks and ores are made in mobile chemical laboratories.

Photograph Credits:

Crystals of gold, Kittitas Co. Wash., and Gold nugget, Plumas Co., Calif., courtesy Smithsonian Institution; A gold dredge at work on Goldstream Creek near Fairbanks, Alaska, courtesy Bradford Washburn; Carlin Mine, Nev., Courtesy Guy Gillette.

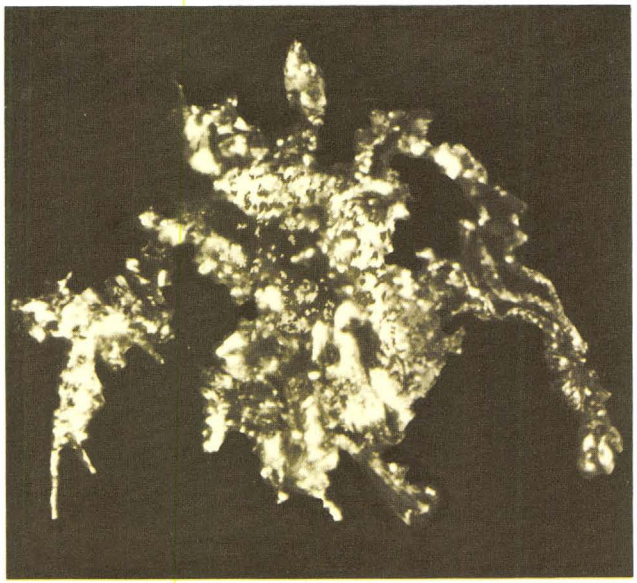
☆ GPO : 1969 O - 339-538

THE STUDY AND SEARCH FOR GOLD CONTINUES

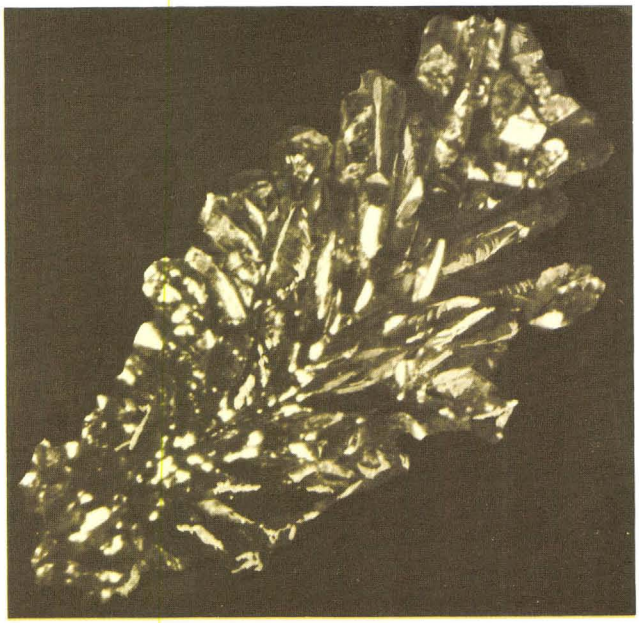
Geologists study all the factors that control the origin and emplacement of mineral deposits, including gold. Studies of igneous rocks in the field and in the laboratory lead to an understanding of how they came to their present location, how they crystallized to solid rock, and how mineral-bearing solutions and gasses formed within them. Studies of rock structures, such as folds, faults, fractures, and joints and of the effects of heat and pressure on rocks suggest why and where fracturing of the crust took place, and where veins might be found. Knowledge of the physical and chemical characteristics of rocks yields information on the pattern of fractures and where to look for them. Studies of weathering processes and transport of material by water enable geologists to predict the most likely places for placer deposits to form.

Research on prospecting methods has led to the development of mobile chemical and spectrographic laboratories that are fitted with newly designed analytical instruments capable of detecting and rapidly measuring the amounts of gold and other valuable metals that may be present in the rocks and ores. These laboratories can accompany the geologist into the field and, by providing on-the-spot analyses of selected samples, guide the geologist in his search.

The occurrence of gold is not capricious; its presence in various kinds of rocks and formation under differing environmental conditions follows natural laws. As geologists increase their knowledge of the ore-forming processes they can expect to improve their ability to find gold.



Nature's jewelry. Crystals of gold from Kittitas County, Washington.



PRIMARY DEPOSITS

The gold of primary deposits has been carried with other metallic constituents into the upper part of the earth's crust, by rising hot or warm waters which, under pressure, follow cracks or fractures formed by earth movements. These cracks form the "plumbing system" along which solutions from great depth can travel upward until they encounter cooler rocks. Generally, these areas are within a few thousand feet of the surface.

Where temperatures and pressures are less, minerals begin to crystallize out of the solutions. The crystalline materials, including gold if present, accumulate along fracture surfaces and gradually fill voids along fractures to form veins. The solutions may continue upward, mingle with ground water, and emerge at the surface as hot springs.

Several hypotheses are proposed by geologists to explain the origin of the mineralizing solutions. According to one hypothesis, solutions remaining or expelled from molten rock (magma) as it cooled and crystallized many thousands of feet below the earth's surface formed mineral deposits. These more volatile parts of the molten rock contain the heavy and precious metals, and are among the last to crystallize.

Where fractures formed by earth movements existed in and above the cooling magma, the more mineralizing volatile fractions escaped to higher levels in the crust. The solution as expelled from the crystallizing magma is chiefly water but carries with it silica and some metallic constituents, including gold.

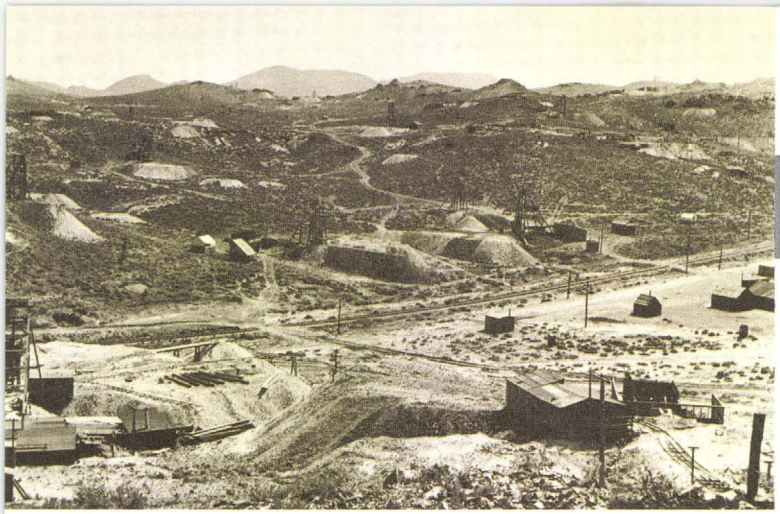
In a second hypothesis, the mineralizing solutions originated in sedimentary rock that contained entrapped water. Where sedimentary

The Carlin Mine, near Carlin, Nevada, was opened in 1965 and is considered to be the largest gold discovery of the past 50 years. The discovery of this deposit, which contains an estimated $120 million in gold, was based on geologic investigations and interpretations published by the U.S. Geological Survey.

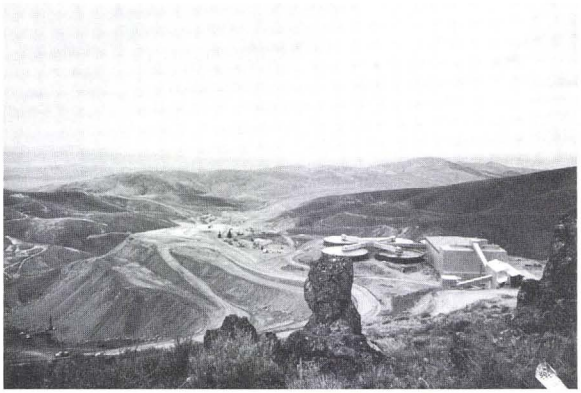
More than one-third of the gold produced in the United States is a byproduct from mining other metallic ores. Where base metals—such as copper, lead, and zinc—are deposited, either in veins or as scattered mineral grains, minor amounts of gold are usually deposited with them. Deposits of this type are mined for the predominant metals, but during processing of the ore, the gold is also recovered.

Some deposits of base metals, such as disseminated or porphyry-copper deposits, are so large that even though they contain only a small amount of gold per ton of copper ore, so much is mined that a substantial amount of gold is recovered. Gold recovered from copper ore mined at the vast open-pit mine at Bingham, Utah, for example, almost equals the amount of gold produced from the largest gold mine in the United States.

The vast open-pit copper mine at Bingham, Utah where gold is recovered as a by-product.



Mining rich gold-silver veins at Goldfield, Nevada circa 1905



The Carlin Mine, Nevada, America's newest large gold mine

the government did not permit them to reopen until 1945. Since then the production of gold has not exceeded 2 million ounces a year. During 1965, about 1.68 million ounces of gold was produced, and by the end of that year, the cumulative total of gold produced from deposits in the United States since 1792 had reached 307.2 million ounces.

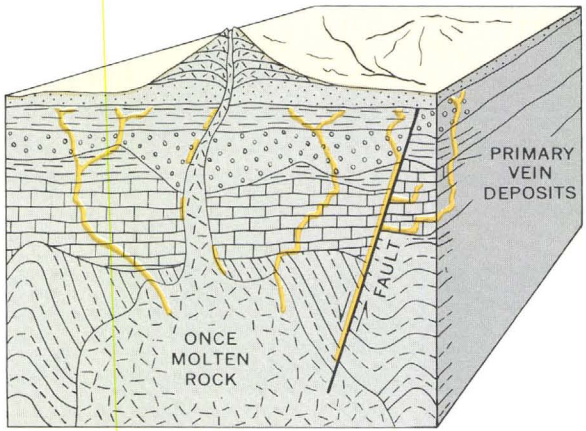
The largest producing gold mine in the United States is the Homestake Mine at Lead, South Dakota, which yields about 575,000 ounces of gold each year. In this mine, which is more than a mile deep, hot mineral-bearing solutions formed primary deposits of gold and sulfide minerals.

rocks are downfolded into the earth's crust and heated the water is driven off, and in its upward travel along fractures it dissolves metallic minerals from the rock. In the cooler zones the metallic minerals are precipitated as vein material.

According to a third hypothesis, geologists surmise that when sedimentary rocks are deeply buried and subjected to heat and pressure, some of the water driven off was an integral part of the rock-forming minerals. These hot solutions also travel upwards along fractures and deposit vein material.

Commonly the principal constituents of a fracture filling or vein are quartz, or quartz and calcite, but the vein material generally contains some copper, lead, iron, and other metal-bearing compounds. In many veins brass-like iron sulfide—pyrite—is abundant. Pyrite and iron-stained mica have sometimes been mistaken for gold and have been called "fool's gold."

Mineralizing solutions travel upward along fractures and form primary vein deposits.

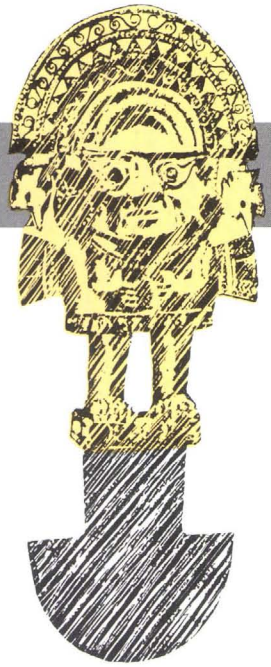


PLACER DEPOSITS

The gold in primary deposits is subject to weathering and erosion processes at the surface. During weathering, the rocks and the ore minerals in them are disintegrated into blocks, fragments, and finally into mineral grains. Products of this disintegration—boulders, gravel, sand, and finer particles—are washed into gullies, creeks, and rivers. Most metal-bearing minerals rapidly decompose chemically during weathering, and some of their constituents are dissolved and carried away by surface water. Gold, however, is extremely resistant to weathering and, when freed from the enclosing rocks, is carried downstream as metallic particles.

