



## **CONTACT INFORMATION**

Mining Records Curator  
Arizona Geological Survey  
1520 West Adams St.  
Phoenix, AZ 85007  
602-771-1601  
<http://www.azgs.az.gov>  
[inquiries@azgs.az.gov](mailto:inquiries@azgs.az.gov)

The following file is part of the

Arizona Department of Mines and Mineral Resources 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.

01/31/89

ARIZONA DEPARTMENT OF MINES AND MINERAL RESOURCES FILE DATA

PRIMARY NAME: IRON CAP PROPERTY

ALTERNATE NAMES:

WILLIAMS SHAFT

GILA COUNTY MILS NUMBER: 175B

LOCATION: TOWNSHIP 1 N RANGE 15.5E SECTION 15 QUARTER S2  
LATITUDE: N 33DEG 25MIN 35SEC LONGITUDE: W 110DEG 46MIN 10SEC  
TOPO MAP NAME: GLOBE - 7.5 MIN

CURRENT STATUS: PAST PRODUCER

COMMODITY:

COPPER  
SILVER  
GOLD  
URANIUM

BIBLIOGRAPHY:

ADMR IRON CAP MINE FILE  
ARIZONA MINING JOURNAL NOV 1919 P 42, JAN 15  
1922 P 16, MAY 1922 P 24-25  
ADMR CARD FILE  
PETERSON N P GEOL & ORE DEPTS GLOBE-MIAMI  
DIST USGS PP 342 1962 P 106-110  
RAND L H & E B STURGIS MINES HANDBOOK 1931  
P 342-344

ARIZONA DEPARTMENT OF MINES AND MINERAL RESOURCES

INFORMATION FROM MINE CARDS IN MUSEUM

ARIZONA

MM 1473 Uranium Ore

GILA COUNTY

IRON CAP MINE MILS #175 B

~~1-AKA~~

IRON CAP PROPERTY (22)

IRON CAP MINE

GILA COUNTY

- ABM Bull. 125 p. 37

- USGS P.P. 342 p. 103 106

See Arizona Mining Journal

Jan 1918 p. 19, Sept. 1919 p. 19

April 1920 p. 43, Aug. 1919 p. 19

Jan. 1, 1922 p. 15, Jan. 15, 1922 p. 16,

April 15, 1922 p. 16, May 1, 1922 p. 24

MAP\_ Upstairs in the flat file - Drawer 7 - map of claims (AZ Library and Archives maps)

IRON CAP MINE

GILA COUNTY

Drove to the Iron Cap Mine and adjoining properties - there is no activity in this area. FTJ WR 5-28-65

---



July 5, 1958

Mr. Jack E. Bream,  
Research and Development  
Fisher Contracting Company  
P.O.Box 6306  
Phoenix, Arizona.

Dear Jack:

I have read the report on the Superior and Boston and Iron Cap Mining Groups at Globe, Arizona and have reviewed the report and mine maps with Mr. Robert Darnlley of Phoenix. Brought about twenty maps and the report to the office and have gone over them carefully.

The three groups mentioned in the report are the Superior and Boston; the Iron Cap and the Arizona Commercial Mining Company. The report pays special attention to the Superior and Boston and much of the information consists of photostatic reproductions of articles published in the Arizona Mining Journal, circa 1922. The same three properties are discussed in Bulletin 140, Arizona Bureau of Mines, Arizona Metal Production as follows:

Iron Cap Mine Production	1912-1928	\$11,700,00.00
Superior and Boston	1907-1926	4,300,00.00
Arizona Commercial	1906 - 1930	15,650,00.00

The Old Dominion Mine, formerly owned by Phelps Dodge, adjacent to these three properties produced \$134,000,000 in the period of 1882 - 1930. Production of all of these mines was principally copper but there was some gold and silver.

Mr. Darnlley and his associates have gone to considerable trouble and expense to compile the available information on the properties and to collect the mine maps. Unfortunately, there are no assay records and the reserve map for the Iron Cap is not supported by estimate figures which would show us the width and extent of the blocks of ore and the metal content.

Mr. Darnlley informed me that the Superior and Boston group is now under lease to D.W. Jaquays; that the Arizona Commercial is now owned by the Miami Copper Company, which leaves the Iron Cap as the only available open ground. He also stated that the mine shafts on the Iron Cap, Arizona Commercial and Superior and Boston are inaccessible due to caves or fires. He thought the Iron Cap could be entered by way of surface stopes on the Superior and Boston ground. However, as the ore remaining in the Iron Cap underground workings, according to the maps, is below the 920 level it would be foolish to attempt entry through old stopes.

Also, the grade shown on the Iron Cap reserve map is not sufficiently high enough to be copper ore at the present price.

I am enclosing a sketch map of the Globe area, after the article by Charles Willis in the Arizona Mining Journal. It depicts

The various mining groups in the Globe area. I believe I am correct in this: The Iron Cap group belongs to an association of owners; the Superior and Boston belongs to a Mrs. E.A. Borge and is under lease to D.W. Jaguays; the Arizona Commercial, Old Dominion, New Dominion, Old Dominion Extension, Big Johnny group, Globe Mining and others claims now belong to either the Miami Copper Company or to the Inspiration Consolidated Copper Company.

The Old Dominion, Iron Cap, Arizona Commercial and Superior and Boston produced from veins and were worked as underground mines. Production from these properties was made before open pit mining became a factor in the Globe-Miami area. In fact, mining near Globe ceased during the Depression of the 30's; pumping charges were heavy; the grade of ore was marginal forcing the Old Dominion and other mines to close.

It is possible that low grade disseminated ore occurs in the walls surrounding the Iron Cap veins and that this ore can be mined by open pit methods. You may recall that this thing happened at the Pima Mine at Tucson. The Pima was worked first as an underground mine and is now being operated as an open pit.

As mentioned before, there are no assay maps of the Iron Cap area. The geological maps are old and do show much geology away from the vein system. Dannelley is not familiar with the surface geology and I did not want to question him too closely.

It is my opinion that if you can get a short term option on the Iron Cap group without making any payment or assuming any obligation that it would be worth while to do so. If the surface shows mineralization or drill holes on adjacent ground are mineralized it may be possible to sell the property to Miami Copper or Inspiration or even make a profitable lease agreement with them. If all of the ground surrounding the Iron Cap, except the Superior and Boston, is held by Miami or Inspiration the Iron Cap should be valuable, in fact, it is valuable. It is quite possible the owners know this and their selling price will be too high. It is also possible that they don't know it. The Iron Cap group has twenty eight mining claims, all patented (?), with an approximate area of 450 acres.

The grapevine reports are that neither Miami nor Inspiration are too long on ore in their present workings. Both companies have spent considerable money on their surface plants and they may anticipate ore in the Globe area.

The Iron Cap group is worth investigating.

Very truly yours,

Wm. P. Crawford

P.S. I will keep Dannelley's maps and records until I hear from you. If the owner's price is not too high and you can get an option give them a good spiel about reopening the old shafts, about the romance of underground mining. Then we can talk to Carroll Weed and Ben Coil and see if the ground around the Iron Cap is held by Miami and Inspiration. ~~It~~ <sup>It</sup> be good real estate too.

# ARIZONA TESTING LABORATORIES

A DIVISION OF CLAUDE E. McLEAN & SON LABORATORIES, INC.  
 PHONE AL 3-6272 817 WEST MADISON ST. P. O. BOX 1888 PHOENIX

*Chemists... Engineers*

For Mr. Charles H. Dunning -for  
 Iron Cap Mine

Date May 19, 1955

Sample of Ore

Received: -