Both gold and coarse gravel can be moved only where water is moving rapidly. On curves in streams where part of the current moves more slowly, or where the stream gradient is reduced, gold collects in sand and gravel bars. Gold is about seven times as dense as gravel or sand, and quickly is concentrated in the bed of a stream where it collects in low points or in pockets. An irregular streambed will aid in trapping gold particles. A few unusually heavy and resistant minerals commonly accumulate with gold. Magnetite is the most common, but other heavy minerals that may be present are platinum, cassiterite, monazite, ilmenite, columbite-tantalite, chromite, and some gem stones.

A gold dredge at work on Goldstream Creek near Fairbanks, Alaska.



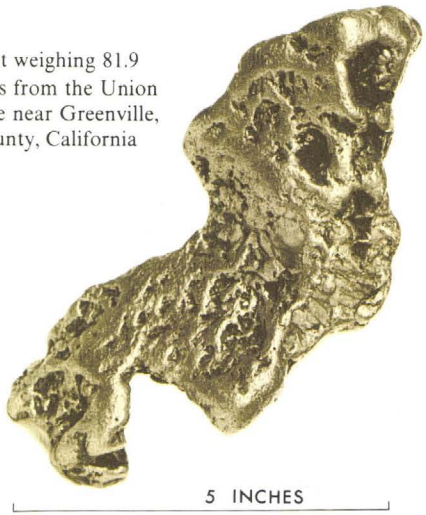
Sacrificial gold knife used by the Inca Indians of Peru

Gold was first produced in the United States from the southern Appalachian region, beginning about 1792, but these deposits—though rich—were relatively small and were quickly depleted. The discovery of gold at Sutter's Mill in California sparked the gold rush of 1849–50, and hundreds of mining camps sprang to life as new deposits were discovered. As a result, the production of gold increased rapidly. The Mother Lode and Grass Valley mines in California and the Comstock Lode in Nevada were discovered during the 1860's, followed by the Cripple Creek deposits of Colorado in 1892. By 1905 the Tonopah and Goldfield deposits in Nevada and the Alaskan placer deposits had been discovered, and gold production for the first time exceeded 4 million ounces a year—a level maintained until 1917. During World War I and for some years thereafter, annual production declined to about 2 million ounces. When the price of gold was raised in 1934 to $35 an ounce, production increased rapidly, and in 1937 again passed the 4 million-ounce mark. Shortly after the start of World War II, gold mines were closed and

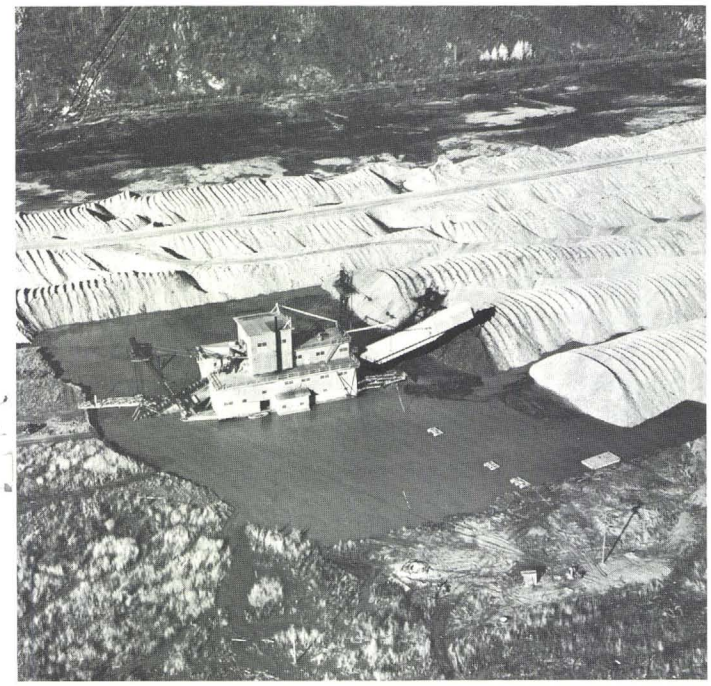
THE NEED FOR GOLD

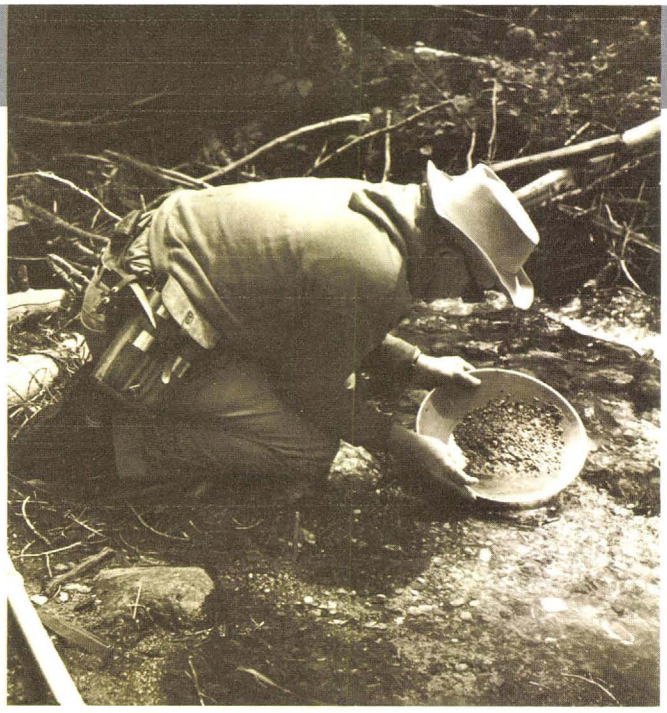
Throughout history, gold has been a precious material, eagerly sought and cherished. It was probably the first metal to be mined because it commonly occurs in its native form, because it is beautiful and imperishable, and because exquisite objects can be formed from it—even with primitive tools. The amount of gold known to ancient civilizations probably totaled not much more than the amount produced each year by the world's largest gold mine located in the Witwatersrand district of South Africa (about 1.5 million ounces). Hoards of gold discovered by archeologists in Greece, Scythia, and Egypt, as well as the gold from Indian treasuries in Mexico and Peru, represented years of patient collection of small quantities from streams and veins, often by slave labor.

The intrinsic value of gold has always been recognized, even before gold was used in coinage, and it remains the only universally recognized standard of value in international monetary exchange. Most of the world's refined gold is absorbed by governments and central banks to provide stability for paper currency, but the amount of gold used in the arts and industry is increasing. In addition to its use for jewelry, decorative finishes, and dentistry, its special properties have led to numerous applications in modern science and technology. Surface coatings of gold protect earth satellites from heat and corrosion, and certain electrical components and circuits of spacecraft are made of gold when extreme reliability is required.



Gold nugget weighing 81.9 Troy ounces from the Union Placer Mine near Greenville, Plumas County, California





The gold pan—a modern sampling tool

In gold-bearing country, prospectors look for gold where coarse sands and gravels have accumulated, and where heavy minerals or "black sand" have been concentrated and settle with the gold. The natural processes of stream washing and wave action on beaches efficiently separate materials with different densities. These processes are similar in action to the prospector's pan and sluice box that sort and concentrate gold from lighter materials.

Placer deposits of gold have been formed in the same manner down through the earth's history. Throughout geologic time, the weathering and erosion processes have created some surface-placer deposits which have then been buried under rock debris. These "fossil" placer deposits are cemented into hard rocks by geologic processes; yet the shape and the characteristics of the old river channels are still recognizable.

In many areas the discovery of placer deposits has been the first clue to gold veins in the mountains in the headwaters of the streams. In some areas, however, the veins are too low in grade for profitable mining, and deposits of economic value are formed only where weathering and stream action have concentrated the vein gold into placer deposits. The richer gold placers have formed where a younger stream cut through an earlier placer deposit and concentrated the gold for a second time.

Recovering gold in a long sluice box. Gold-bearing gravels are shoveled into the upper end of the sluice way; a series of riffles set across the bottom of the box traps the gold. Myrtle Creek, Alaska, circa 1900.

"Gold - Barbarous Relic or Eternal Backing for Commerce and War?" by Ira U. Cobleigh, U.S.A.

KB copy
Gold

Ladies and Gentlemen, I welcome this opportunity to address the Schultz autumnal gold and monetary seminar here in Montreal. The last time I was in this city, I was a kid on an overnight trip from Camp Abnaki, a hundred miles south of here in Vermont, where I was the camp bugler. In some ways I haven't changed much. I still get up early and am still alerting people to what they should be doing but I certainly didn't come here to bugle "taps" for gold!

I am in fact delighted at my topic "Gold - Barbarous Relic or Eternal backing for Commerce and War?" It's one I've given a lot of thought to especially since 1968, the doomsday year for the American dollar. After enjoying paper money convertible into gold from 1900 to mid-1933, the U.S. dollar began to hit the skids. On January 30, 1934 Americans had foisted on them a new paper dollar, worth, in theory, one thirtyfifth of an ounce of gold, but not convertible into that, or any other gold unit. As a sop to citizens, long accustomed to believing that a dollar was "good as gold", a provision was made that all Federal Reserve Notes would be backed up, 40%, by specific reserves in the form of gold bars (stored either at Fort Knox or in the subterranean vaults of the Federal Reserve Bank in New York), andnational bank deposits would be protected by reserves of 35%, similarly stored away. That worked out pretty well and kept the dollar fairly honest until 1945. The U.S. then needed to expand its currency, having spent so much on World War II, and just been designated as the nation to provide the world money of record -- the dollar -- by the International Monetary Fund, in 1944. So the gold backing for Federal Reserve Notes was reduced to 25%.

In 1965 gold reserves behind bank deposits were eliminated and in 1968 the gold cover for U.S. paper money was eliminated. The U.S. dollar then became a greenback like the $400 million paper dollars issued after the Civil War, unbacked by any reserve of precious metals, either gold or silver. The only tie to gold left, was the privilege, accorded to central banks of foreign nations, holding dollar balances, to convert these (on request) into gold at $35 an ounce at the U.S.Treasury. Because, however, the U.S.Treasury kept on printing dollar bills and monetizing debt, and had, by mid-1971, flooded Europe with some $80 billions of migratory dollars, when France and Switzerland in August 1971 requested conversion of some $300 million dollars into gold, President Nixon slammed down the gold window. He eliminated all convertibility and arbitrarily announced a 10% devaluation of the dollar. It then became officially one thirty eighth of an ounce of gold, a phantom evaluation. Then the dollar was floated (it's strange to say it was floating when it was actually sinking), only to dip and waver from day to day in a weird kaleidescopic relationship with other national currencies. The first devaluation was not enough, so on Feb.12, 1973 there was another - this time arbitrarily valuing the dollar at $42.22 per ounce of gold.

In the meanwhile gold, now a free commodity on the markets of the world,

Thought this would be educational in your quest for more information
H.W.

kept moving up, stimulated by rising demands for industrial, artistic and scientific use and the avidity of hoarders who historically have mistrusted all paper money. More recently its price advance has been spurred by heavy purchase by 1) Arabs who would rather have gold than dollars in payment for their oil, and 2) by Japanese who on April 1, 1973 for the first time were permitted to own gold legally. So we have seen gold reach $128 an ounce in 1973. Dr. Schultz, I, and many other students of gold believe that it will go much higher.

In all of these developments you will see that gold has played a major part even though it has been denigrated, derided and vilified continuously by highly influential U.S. economists, bankers, and treasury officials.

So now I warm to my task, which is to document, beyond doubt, the indispensibility of gold as money, and the king of metals exerting a pervasive influence for 6000 years on the history of mankind. For in truth, the availability, the acquisition and the use of gold has motivated the rise and fall of nations and empires, and often been a key factor in the expansion and regulation of industry, banking, international commerce and trade; the winning and losing of wars that have dramatically altered national boundary lines and inexorably affected the freedom, living conditions, and economic opportunities of hundreds of millions of peoples. Only a jackass would say that gold is too valuable to use for money! Only a jackass would assert that gold is "a barbarous relic."

Let's turn back for a few moments the pages of history and see how gold got its start, became man's most cherished portable asset. Why it became so important that in the financial centers of the world the dominant question asked each business day by banking and industrial leaders is "What is the price of gold?" The gold price is indeed the thermometer that tells us how sick the dollar is; and the dollar in its sinuous and unpredictable relationship with other major currencies, is intertwined in the determination of profits and losses, interest rates and the extent to which the savings and fixed incomes of people around the world may be eroded or destroyed by inflation.

Everything that has happened to the U.S. dollar since 1933 has been the result of a deliberate iniquitous and continuous conspiracy to downgrade gold, and ultimately demonetize it, and to pave the way for monetarily illiterate and devious politicians to perpetuate the errors of Keynes, through progressive inflation, ever rising costs of labor, escalating debts and printing of paper dollars without limit, -- all in a hopeless endeavor to maintain full employment and escape recession or depression. The premise of two generations of politicians in America that gold is outmoded has been dead wrong. The cumulative financial wisdom of intelligent men for 2600 years clearly has established gold as the ideal and the essential monetary metal for any nation destined for greatness and survival.

Almost all the commodities you can name wear out, break up, are consumed or become eroded, rusted, tarnished, used up or thrown away. Except gold! Gold because of its unique qualities is different. It is the most beautiful of metals with a permanent yellow luster that has attracted men and enraptured women since its magnetic glitter in dust or nuggets first caught the attention of the river people along the banks of the Nile and the Euphrates, thousands of years ago. Gold is maleable, ductile, ornamental, divisible, is easily alloyed or worked with other metals,

heat-resistant and an excellent conductor of electricity. It will not tarnish, fade, corrode or rust, and is impervious to the elements. No material possession of man is more durable, and few are heavier. A cement bag filled with gold would weigh over 1,050 pounds and be worth about $1,800,000 (at $105 an ounce). Very early in history, gold became a symbol of wealth, status and power -- and it still is.

Gold Demand for Currency.

Some time around 3,000 B.C. men had become sufficiently civilised so that they had developed commerce and trade by land and sea over a wide region; and there was a real need for a better method than crude barter in the exchange of goods. What was sought was both a medium of exchange and a standard and store of value, available in interchangeable units -- in other words, money. In their quest for a practical money, primitive peoples tried, at one time or another, almost everything of value that was reasonably portable: copper, rocks, sea shells, ivory, beads, grain, salt, fish, cattle, hides and women. After centuries of trial and error it appeared that metals made the best money, and that gold was the best of the metals. Even then some ingenuity was required to create a uniform trading unit. Pioneering in this effort was King Menes of Egypt who, at about 3200 B.C., designed 14-gram gold bars bearing his name which gained some acceptance in the Nile Valley. A thousand years later, other Egyptian kings came upon something a little more convenient -- gold rings of uniform diameter and weight. In Babylon around 2000 B.C., a medium ofexchange known as a shekel came into use. It was a small gold bar weighing 8½ grams and, used as money in those heathen days, it was worth enough to purchase an ox! This shekel probably rates as the first practical money form, because the Babylonians were great trading people and they used this currency exclusively in commerce in Mesopotamia, Persia and possibly as far as India.

The credit for the first actual coinage goes to King Gyges of Lydia who minted gold into crude coins shaped like lima beans, in 700 B.C. Forty years later, a famous descendant of Gyges, King Croesus, struck similar coins of pure gold, but he identified them with a lion and a bull squaring off at each other on the obverse ; and a square mark on the reverse. These coins were the forerunners of all the millions of coins struck in the centuries since, in a bewildering variety of size, shapes, art work and markings, by over 800 different states or governments. And they set the stage for the most insistent demand for gold throughout history - to make money. Today 65% of the world's known gold supply is in the monetary reserves of nations, for the most part in standard-sized gold bars.

While gold has been widely used in jewelry ornamentation and the arts, and the Egyptians buried their dead with fantastic works of gold art including solid gold coffins, most of the newly mined gold throughout all hsitory has been used to meet the money demand, and as the preferred metal for monetary reserves. For some reason gold has always been in short supply and its scarcity has contributed to its preeminence as a money metal.

The place of gold in the power struggles of nations became increasingly evident after coined money began to circulate freely in the Mediterranean World. King Croesus didn't have much luck with his gold coins because,

only a few years after his monetary breakthrough, King Darius of Persia conquered Lydia and immediately took over and copied the coinage systems. For the next few centuries the gold Persian daric became the major regional currency, used in trade as far East as India; and an essential ingredient in the expansion and military prepotence of Persia.

When Persia declined, and was conquered by Alexander of Macedonia, his first appropriation was the store of gold and the coinage facilities of the Persian treasury. This gold provided Alexander with the funds to equip and expand his army, to reward his invincible generals, and to finance further conquests. When Alexander went on to conquer Egypt he won the golden treasury of that nation and was then in funds to finance his military aggression as far as the gates of India and to pine for "new worlds to conquer." It is not hard to argue that one of the principal factors in the success of Alexander and his vast expansion of the Macedonian Empire was the bulging treasure in gold that he had pirated from each conquered nation.

The next great empire in the Mediterranean World was Rome. Here again gold played a strategic part. Rome as a republic had to fight three wars before it conquered Carthage (in 241 B.C.); but this conquest was a prerequisite for the creation of the Roman Empire. Carthage was a sea power and controlled the shipping routes to Spain, where (after Egypt) the greatest production of gold was in progress. When Rome possessed this gold, its Treasury fattened in a hurry. Julius Caeser became governor of Spain for a few years, and came back a gold multi-millionaire. With this stake he went on to be the most powerful man in Rome, and set the stage for Augustus -- the greatest government administrator the world has ever known. A poor Julius Caesar would have been just another general -- a rich one became the catalyst of the Roman Empire.

Nobody appreciated gold more than Caesar Augustus. He expanded gold production in Spain, and took all of the gold from Cleopatra's kingdom after the battle of Actium. While he constituted the denarius, (a silver coin), as the money in common circulation, the backup on reserve money of Rome was the aurelius, a gold coin preserved with its original content and quality for 75 years until Nero came along and started Rome down hill by fiddling around and cheapening its money. When the Roman people began to grow soft, lazy and indolent they tried to buy off their border enemies with gold rather than fight them as of old (the Teutonic tribes were too tough). This "payoff" delayed the fall of Rome; but there was not enough gold coinage and character left in Rome to prevent it.

Next, the glory that was Rome swung, under the Emperor Constantine, to the East with Constantinople as capital, in 330 A.D. Again gold was instrumental in Empire success and survival. Under Constantine there was first minted the besant, a gold coin of 65 grams, .975 fine. This coin had a replica of the Emperor's head on it, and was minted without change or dilution for over 1000 years. It was probably the coin with the longest acceptance of any in history, honored from Bombay to the Baltic. The besant extended the life of the Eastern Empire, during the last two centuries of its existence by keeping barbarians at the frontiers deterring them from attack or invasion, by golden bribes.

Paralleling the besant, between 750 A.D. and 1150 A.D., was another almost identical gold coin, the dinar, circulated in Arab countries from Syria to Spain along the coastline of North Africa -- illustrating

again the political adhesiveness made possible by gold, and its economic importance in the establishment and expansion of political power.

Promulgation of dependable gold coins, the florin and the ducat, was important to the commercial prowess and regional political importance of the Italian City-States, Florence and Venice at the end of the Middle Ages.

The next milestone in the influence of gold on world history was the Spanish invasion of Central and South America. This brought to Europe countless galleons loaded with gold from the New World. As long as Spain could protect its gold supply lines, Spain was Number One among the nations of Europe; but British pirates and freebooters led by Sir Francis Drake captured Spanish vessels in profusion, gaining great quantities of Sanish bound gold on the high seas. In due course, Spain lost her place at the top with the defeat of the Spanish Armada in 1588.

From then on, till the beginning of World War II, it was Britain that waxed great with the backing of gold. Its pound sterling, convertible into gold from 1821 until 1931, was the most widely accepted money in world history. It stabilized trade and, as a medium of exchange and a standard and store of value it was unrivaled.

Next the United States emerged with its economy moving ahead by leaps and bounds after the finding of gold in California in 1848, opening up California and the West, and building San Francisco from a modest Pacific port with 2000 population, into the leading city of the West. U.S. became and remained the top power in the world so long as it had a large store of gold and a dollar geared to it as a reserve metal. The recent inflation, and the devaluations of the dollar have shown once again the essentiality of gold as a monetary reserve. American stature has declined almost in direct relationship to the decline of its treasury gold from $24.6 billion in 1949 to $11.3 billion today (valued at $42.22)

So where are we now? In a limbo in which no nation has a convertible currency, and there is a woeful need for a reliable and dependable money. What will this be? More paper dollars? More special Drawing Rights (which are nothing but global greenbacks)? Continuous floating currency without any fixed point of reference? No way!

As I have tried to suggest, the clear message of history is that gold is essential to sound money and to the survival of nations. No other commodity has been so widely and so willingly accepted by men at all times, and in all nations in exchange for other material possessions goods or services. In times of famine, invasion, national emergency, depressions and devaluation nothing has provided better financial shelter and assurance than gold. Gold is the ultimate unit of settlement of debts between nations and in war has proved an indispensible asset and sinew in time of war making possible the purchase of vital miltary supplies from other nations who would never accept dubious or depreciating paper currency in payment. All the great national financial disasters of nations -- the assignats of the French Revolution, the trillions of paper marks in Germany in 1923,

and the worthless Continentals of the American Revolution are witness to the fact that without maintenance of adequate gold reserves, financial disaster is always a possibility.

As national civilizations acquired and added to their stores of gold by trade or conquest, made it official by coinage and official designation, and waxed great by a control of this metal and use of it to enhance political power, they added to volume of refined gold in existence assuring a perpetuation of the influence on the progress, flowering or downfall of nations.

So let us here, today, reaffirm our faith in gold, the desirability of its ownership by individuals in coin, bar or mining shares, and the necessity of return to gold as a reserve for world currencies at a gold price that 1) can be stabilized, 2) equate the higher current costs of its production and, 3) stimulate gold exploration and mining. Such a price I conceive to be $150 to $200 an ounce.

Thank you.

43-44
112-113

EVALUATION OF ENGINEERING AND COST DATA, GOLD DRY PLACER OPERATIONS OF LIZDON CORPORATION

May 7, 1961

Lizdon Corporation
Kelsey L. Boltz
Geological Engineer

NOTE:

Subsequent to the compilation of the data contained in this report, all of the assets and personnel of Lizdon Corporation have been transferred to United Placer Industries, Inc.

1. INTRODUCTION

The purpose of this report is to outline and evaluate the pertinent data obtained from the pilot-test plant operation from October 8, 1960 to April 17, 1961.

II. HISTORY

In the "Report on the Dry Placers of the Southwestern United States", August 1, 1960, by Charles A. Lee and Kelsey Boltz for Lizdon Corporation, it was proposed that a pilot-test unit of approximately 10 cubic yards per hour capacity be constructed. After completion of detailed design, Lizdon engaged a machinery manufacturing company to fabricate this plant to Lizdon specifications. By October 8th the plant was completed and brought to the San Domingo Placer field near Morristown, Arizona, and set up on claims owned by Desert Gold Mining Company. The subsequent work performed by Lizdon on these claims accomplished several purposes simultaneously.

1. With test unit Lizdon was under contract to Desert Gold to evaluate placer beds designated by Desert Gold.

2. During said property evaluation Lizdon con-continuously adjusted and modified the plant to obtain maximum efficiency of the plant.

3. Operation provided continuous observation and evaluation of plant performance with respect to:

   a. Recovery of free gold particles
   b. Cost of operation

4. Provided enough data to prove that this method of poperty evaluation is completely reliable for determining the following:-

a. Recoverable unit value of placer deposits
b. Volume of deposits
c. Design of production plant
d. Capital investment of production plant
e. Operation costs of production plant
f. Profit projection

III. BASIC PRINCIPLES OF OPERATION OF LIZDON PORTABLE DRY PLANT.

General: The Lizdon dry placer dredge is comprised of a mechanical excavator, a screening and separating plant, each mounted on movable platforms. The Dry Dredge equipment performs five functions:

1. Excavates and loads the placer material.
2. Screens material to determined size; oversize going to tailings, fines to dryer.
3. Removes sufficient moisture from fines to permit gold separation.
4. Extracts free gold particles.
5. Deposits tailings to rear of dredge.

The Lizdon Dry Dredge differs in principle from the floating wet dredges only in that no water is used either for moving the dredge or as a separating medium.

Pilot-Test Unit. Following is the flowsheet with the specifications and operational principles of same:

A. Excavating and loading.

1. Operation

The placer material is excavated by the slusher bucket and is drawn up a 45° loading ramp and is dumped on to a 6" grizzly.

B. Screening.

1. The material drops directly from the 6" grizzly on to a double deck vibrating screen where material greater than 10 mesh is removed and the minus 10 mesh portion containing the gold particles flows by gravity into a surge hopper below the screen.

C. Drying

1. The minus 10 mesh portion is conveyed under infra red generators where the material is heated to approximately 120°F. The infra red rays are generated by the combustion of butane gas drawn from a separate portable tank.

2. The material is then fed into an aerator which quickly evaporates sufficient moisture for the efficient operation of the electrostatic separator.

D. Gold Separation

1. The material is next gravity fed on to an air-electrostatic separator which simply and quickly removes the free gold particles.

E. Tailing Disposal

1. The oversized material from the vibrating screen and the waste material from the electro-static separator are gravity fed on to a conveyor belt which deposits these tailings at the rear of the unit.

F. Power

1. The entire pilot plant receives its power from a 15 KW diesel powered electric generator which is mounted on a 4-wheel drive

truck. This truck also serves as the dead man for the slusher tail cable and is also used for pulling and positioning the test unit.

With the exception of the aereator and the electrostatic separator all the basic components are standard manufactured items which are widely used in the dirt excavating and moving industries, and in the aggregate screening industries. Therefore, this provides for:

1. Simplicity of maintenance and operation.
2. Easily obtainable replacement parts.
3. Accurate operational cost analysis.

OPERATION: The test unit has a capacity of from 5 to 15 cu. yds. per hour depending on the character of the gravels. Generally the plant is positioned in such a manner as to cut the sample pits from surface to bedrock across the width of the channel. These pits range from 3 to 5 feet wide and up to 100 feet in length, and can reach a depth of 25 feet. The pits thus may yield up to 100 cu. yds. of material, all of which is processed, recovering the free gold particles. For preliminary exploration, the pits are widely spaced (up to 1000 feet apart) along the subject channel. If favorable results are thus obtained, pits are then positioned between the exploration cuts for accurate determination of data. These development pits are thus eventually spaced from 200 to 400 feet apart, again depending upon the nature of the particular deposit.

PERSONNEL: Two men comprise the operating crew of the test unit. One is an experienced equipment operator with a

working knowledge of machinery, mechanics and welding. The other is a graduate engineer who periodically adjusts the plant and gathers and records all pertinent engineering data. This data includes the following:

1. Areal and cross sectional geologic mapping.
2. Screen analyses of placer material.
3. Screen analyses of gold particle size.
4. Analyses of composition of placer materials.
5. Moisture analyses.
6. Correlation of gold concentration with respect to stratigraphic position in gravels.
7. Plant performance and efficiency.
8. Scheduling and positioning of sample cuts.

This data is then compiled into a concise report and analyzed to determine production projection.

One of the most important features of this procedure is that the method of sampling is exactly the same as the method of production. Actually, this sampling is in reality a limited scale production. Therefore, because of this large volume sampling, the recovery and costs are accurately expanded from sampling to production, reducing the error to an absolute minimum.

<u>Engineering Data Obtained by the Test Plant on the San Domingo Placer Field:</u> Following is a tabulation of the data obtained by the pilot-test unit in partial evaluation of the Desert Gold Property and in evaluation of the efficiency of the pilot-test unit itself. Four of the tabulated pits were evaluated by Lizdon

Corporation under contracts to MacDonald Construction Company and Rare Metals Corporation.

LIZDON PILOT TEST UNIT ANALYSIS OF PITS [illegible]47 INCL. FOR DESERT GOLD MINING CO.

Pit No.	Cu.Yds. Processed	Total Au Recovered	Value Au Recovered $(-10\%)	Recovered Au $ per cu. yd.	Assay of Composite Tailings Sample oz/ton	Recovery %	Bank Est. Moisture %	Size Au % thru 0.065"	Gravel Approx. Ratio +0.104" to -0.104"
1	Inclement weather prevented completion -- Results not usable.								
2	26.0	28.68 gm	31.86	1.22	Trace	90 plus	10%	99.8	3:1
3	26.7	12.91 gm	14.29	0.54	Trace	90 -plus	10%	98.0	3:1
4	26.4	13.94 gm	15.57	0.59	Nil	90 plus	5%	98.5	2.5:1
5	27.1	16.61 gm	18.54	0.69	0.001	90 plus	12%	100.0	2.5:1
6	9.5	4.76 gm	5.31	0.56	0.001	90 plus	15%	100.0	2:1
7	23.4	3.17 gm	3.54	0.15	Nil	90 plus	7%	100.0	3:1
8	34.0	0.78 oz.	27.30	0.72	Trace	90 plus	10%	97.0	3:1
9	32.0	0.623 oz.	21.81	0.62	0.002	88.7	5%	100.0	2.5:1
10	70.0	1.44 oz.	50.40	0.65	Trace	90 plus	5%	100.0	2.5:1
11	Inclement weather prevented completion -- Results not usable.								
12	106.0	1.95 oz.	68.25	0.64	Nil	90 plus	5%	99.1	2.5:1
13	43.5	0.94 oz.	32.90	0.76	Trace	90 plus	10%	98.5	3:1
14	77.5	1.62 oz.	56.70	0.73	Trace	90 plus	10%	-	3:1
15	Not completed								
16	40.0	1.23 oz.	43.05	1.08	Nil	90 plus	10%	99.0	3:1
17	89.8	1.80 oz.	63.00	0.63	0.002	88.7	12%	100.0	3:1
	FOR MAC DONALD CONSTRUCTION COMPANY								
M1	51.2	2.20 oz.	77.00	1.50	Trace	90 plus	12%	97.0	3:1
M2	71.2	4.50 oz.	157.50	2.21	Trace	90 plus	12%	97.0	3:1
	FOR RARE METALS CORP.								
R1	31.0	0.115 oz.	3.67	0.12	Nil	90 plus	5%	100.0	2:1
R2	6.7	0.019 oz.	0.66	0.09	Nil	90 plus	5%	100.0	2:1

The composition of the San Domingo placer field is more or less typical of the desert placers of southwestern United States. A composite screen analysis pertinent to this operation is as follows:

+ 6"	5%
- 6" + 1"	20%
- 1" + 1/4"	20%
- 1/4" + 0.080"	20%
- 0.080" + 100m	25%
- 100m	10%

This material is moderately to loosely compacted. The clay content is not excessive. The above performance data of the pilot-test unit indicates that the process used by Lizdon is quite efficient in its recovery of contained free gold particles.

IV. PRODUCTION PLANT OPERATIONAL COST PROJECTION

In order to accurately estimate the operational costs, it is necessary, as well as convenient, to arrive at a figure expressed in dollars per hour of plant operation and in cents per cubic yard of material processed. To derive this estimate, data from the test unit is combined with operational data and experience with the standard equipment to be used. Each piece of equipment is selected to:

1. Perform the desired physical operation while
2. operating at optimum efficiency, which means
3. at the lowest possible cost.

That is, each piece of equipment is balanced with each of the other components of the plant.

Costs are estimated for each of the following items:

1. Excavating and loading
2. Screening
3. Drying
4. Extraction
5. Tailings disposal
6. Power
7. Engineering and supervision
8. Laboratory
9. Transportation
10. Office
11. Interest, insurance and taxes
12. Travel, legal and accounting

The following cost estimate is based upon operation of the pilot plant on three placer fields in Southwestern Arizona and is projected to an operation of 150 cu. yds. per hour.

EXCAVATING AND LOADING:

(Michigan 275 rubber tired 4 1/2 cu. yd., Clark Equipment Co., Manufacturer, Capitalized $43,500.)

Fixed Cost	Dollars per hr.	Cents per cu.yd
Depreciation (10,000 hours)	3.16	2.11
Interest, insurance & taxes	1.15	0.76
Operating Cost		
Fuel @ .20 gallon	1.20	0.80
Lubrication and oil	0.19	0.13
Maintenance and repair	1.90	1.27
Hydraulic Oil	0.04	0.03
Tires	1.25	0.83
Labor	3.50	2.34
	12.39	8.27

SCREENING (Capitalized $25,000.)

Fixed Cost	Dollars per hour	Cents per cu. yd.
Depreciation (20,000 hrs.)	1.25	0.84
Operating Cost		
Labor	3.50	2.33
Maintenance	3.15	2.09
	7.90	5.26

DRYING (Capitalized $10,000.)

Fixed Cost	Dollars per hour	Cents per cu. yd.
Depreciation (20,000 hrs.)	0.50	0.30
Operating Cost		
Butane	6.30	4.20
Labor	1.50	1.00
Maintenance & Repair	1.35	0.90
	9.65	6.40

EXTRACTION (Capitalized $30,000.)

Fixed Cost	Dollars per hour	Cents per cu. yd.
Depreciation (20,000 hrs.)	$0.66	0.44
Operating Cost		
Labor	3.50	2.33
Maintenance	3.15	2.09
	7.31	4.86

TAILINGS CONVEYING (Capitalized $9,000.)

Fixed Cost	Dollars per hour	Cents per cu. yd.
Depreciation (20,000 hrs.)	0.45	0.3
Operating Cost		
Labor & Maintenance	0.60	0.4
	1.05	0.7

POWER (100 KW Diesel-powered Electric Set) Capitalized $7,000.

Fixed Cost	Dollars per hour	Cents per cu. yd.
Depreciation (20,000 hrs.)	0.35	0.23
Operating Cost		
Fuel @ 20¢ gal.	2.00	1.33
Lubrication & oil	0.10	0.07
Maintenance & repair	0.35	0.23
	2.90	1.86

FIXED OVERHEAD

	Dollars per hour	Cents per cu. yd.
Laboratory	2.00	1.33
Transportation	1.25	0.83
Engineering & Supervision	5.00	3.32
Office	2.00	1.33
Interest, insurance & taxes	2.00	1.33
Travel, legal, and accounting	4.00	2.66
	16.25	10.80

TOTAL COSTS

Operating Costs	Dollars per hour	Cents per cu. yd.
Excavating & loading	12.39	8.27
Screening	7.90	5.26
Drying	9.65	6.43
Extraction	7.31	4.86
Conveying	1.05	0.70
Power	2.90	1.86
	41.20	27.38
Fixed Costs		
Engineering & Supervision	5.00	3.32
Laboratory	2.00	1.33
Transportation	1.25	0.83
Office	2.00	1.33
Interest, insurance & taxes	2.00	1.33
Travel, legal, accounting	4.00	2.66
	16.25	10.80
GRAND TOTAL	57.45	38.18

LIZDON CORPORATION

Kelsey L. Boltz

Kelsey L. Boltz
Registered Professional Engineer
#3165 New Mexico

ADDENDUM TO REPORT BY KELSEY L. BOLTZ MAY 7,

entitled

EVALUATION OF ENGINEERING AND COST DATA, GOLD

DRY PLACER OPERATIONS OF LIZDON CORP.

Subsequent to the writing of the foregoing report, United Placer Industries, Inc., undertook to construct a dry dredge of a capacity of from 30 to 50 cubic yards per hour. The purpose of this plant was to enable United Placers Industries to more quickly evaluate the placer deposits held by it under lease. The pilot unit, although very efficient in recovery, was slow in evaluation because of its limited capacity (5 to 15 cubic yards per hour). During the design of the 30 to 50 cubic yard plant United Placer Industries decided to increase the capacity to more than double (75 to 100 cubic yards per hour) and simultaneously retain its high mobility factor. In so doing, this plant could be used for large scale, rapid evaluation and, in areas of substantial recoverable values could economically maintain its operation.

This plant was completed and put into operation the latter part of October, 1961 on the San Domingo Placer Field for the purpose of further evaluation of that deposit. Inclement weather in the area forced United Placer Industries to move the plant to the Weaver Creek deposit eight (8) miles north of Wickenburg, Arizona, where it has been engaged in evaluation of the Oro Fino Wash of the said deposit.

After completion of deposit evaluation and, in the event of the encounter of substantial recoverable values, it is the present intent of United Placers Industries to put this plant into production operation. In order to use this plant as a production plant it is necessary to determine the minimum recoverable values required to pay for the cost of operation; that is, the cost of operation of the 75 to 100 cubic yards per hour plant on a production basis.

The operation of the plant on a production basis differs somewhat from the operation as an evaluation unit. Based upon its evaluation operations to date, the following is an estimate of the cost of operation as a production unit:

ESTIMATE OF COST OF OPERATION OF 75 to 100 CU. YDS. per hour PLANT

FIELD OPERATION	$ Per Day
Labor	
3 Loader operators @ $2.50 per hour	$ 60.00
3 Plant operators @ $2.75 per hour	66.00
Salaried Personnel	
1 Diesel Electric Mechanic and welder	28.00
1 Clean-up and laboratory man, bonded	28.00
1 Superintendent	32.00
Living and transportation expense of superintendent & mechanic	20.00
Fuel	
Diesel, 480 gallons per day @ 20¢	96.00
Butane, 280 gallons per day @ 16¢	45.60
Gasoline	12.00
Materials and Supplies	
Welding, steel, belts, chains, filters, oil, grease, etc.	120.00
Insurance and taxes	35.00
Office, bookkeeping telephone, office manager	50.00
Legal, Accounting	20.00
Transportation	15.00
Sub total	627.60
Depreciation: $120,000. capital investment of plant over 5-year period	65.75
Sub total	693.35
Development and exploration	100.00
Contingencies 10% of total	79.34
Grand Total per Day	$872.69

The above cost is based on 24 hours per day operation; i.e., three eight (8) hour shifts. It is reasonably assumed that twenty (20) hours will be productive hours at the rate of 85 cubic yards per hour which will yield 1700 cubic yards per day.

Cost per cubic yard = $\frac{\$872.69}{1700 \text{ cu.yd.}}$ = 51.3¢ per cubic yard.

Capitalization of 75 to 100 cubic yards per hour plant.

Subject to final revisions by the accounting department of United Placer Industries the cost of building and placing this plant into operation is placed at $120,000. It must be stated here that considerable amount of experimentation is included in this cost and that subsequent plants of this size can be produced at a cost not to exceed $100,000.

Grade, Capacity, Cost and Profit.

It is seen from the foregoing cost estimates that the cost of operation per cubic yard decreases as the capacity of the plant is increased. It follows, therefore, that lower grade deposits may be profitably operated with larger capacity plants, other conditions being equal.

For example, a realistic assumption is the operation of a deposit containing 75¢ per cubic yard recoverable gold content.

For a 75 to 100 cubic yard plant the economics are:

Recoverable Value per cu. yd.	75¢
Cost per cubic yard	52¢
Net profit per cubic yard	23¢

@ 1700 cubic yards per day, net profit = $391.00 per day
9,775.00 per month
117,300.00 per year

For a 150-cu. yd. plant the economics are:

Recoverable Value per cu. yd.	75¢
Cost per cubic yard	38¢
Net profit per cubic yard	37¢

@ 3000 cubic yards per day, net profit =$ 1,110. per day
= 27,750. per month
=333,000. per year

To realize the same net profit per cubic yard as the 75 to 100 yard plant on a 75¢ placer, the 150 yard plant can operate on a placer yielding 61¢ per cubic yard. I.E.:

Recoverable value per cu. yd.	61¢
Cost per cubic yard	38¢
Net profit per cubic yard	23¢

@ 3,000 cubic yards per day, net profit = $ 690.00 per day
= $ 17250.00 per month
= $207,000.00 per year

To realize the same yearly profit as a 75 to 100 yard plant on a 75¢ placer, the 150 yard plant can operate on a placer yielding 51¢ per cubic yard. I.E.:

Recoverable value per cu. yd.	51¢
Cost per cubic yard	38¢
Net profit per cubic yard	13¢

@ 3,000 cubic yards per day, net profit = $ 391.00 per day
= $117,300.00 per year

It is the plan of United Placer Industries to eventually construct and operate plants of size up to 1,500 cubic yards per hour capacity. It can be reasonably expected that such plants will operate at a cost considerably lower than those of the foregoing estimates. It is well established that deposits that will yield 25¢ per cubic yard are very extensive and that such deposits will become profitable operated with large capacity dry dredges of this type.

In the foregoing calculations the physical conditions of the deposits are the same; that is, taken as those encountered in the San Domingo Placer Field. It is understood that the capacities, recoveries and resulting economics will vary with different deposits.

Respectfully submitted,

Kelsey L. Boltz

KB/d

EVALUATION OF ENGINEERING AND COST DATA, GOLD DRY PLACER

OPERATIONS OF LIZDON CORPORATION

May 7, 1961

Lizdon Corporation
Kelsey L. Boltz
Geological Engineer

NOTE:

Subsequent to the compilation of the data contained in this report, all of the assets and personnel of Lizdon Corporation have been transferred to United Placer Industries, Inc.

1. INTRODUCTION

The purpose of this report is to outline and evaluate the pertinent data obtained from the pilot-test plant operation from October 8, 1960 to April 17, 1961.

II. HISTORY

In the "Report on the Dry Placers of the Southwestern United States", August 1, 1960, by Charles A. Lee and Kelsey Boltz for Lizdon Corporation, it was proposed that a pilot-test unit of approximately 10 cubic yards per hour capacity be constructed. After completion of detailed design, Lizdon engaged a machinery manufacturing company to fabricate this plant to Lizdon specifications. By October 8th the plant was completed and brought to the San Domingo Placer field near Morristown, Arizona, and set up on claims owned by Desert Gold Mining Company. The subsequent work performed by Lizdon on these claims accomplished several purposes simultaneously.

1. With test unit Lizdon was under contract to Desert Gold to evaluate placer beds designated by Desert Gold.

2. During said property evaluation Lizdon con- continuously adjusted and modified the plant to obtain maximum efficiency of the plant.

3. Operation provided continuous observation and evaluation of plant performance with respect to:

   a. Recovery of free gold particles
   b. Cost of operation

4. Provided enough data to prove that this method of property evaluation is completely reliable for determining the following:-

a. Recoverable unit value of placer deposits
b. Volume of deposits
c. Design of production plant
d. Capital investment of production plant
e. Operation costs of production plant
f. Profit projection

III. BASIC PRINCIPLES OF OPERATION OF LIZDON PORTABLE DRY PLANT.

General: The Lizdon dry placer dredge is comprised of a mechanical excavator, a screening and separating plant, each mounted on movable platforms. The Dry Dredge equipment performs five functions:

1. Excavates and loads the placer material.
2. Screens material to determined size; oversize going to tailings, fines to dryer.
3. Removes sufficient moisture from fines to permit gold separation.
4. Extracts free gold particles.
5. Deposits tailings to rear of dredge.

The Lizdon Dry Dredge differs in principle from the floating wet dredges only in that no water is used either for moving the dredge or as a separating medium.

Pilot-Test Unit. Following is the flowsheet with the specifications and operational principles of same:

A. Excavating and loading.

1. Operation

The placer material is excavated by the slusher bucket and is drawn up a 45° loading ramp and is dumped on to a 6" grizzly.

B. Screening.

1. The material drops directly from the 6" grizzly on to a double deck vibrating screen where material greater than 10 mesh is removed and the minus 10 mesh portion containing the gold particles flows by gravity into a surge hopper below the screen.

C. Drying

1. The minus 10 mesh portion is conveyed under infra red generators where the material is heated to approximately 120°F. The infra red rays are generated by the combustion of butane gas drawn from a separate portable tank.

2. The material is then fed into an aerator which quickly evaporates sufficient moisture for the efficient operation of the electrostatic separator.

D. Gold Separation

1. The material is next gravity fed on to an air-electrostatic separator which simply and quickly removes the free gold particles.

E. Tailing Disposal

1. The oversized material from the vibrating screen and the waste material from the electro-static separator are gravity fed on to a conveyor belt which deposits these tailings at the rear of the unit.

F. Power

1. The entire pilot plant receives its power from a 15 KW diesel powered electric generator which is mounted on a 4-wheel drive

truck. This truck also serves as the dead man for the slusher tail cable and is also used for pulling and positioning the test unit.

With the exception of the aereator and the electrostatic separator all the basic components are standard manufactured items which are widely used in the dirt excavating and moving industries, and in the aggregate screening industries. Therefore, this provides for:

1. Simplicity of maintenance and operation.
2. Easily obtainable replacement parts.
3. Accurate operational cost analysis.

OPERATION: The test unit has a capacity of from 5 to 15 cu. yds. per hour depending on the character of the gravels. Generally the plant is positioned in such a manner as to cut the sample pits from surface to bedrock across the width of the channel. These pits range from 3 to 5 feet wide and up to 100 feet in length, and can reach a depth of 25 feet. The pits thus may yield up to 100 cu. yds. of material, all of which is processed, recovering the free gold particles. For preliminary exploration, the pits are widely spaced (up to 1000 feet apart) along the subject channel. If favorable results are thus obtained, pits are then positioned between the exploration cuts for accurate determination of data. These development pits are thus eventually spaced from 200 to 400 feet apart, again depending upon the nature of the particular deposit.

PERSONNEL: Two men comprise the operating crew of the test unit. One is an experienced equipment operator with a

working knowledge of machinery, mechanics and welding. The other is a graduate engineer who periodically adjusts the plant and gathers and records all pertinent engineering data. This data includes the following:

1. Areal and cross sectional geologic mapping.
2. Screen analyses of placer material.
3. Screen analyses of gold particle size.
4. Analyses of composition of placer materials.
5. Moisture analyses.
6. Correlation of gold concentration with respect to stratigraphic position in gravels.
7. Plant performance and efficiency.
8. Scheduling and positioning of sample cuts.

This data is then compiled into a concise report and analyzed to determine production projection.

One of the most important features of this procedure is that the method of sampling is exactly the same as the method of production. Actually, this sampling is in reality a limited scale production. Therefore, because of this large volume sampling, the recovery and costs are accurately expanded from sampling to production, reducing the error to an absolute minimum.

<u>Engineering Data Obtained by the Test Plant on the San Domingo Placer Field:</u> Following is a tabulation of the data obtained by the pilot-test unit in partial evaluation of the Desert Gold Property and in evaluation of the efficiency of the pilot-test unit itself. Four of the tabulated pits were evaluated by Lizdon

Corporation under contracts to MacDonald Construction Company and Rare Metals Corporation.

LIZDON PILOT TEST UNIT ANALYSIS OF PITS [illegible]-47 INCL. FOR DESERT GOLD MINING CO.

Pit No.	Cu.Yds. Processed	Total Au Recovered	Value Au Recovered $(-10\%)	Recovered Au $ per cu. yd.	Assay of Composite Tailings Sample oz/ton	Recovery %	Bank Est. Moisture %	Size Au % thru 0.065"	Gravel Approx. Ratio +0.104" to -0.104"
1	Inclement weather prevented completion -- Results not usable.								
2	26.0	28.68 gm	31.86	1.22	Trace	90 plus	10%	99.8	3:1
3	26.7	12.91 gm	14.29	0.54	Trace	90 -plus	10%	98.0	3:1
4	26.4	13.94 gm	15.57	0.59	Nil	90 plus	5%	98.5	2.5:1
5	27.1	16.61 gm	18.54	0.69	0.001	90 plus	12%	100.0	2.5:1
6	9.5	4.76 gm	5.31	0.56	0.001	90 plus	15%	100.0	2:1
7	23.4	3.17 gm	3.54	0.15	Nil	90 plus	7%	100.0	3:1
8	34.0	0.78 oz.	27.30	0.72	Trace	90 plus	10%	97.0	3:1
9	32.0	0.623 oz.	21.81	0.62	0.002	88.7	5%	100.0	2.5:1
10	70.0	1.44 oz.	50.40	0.65	Trace	90 plus	5%	100.0	2.5:1
11	Inclement weather prevented completion -- Results not usable.								
12	106.0	1.95 oz.	68.25	0.64	Nil	90 plus	5%	99.1	2.5:1
13	43.5	0.94 oz.	32.90	0.76	Trace	90 plus	10%	98.5	3:1
14	77.5	1.62 oz.	56.70	0.73	Trace	90 plus	10%	-	3:1
15	Not completed								
16	40.0	1.23 oz.	43.05	1.08	Nil	90 plus	10%	99.0	3:1
17	89.8	1.80 oz.	63.00	0.63	0.002	88.7	12%	100.0	3:1
	FOR MAC DONALD CONSTRUCTION COMPANY								
M1	51.2	2.20 oz.	77.00	1.50	Trace	90 plus	12%	97.0	3:1
M2	71.2	4.50 oz.	157.50	2.21	Trace	90 plus	12%	97.0	3:1
	FOR RARE METALS CORP.								
R1	31.0	0.115 oz.	3.67	0.12	Nil	90 plus	5%	100.0	2:1
R2	6.7	0.019 oz.	0.66	0.09	Nil	90 plus	5%	100.0	2:1

The composition of the San Domingo placer field is more or less typical of the desert placers of southwestern United States. A composite screen analysis pertinent to this operation is as follows:

+ 6"	5%
- 6" + 1"	20%
- 1" + 1/4"	20%
- 1/4" + 0.080"	20%
- 0.080" + 100m	25%
- 100m	10%

This material is moderately to loosely compacted. The clay content is not excessive. The above performance data of the pilot-test unit indicates that the process used by Lizdon is quite efficient in its recovery of contained free gold particles.

IV. PRODUCTION PLANT OPERATIONAL COST PROJECTION

In order to accurately estimate the operational costs, it is necessary, as well as convenient, to arrive at a figure expressed in dollars per hour of plant operation and in cents per cubic yard of material processed. To derive this estimate, data from the test unit is combined with operational data and experience with the standard equipment to be used. Each piece of equipment is selected to:

1. Perform the desired physical operation while
2. operating at optimum efficiency, which means
3. at the lowest possible cost.

That is, each piece of equipment is balanced with each of the other components of the plant.

Costs are estimated for each of the following items:

1. Excavating and loading
2. Screening
3. Drying
4. Extraction
5. Tailings disposal
6. Power
7. Engineering and supervision
8. Laboratory
9. Transportation
10. Office
11. Interest, insurance and taxes
12. Travel, legal and accounting

The following cost estimate is based upon operation of the pilot plant on three placer fields in Southwestern Arizona and is projected to an operation of 150 cu. yds. per hour.

EXCAVATING AND LOADING:

(Michigan 275 rubber tired 4 1/2 cu. yd., Clark Equipment Co., Manufacturer, Capitalized $43,500.)

Fixed Cost	Dollars per hr.	Cents per cu.yd
Depreciation (10,000 hours)	3.16	2.11
Interest, insurance & taxes	1.15	0.76
Operating Cost		
Fuel @ .20 gallon	1.20	0.80
Lubrication and oil	0.19	0.13
Maintenance and repair	1.90	1.27
Hydraulic Oil	0.04	0.03
Tires	1.25	0.83
Labor	3.50	2.34
	12.39	8.27

SCREENING (Capitalized $25,000.)

Fixed Cost	Dollars per hour	Cents per cu. yd.
Depreciation (20,000 hrs.)	1.25	0.84
Operating Cost		
Labor	3.50	2.33
Maintenance	3.15	2.09
	7.90	5.26

DRYING (Capitalized $10,000.)

Fixed Cost	Dollars per hour	Cents per cu. yd.
Depreciation (20,000 hrs.)	0.50	0.30
Operating Cost		
Butane	6.30	4.20
Labor	1.50	1.00
Maintenance & Repair	1.35	0.90
	9.65	6.40

EXTRACTION (Capitalized $30,000.)

Fixed Cost	Dollars per hour	Cents per cu. yd.
Depreciation (20,000 hrs.)	$0.66	0.44
Operating Cost		
Labor	3.50	2.33
Maintenance	3.15	2.09
	7.31	4.86

TAILINGS CONVEYING (Capitalized $9,000.)

Fixed Cost	Dollars per hour	Cents per cu. yd.
Depreciation (20,000 hrs.)	0.45	0.3
Operating Cost		
Labor & Maintenance	0.60	0.4
	1.05	0.7

POWER (100 KW Diesel-powered Electric Set) Capitalized $7,000.

Fixed Cost	Dollars per hour	Cents per cu. yd.
Depreciation (20,000 hrs.)	0.35	0.23
Operating Cost		
Fuel @ 20¢ gal.	2.00	1.33
Lubrication & oil	0.10	0.07
Maintenance & repair	0.35	0.23
	2.90	1.86

FIXED OVERHEAD

	Dollars per hour	Cents per cu. yd.
Laboratory	2.00	1.33
Transportation	1.25	0.83
Engineering & Supervision	5.00	3.32
Office	2.00	1.33
Interest, insurance & taxes	2.00	1.33
Travel, legal, and accounting	4.00	2.66
	16.25	10.80

TOTAL COSTS

Operating Costs	Dollars per hour	Cents per cu. yd.
Excavating & loading	12.39	8.27
Screening	7.90	5.26
Drying	9.65	6.43
Extraction	7.31	4.86
Conveying	1.05	0.70
Power	2.90	1.86
	41.20	27.38
Fixed Costs		
Engineering & Supervision	5.00	3.32
Laboratory	2.00	1.33
Transportation	1.25	0.83
Office	2.00	1.33
Interest, insurance & taxes	2.00	1.33
Travel, legal, accounting	4.00	2.66
	16.25	10.80
GRAND TOTAL	57.45	38.18

LIZDON CORPORATION

Kelsey L. Boltz

Kelsey L. Boltz
Registered Professional Engineer
#3165 New Mexico

ADDENDUM TO REPORT BY KELSEY L. BOLTZ MAY 7,

entitled

EVALUATION OF ENGINEERING AND COST DATA, GOLD

DRY PLACER OPERATIONS OF LIZDON CORP.

Subsequent to the writing of the foregoing report, United Placer Industries, Inc., undertook to construct a dry dredge of a capacity of from 30 to 50 cubic yards per hour. The purpose of this plant was to enable United Placers Industries to more quickly evaluate the placer deposits held by it under lease. The pilot unit, although very efficient in recovery, was slow in evaluation because of its limited capacity (5 to 15 cubic yards per hour). During the design of the 30 to 50 cubic yard plant United Placer Industries decided to increase the capacity to more than double (75 to 100 cubic yards per hour) and simultaneously retain its high mobility factor. In so doing, this plant could be used for large scale, rapid evaluation and, in areas of substantial recoverable values could economically maintain its operation.

This plant was completed and put into operation the latter part of October, 1961 on the San Domingo Placer Field for the purpose of further evaluation of that deposit. Inclement weather in the area forced United Placer Industries to move the plant to the Weaver Creek deposit eight (8) miles north of Wickenburg, Arizona, where it has been engaged in evaluation of the Oro Fino Wash of the said deposit.

After completion of deposit evaluation and, in the event of the encounter of substantial recoverable values, it is the present intent of United Placers Industries to put this plant into production operation. In order to use this plant as a production plant it is necessary to determine the minimum recoverable values required to pay for the cost of operation; that is, the cost of operation of the 75 to 100 cubic yards per hour plant on a production basis.

The operation of the plant on a production basis differs somewhat from the operation as an evaluation unit. Based upon its evaluation operations to date, the following is an estimate of the cost of operation as a production unit:

ESTIMATE OF COST OF OPERATION OF 75 to 100 CU. YDS. per hour PLANT

FIELD OPERATION	$ Per Day
Labor	
3 Loader operators @ $2.50 per hour	$ 60.00
3 Plant operators @ $2.75 per hour	66.00
Salaried Personnel	
1 Diesel Electric Mechanic and welder	28.00
1 Clean-up and laboratory man, bonded	28.00
1 Superintendent	32.00
Living and transportation expense of superintendent & mechanic	20.00
Fuel	
Diesel, 480 gallons per day @ 20¢	96.00
Butane, 280 gallons per day @ 16¢	45.60
Gasoline	12.00
Materials and Supplies	
Welding, steel, belts, chains, filters, oil, grease, etc.	120.00
Insurance and taxes	35.00
Office, bookkeeping telephone, office manager	50.00
Legal, Accounting	20.00
Transportation	15.00
Sub total	627.60
Depreciation: $120,000. capital investment of plant over 5-year period	65.75
Sub total	693.35
Development and exploration	100.00
Contingencies 10% of total	79.34
Grand Total per Day	$872.69

The above cost is based on 24 hours per day operation; i.e., three eight (8) hour shifts. It is reasonably assumed that twenty (20) hours will be productive hours at the rate of 85 cubic yards per hour which will yield 1700 cubic yards per day.

Cost per cubic yard = $\frac{\$872.69}{1700 \text{ cu.yd.}}$ = 51.3¢ per cubic yard.

Capitalization of 75 to 100 cubic yards per hour plant.

Subject to final revisions by the accounting department of United Placer Industries the cost of building and placing this plant into operation is placed at $120,000. It must be stated here that considerable amount of experimentation is included in this cost and that subsequent plants of this size can be produced at a cost not to exceed $100,000.

Grade, Capacity, Cost and Profit.

It is seen from the foregoing cost estimates that the cost of operation per cubic yard decreases as the capacity of the plant is increased. It follows, therefore, that lower grade deposits may be profitably operated with larger capacity plants, other conditions being equal.

For example, a realistic assumption is the operation of a deposit containing 75¢ per cubic yard recoverable gold content.

For a 75 to 100 cubic yard plant the economics are:

Recoverable Value per cu. yd.	75¢
Cost per cubic yard	52¢
Net profit per cubic yard	23¢

@ 1700 cubic yards per day, net profit = $391.00 per day
9,775.00 per month
117,300.00 per year

For a 150-cu. yd. plant the economics are:

Recoverable Value per cu. yd.	75¢
Cost per cubic yard	38¢
Net profit per cubic yard	37¢

@ 3000 cubic yards per day, net profit =$ 1,110. per day
= 27,750. per month
=333,000. per year

To realize the same net profit per cubic yard as the 75 to 100 yard plant on a 75¢ placer, the 150 yard plant can operate on a placer yielding 61¢ per cubic yard. I.E.:

Recoverable value per cu. yd.	61¢
Cost per cubic yard	38¢
Net profit per cubic yard	23¢

@ 3,000 cubic yards per day, net profit = $ 690.00 per day
= $ 17250.00 per month
= $207,000.00 per year

To realize the same yearly profit as a 75 to 100 yard plant on a 75¢ placer, the 150 yard plant can operate on a placer yielding 51¢ per cubic yard. I.E.:

Recoverable value per cu. yd.	51¢
Cost per cubic yard	38¢
Net profit per cubic yard	13¢

@ 3,000 cubic yards per day, net profit = $ 391.00 per day
= $117,300.00 per year

It is the plan of United Placer Industries to eventually construct and operate plants of size up to 1,500 cubic yards per hour capacity. It can be reasonably expected that such plants will operate at a cost considerably lower than those of the foregoing estimates. It is well established that deposits that will yield 25¢ per cubic yard are very extensive and that such deposits will become profitable operated with large capacity dry dredges of this type.

In the foregoing calculations the physical conditions of the deposits are the same; that is, taken as those encountered in the San Domingo Placer Field. It is understood that the capacities, recoveries and resulting economics will vary with different deposits.

Respectfully submitted,

Kelsey L. Boltz

Kelsey L. Boltz

KB/d

WIDE WORLD PHOTOS INC.
Rockefeller Plaza
N.Y.
20530
2

ELECTROOXIDATION OF REFRACTORY AND SULFIDE MINERALS.

B. J. Scheiner*, R. E. Lindstrom, T. A. Henrie,
U. S. Bureau of Mines,
Reno, Nevada 89505

Electrooxidation procedures were investigated by the U. S. Bureau of Mines for recovery of metal values from low-grade sulfide and refractory ores. The process, which involves electrolysis of ore-brine slurry, was studied both on a bench scale and in a pilot plant. The oxidation process resulted in a favorable extraction of (1) gold from carbonaceous ores; (2) silver from refractory ores; (3) antimony oxide from stibnite; (4) mercury from cinnabar ores; and (5) molybdenum from molybdenite ores without emission of SO_2 gases to the atmosphere.

C. KIRK HILLMAN CO.
SEATTLE, WASH., U.S.
QUALITY DRILLING EQUIPMENT

file Gold
minerals drawer

TABLE OF MULTIPLYING FACTORS

TABLE OF MULTIPLYING FACTORS FOR DETERMINING GOLD VALUE PER CUBIC YARD FOR VARIOUS DIAMETER DRIVE SHOES

To determine the value in cents per cubic yard, multiply the number of Mgs. of gold recovered from the hole by the factor shown in the following table which corresponds to the depth of hole and the proper diameter of drive shoe. These are computed from the following formula:

$$\text{Value per cu. yd.} = \frac{\text{Mg. recovered x price per Mg.}}{\text{Volume (in cubic yards)}}$$

This value is equal to K x Mg. recovered, where K is the proper multiplying factor. The factors are based on the following values:
VALUE OF GOLD $35.00 PER OUNCE.

FINENESS OF GOLD 1000

DEPTH OF DRILL HOLES EXPRESSED IN FEET — DIAMETER OF DRIVE SHOE EXPRESSED IN INCHES

These factors are [illegible] d is represented by a cylinder whose length is equal to the depth of hole and the diameter equal to the diameter of the drive [illegible] than the volume represented by this cylinder. When this is true, the gold actually recoverd is credited to a larger volume of [illegible] ual value per cubic yard is then slightly greater than that shown by calculating using the following table.

Depth to Bedrock	[illegible]" Shoe	[illegible]" Shoe	[illegible]" Shoe	[illegible]" Shoe
6				
6.5				
7				
7.5				
8				
8.5				
9				
9.5				
10				
10.5				
11				
11.5				
12				
12.5				
13				
13.5				
14				
14.5				
15				
15.5				
16				
16.5				
17				
17.5				
18	1.123	.7324	.5500	.3255
18.5	1.092	.7126	.5351	.3167
19	1.064	.6938	.5215	.3084
19.5	1.036	.6761	.5077	.3005
20	1.011	.6592	.4950	.2930
20.5	.9858	.6431	.4829	.2858
21	.9621	.6278	.4717	.2790
21.5	.9399	.6132	.4605	.2725
22	.9185	.5992	.4500	.2664
22.5	.8981	.5859	.4400	.2604
23	.8786	.5732	.4304	.2548
23.5	.8599	.5610	.4216	.2495
24	.8420	.5493	.4125	.2442
24.5	.8248	.5381	.4041	.2392
25	.8083	.5273	.3960	.2344
25.5	.7925	.5170	.3882	.2298
26	.7772	.5071	.3810	.2254
26.5	.7626	.4975	.3740	.2211
27	.7485	.4883	.3670	.2170
27.5	.7348	.4794	.3600	.2131
28	.7217	.4708	.3540	.2093
28.5	.7091	.4626	.3475	.2056
29	.6968	.4546	.3417	.2021
29.5	.6850	.4469	.3358	.1985
30	.6736	.4394	.3300	.1953
30.5	.6626	.4322	.3246	.1921
31	.6519	.4253	.3194	.1890
31.5	.6415	.4185	.3142	.1860
32	.6315	.4120	.3094	.1831
32.5	.6218	.4056	.3047	.1803
33	.6124	.3995	.3000	.1776

Depth to Bedrock	5¼" Shoe	6½" Shoe	7½" Shoe	9¾" Shoe
33.5	.6032	.3935	.2955	.1749
34	.5943	.3877	.2912	.1723
34.5	.5857	.3821	.2870	.1698
35	.5774	.3767	.2828	.1674
35.5	.5692	.3714	.2789	.1651
36	.5613	.3662	.2750	.1628
36.5	.5536	.3612	.2712	.1605
37	.5462	.3563	.2675	.1584
37.5	.5389	.3516	.2640	.1563
38	.5318	.3469	.2604	.1542
38.5	.5249	.3424	.2571	.1522
39	.5182	.3380	.2539	.1503
39.5	.5116	.3337	.2506	.1483
40	.5052	.3296	.2475	.1465
40.5	.4990	.3255	.2445	.1447
41	.4929	.3215	.2415	.1429
41.5	.4869	.3177	.2385	.1412
42	.4811	.3139	.2358	.1395
42.5	.4755	.3102	.2329	.1379
43	.4699	.3066	.2302	.1363
43.5	.4645	.3031	.2275	.1347
44	.4593	.2996	.2250	.1332
44.5	.4541	.2963	.2224	.1317
45	.4491	.2930	.2200	.1302
45.5	.4441	.2897	.2176	.1288
46	.4393	.2866	.2152	.1274
46.5	.4346	.2835	.2129	.1260
47	.4300	.2805	.2106	.1247
47.5	.4254	.2775	.2084	.1234
48	.4210	.2746	.2063	.1221
48.5	.4167	.2718	.2041	.1208
49	.4124	.2690	.2020	.1196
49.5	.4082	.2663	.2000	.1184
50	.4042	.2637	.1980	.1172
50.5	.4002	.2611	.1961	.1160
51	.3962	.2585	.1941	.1149
51.5	.3924	.2560	.1922	.1138
52	.3886	.2535	.1903	.1127
52.5	.3849	.2511	.1886	.1116
53	.3813	.2487	.1868	.1106
53.5	.3777	.2464	.1850	.1095
54	.3742	.2441	.1833	.1085
54.5	.3708	.2419	.1816	.1075
55	.3674	.2397	.1800	.1065
55.5	.3641	.2375	.1784	.1056
56	.3609	.2354	.1768	.1046
56.5	.3577	.2333	.1752	.1037
57	.3545	.2313	.1737	.1028
57.5	.3514	.2293	.1722	.1019
58	.3484	.2273	.1707	.1010
58.5	.3454	.2254	.1692	.1002
59	.3425	.2234	.1678	.09932
59.5	.3396	.2216	.1664	.09848
60	.3368	.2197	.1651	.09766
60.5	.3340	.2179	.1638	.09686

Copyrighted
Do not
Scan.

C. KIRK HILLMAN
SEATTLE, WASH., U. S.
QUALITY DRILLING EQUIPMENT

ENGINEERING DATA

	4" Drive Pipe Inside dia. 3.826"	5¼" Drive Shoe Cutting Edge dia. 5¼"	5" Drive Pipe Inside dia. 4.813"	6½" Drive Shoe Cutting Edge dia. 6½"
Cross-sectional Area	11.4969 Sq. In.	21.6475 Sq. In.	18.1838 Sq. In.	33.1832 Sq. In.
Volume in Cu. In. per Ft. depth	137.9628 Cu. In.	259.7700 Cu. In.	218.3255 Cu. In.	398.1978 Cu. In.
Volume in Cu. Ft. per Ft. depth	.079835 Cu. Ft.	.1503299 Cu. Ft.	.1263394 Cu. Ft.	.2304585 Cu. Ft.
Volume in Cu. Yds. per Ft. depth	.00295695 Cu. Yds.	.00556777 Cu. Yds.	.0046795 Cu. Yds.	.0085355 Cu. Yds.

Depth to which 5¼" drive shoe must be driven to cut out a theoretical volume of one cubic yard ..... 179.6'

Theoretical rise in 4" drive pipe using a 5¼" drive shoe driven to a depth of one foot ..... 22.6"

Depth to which 6½" drive shoe must be driven to cut out a theoretical volume of one cubic yard ..... 117.1'

Theoretical rise in 5" drive pipe using a 6½" drive shoe driven to a depth of one foot ..... 21.9"

	6" Drive Pipe Inside dia. 5.761"	7½" Drive Shoe Cutting Edge dia. 7½"	8" Drive Pipe Inside dia. 7.625"	9¾" Drive Shoe Cutting Edge dia. 9¾"
Cross-sectional Area	26.0666 Sq. In.	44.1788 Sq. In.	45.6636 Sq. In.	74.6621 Sq. In.
Volume in Cu. In. per Ft. depth	312.7997 Cu. In.	530.1450 Cu. In.	547.9632 Cu. In.	895.9450 Cu. In.
Volume in Cu. Ft. per Ft. depth	.181019 Cu. Ft.	.3067958 Cu. Ft.	.3171086 Cu. Ft.	.5184267 Cu. Ft.
Volume in Cu. Yds. per Ft. depth	.00670433 Cu. Yds.	.0113628 Cu. Yds.	.0117447 Cu. Yds.	.01920321 Cu. Yds.

Depth to which 7½" drive shoe must be driven to cut out a theoretical volume of one cubic yard ..... 88.00'

Theoretical rise in 6" drive pipe using a 7½" drive shoe driven to a depth of one foot ..... 20.3"

Theoretical rise in 6" drive pipe using a 7½" drive shoe (using Keystone Constant) ..... 17.9"

Depth to which 9¾" drive shoe must be driven to cut out a theoretical volume of one cubic yard ..... 52.08'

Theoretical rise in 8" drive pipe using a 9¾" drive shoe driven to a depth of one foot ..... 19.6"

B. Basta Mill
Butte, Mont.

COMPARISON OF GOLD VALUES PER TROY OUNCE, GRAIN, MILLIGRAM

Gold Value per Ounce (Dollars)	Gold Value per Grain (Cents)	Gold Value per Mg. (Cents)
58.00	12.0833	.1866
57.00	11.8747	.1834
56.00	11.6664	.1802
55.00	11.4582	.1769
54.00	11.2499	.1736
53.00	11.0416	.1704
52.00	10.8333	.1672
51.00	10.6249	.1639
50.00	10.4166	.1607
49.00	10.2083	.1575
48.00	10.0000	.1543
47.00	9.7916	.1511
46.00	9.5833	.1479
45.00	9.3750	.1447
44.00	9.1666	.1415
43.00	8.9583	.1382
42.00	8.7500	.1350
41.00	8.5416	.1318
40.00	8.3333	.1286
39.00	8.1250	.1254
38.00	7.9166	.1222
37.00	7.7083	.1190
36.00	7.5000	.1157
35.00	7.2916	.1125
34.00	7.0832	.1093
33.00	6.8750	.1061
32.00	6.6666	.1029
31.00	6.4583	.0997
30.00	6.2499	.0965
29.00	6.0417	.0933
28.00	5.8332	.0901
27.00	5.6250	.0868
26.00	5.4167	.0836
25.00	5.2083	.0804
24.00	5.0000	.0772
23.00	4.7916	.0740
22.00	4.5833	.0707
21.00	4.3750	.0675
20.00	4.1666	.0643
19.00	3.9583	.0611
18.00	3.7500	.0579
17.00	3.5416	.0547
16.00	3.3333	.0515
15.00	3.1250	.0482
14.00	2.9166	.0450
13.00	2.7083	.0418
12.00	2.5000	.0386
11.00	2.2916	.0354

CONVERSION TABLE QTS. TO CU. YDS.

Qt.	Cu. Yd.
¼	.0003
½	.0006
¾	.0009
1—	.0012
¼	.0015
½	.0018
¾	.0021
2—	.0024
¼	.0027
½	.0030
¾	.0034
3—	.0037
¼	.0040
½	.0043
¾	.0046
4—	.0049
¼	.0052
½	.0055
¾	.0058
5—	.0061
¼	.0064
½	.0068
¾	.0071
6—	.0074
¼	.0077
½	.0080
¾	.0083
7—	.0086
¼	.0089
½	.0092
¾	.0095
8—	.0099
¼	.0102
½	.0105
¾	.0108
9—	.0111
¼	.0114
½	.0117
¾	.0120
10—	.0123
¼	.0126
½	.0130
¾	.0133
11—	.0136
¼	.0139
½	.0142
¾	.0145
12—	.0148

CONVENIENT EQUIVALENTS

B. Basta Mill
Butte, Mont.

1 Troy Ounce	480	Grains.
1 Troy Ounce	20	Pennyweight.
1 Troy Ounce	31.104	Grams
1 Troy Ounce	1.09712	Avoirdupois Ounces.
1 Troy Ounce	.08333	Pounds.
1 Troy Pound	.822857	Avoirdupois Pound.
1 Troy Pound	13.1657	Avoirdupois Ounces.
1 Troy Pound	0.37324	Kilograms.
1 Avoirdupois Ounce	437.5	Grains.
1 Avoirdupois Ounce	.0625	Avoirdupois Pound.
1 Avoirdupois Ounce	28.349	Grams.
1 Avoirdupois Pound	0.45359	Kilograms.
1 Cubic Foot	1,728	Cubic Inches.
1 Cubic Foot	.0283	Cubic Meter.
1 Cubic Foot	.037037	Cubic Yard.
1 Cubic Foot	7.48	U. S. Gallons. (12 gal buckets
1 Cubic Foot Water weighs	62.425	Pounds.
1 Cubic Yard	27	Cubic Feet.
1 Cubic Yard	46,656	Cubic Inches.
1 Cubic Yard	201.977	U. S. Gallons.
1 U. S. Gallon	3.7854	Liters.
1 U. S. Gallon Water weighs	8.345	Pounds.
1 U. S. Gallon	231	Cubic Inches.
1 U. S. Gallon	0.833	Imperial Gallons.
1 Grain	64.8	Milligrams.
1 Gram	15.43	Grains.
1 Gram	0.03215	Troy Ounce.
1 Second Foot	One cubic foot of water passing a given point in one second.	
1 Second Foot	60	Cubic Feet per Minute.
1 Second Foot	7.48	U. S. Gallons per Second.
1 Second Foot	448.8	U. S. Gallons per Minute.
1 Second Foot	646317	U. S. Gallons per 24 Hours.
1 Second Foot	1	Acre Foot in 12 Hours, 0 Minutes.
1 Second Foot	40	Miners' Inches.
1 Second Foot		About 1 Acre Inch per Hour.
1 Second Foot	1.135	Horse Power falling from a height of 10 Feet.
1 Miners' Inch	.025	Cubic Foot per Second.
1 Miners' Inch	.187	U. S. Gallons per Second.
1 Miners' Inch	1.5	Cubic Feet per Minute.
1 Miners' Inch	11.22	U. S. Gallons per Minute.

Weight per foot 4" Drive Pipe	14.983 Lbs.
Weight per foot 5" Drive Pipe	20.778 "
Weight per foot 6" Drive Pipe	28.573 "
Weight per foot 8" Drive Pipe	43.388 "
Weight per foot 3½" Round Stems	26.08 "
Weight per foot 3¾" Round Stems	28.21 "
Weight per foot 3¾" Round Stems	32.71 "
Weight per foot 4" Round Stems	42.73 "
Weight per foot 4¼" Round Stems	48.23 "
Weight per foot 4½" Round Stems	54.07 "
Weight per foot 4¾" Round Stems	60.25 "
Weight per foot 5" Round Stems	66.76 "

1 Carat = 200 Milligrams

Other Lands May Cash In Surplus Dollars For Gold, Kennedy Says at IMF Meeting

ALL STREET JO

© 1970 Dow Jones & Company, Inc. All Rights Reserved.

FRIDAY, SEPTEMBER 25, 1970

Gold Demand Continues Sharp Climb Overseas On Talk of Price Rises

By a WALL STREET JOURNAL *Staff Reporter*

FROM - KLB

Gold Prices Overseas Highest in Over a Year

U.S. Gold Stock Fell $323 Million During September

Decrease Last Month Left Reserve at $11.49 Billion, Lowest Since Year Ago

IMF Withdrawal Is Cited

By a WALL STREET JOURNAL *Staff Reporter*

WASHINGTON — The U.S. gold stock

[redacted]

(Story on Page 2)

* * *

U.S. Gold Stock Fell $117 Million in August To $11.82 Billion Level

[redacted]

[redacted]

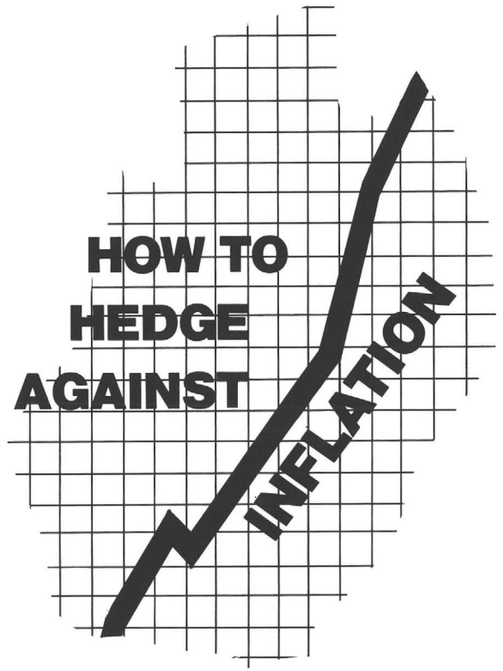
International Investors Incorporated

Investing World-wide Since 1955

122 EAST 42ND STREET, NEW YORK, N.Y. 10017
(212) 687-5200 • TOLL FREE (800) 221-2220

The information contained in this booklet is supplemental to and must be preceded or accompanied by the current prospectus of International Investors Incorporated which includes information about the sales commission and other important facts.

Gold

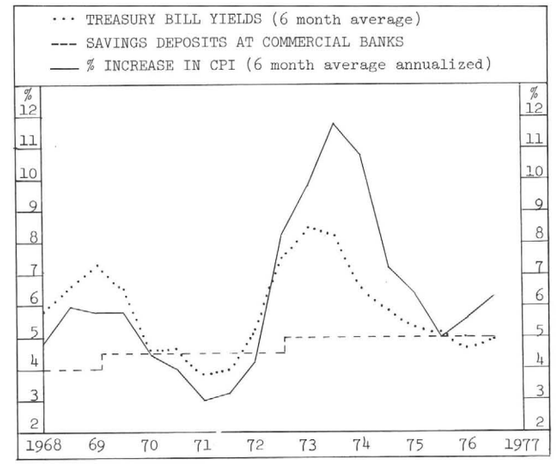


4 GOOD REASONS TO BE GOLD CONSCIOUS

Reason #1

Inflation Cuts Real Interest Returns

SHORT TERM INTEREST YIELDS AND CONSUMER PRICE INDEX



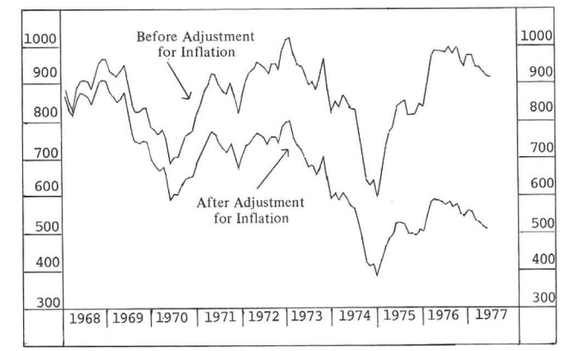
Sources: Economic Report of The President
Federal Reserve Bulletin

The real value of investments in fixed income assets such as bonds or savings and time deposits has been eroding rapidly since 1965. This graph shows you how the growth of the Consumer Price Index has, since 1973, generally been in excess of short term interest rates. Thus, the real rates of return on these lower risk investments, adjusted for inflation, have resulted in negative yields during peak inflation periods. This should serve as a timely reminder to the prudent investor that, in the current environment, fixed income assets cannot effectively protect your capital or your future or present retirement income.

Reason #2

Inflation Reduces Real Stock Values

THE DOW JONES INDUSTRIAL AVERAGE BEFORE AND AFTER ADJUSTMENT FOR INFLATION



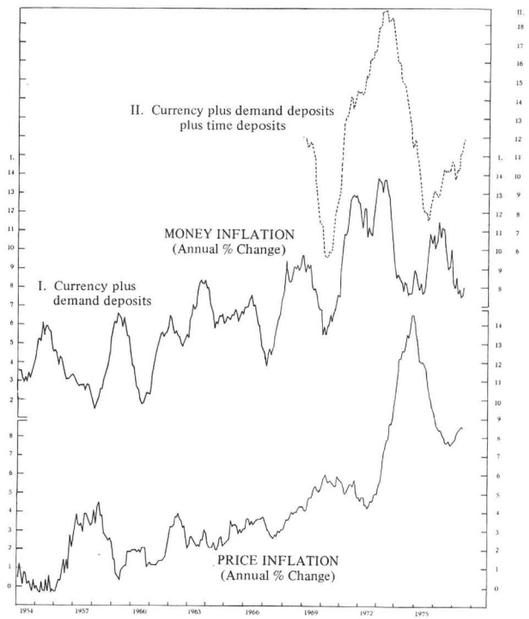
Sources: The Wall Street Journal
U.S. Department of Labor
Van Eck Management Corp.

No one knows better than you, the Investor, that the purchasing power of the dollar continues to shrink rapidly. This graph shows you the Dow Jones Industrial Average before and after the adjustment for inflation. Clearly, investments in industrial common stocks are no longer a hedge against inflation. In fact, it has been difficult, if not impossible in recent years for investors to obtain a real return on their investment, much less protect their capital. As history has proven again and again, having all your assets in industrial common stocks is simply not a good policy in times of strong inflation.

Reason #3

Deficit Spending Fuels Inflation

GLOBAL MONEY AND PRICE INFLATION
(Weighted sum of 11 industrial countries)



Source: Monetary Research Ltd.

Government expenditures have been rising rapidly as governments tried to stimulate their economies to move out of recession and as they increased welfare payments. The resulting deficits were substantially financed by the creation of money "out of thin air" by the banking systems. This graph shows how global money supply has been rising cyclically since 1960. This contributes to price inflation, fluctuating currencies and further uncertainty for investors. The long term rising price inflation erodes both the principal and rate of return on investments. Both the curve and experience would indicate that this trend will continue.

Reason #4

How Inflation and Monetary Turmoil Effect the Gold Market

LONDON GOLD PRICE

Source: Van Eck Management Corp.

Investor demand for gold and gold-related assets is a function of the instability in world monetary, political and social conditions. During the uncertain foreign exchange fluctuations and accelerating inflation in the 1972-4 period, investors purchased large amounts of gold bullion as well as gold mining shares to protect the real value of their savings. Historically, during similar periods of excessive inflation, political uncertainty, growing balance of payments deficits and unusual financial risks, gold and gold mining shares have provided an excellent means of preserving purchasing power against the onslaught of currency debasement.

How it Pays to be Gold Conscious:

By contrast to other investments (represented by Reasons #1 and #2)
INTERNATIONAL INVESTORS INCORPORATED *recorded a substantial increase — not only during the most recent ten year period, but particularly during the 1971-1974 monetary crisis and upsurge in world-wide inflation. You can see this record in the current Prospectus (Tables on page 3 and the Chart on page 9).*

International Investors Incorporated

Now you have "4 Good Reasons" why you should consider gold-related assets an important part of your financial planning.

By investing in INTERNATIONAL INVESTORS INCORPORATED, you obtain the benefit of experienced management that offers you a convenient, diversified, continuously-supervised gold-related investment portfolio.

As a "gold conscious" investor however, you should also be aware that any gold mining investments are subject to inherent physical risks. To help reduce these risks, I.I.I. has interests in over 50 mines to provide you with a wide range of gold mining companies, operating in different geographical and political areas.

These gold mining shares not only serve as a hedge against inflation, but unlike gold bars, they also may provide you with dividend returns to further offset the erosion of your income. (I.I.I.'s portfolio also extends your diversification into silver and uranium mining shares.)

Since inflation is a definite factor today and appears likely to continue, adding I.I.I. shares to your existing investments could increase your overall return. By the same token, such action may well reduce your overall risk while seeking to achieve better long-term performance.

Your golden hedge against inflation should represent between 10% and 50% of your investment portfolio. You may wish to consult your investment adviser or broker to determine the optimal amount. Management strongly recommends that now is the time to gradually start placing some 30% of your investment portfolio into gold — and we believe that I.I.I. is the "gold conscious" way to achieve this goal.

If you agree it pays to be "gold conscious," look into INTERNATIONAL INVESTORS INCORPORATED — today.

John C. van Eck
President

How you can become an INTERNATIONAL INVESTORS shareholder:

There are various programs for buying shares of INTERNATIONAL INVESTORS INCORPORATED, including the Keogh and IRA tax deferred plans. We suggest that you contact your broker or, if you prefer, call our toll-free number (800) 221-2220.

PB 180 068

ANALYSIS OF LARGE SAMPLES OF LOW GRADE GOLD ORES BY METHYL ISOBUTYL KETONE EXTRACTION AND ATOMIC ABSORPTION. STEPHEN L. LAW, ET AL. BUREAU OF MINES, WASHINGTON, D. C. 9P. AUG 68.

UNCLAS

FLD/GP 8G 7B

1 OF 1
PB
180068

END
DATE
FILMED
12-17-68

TPR 7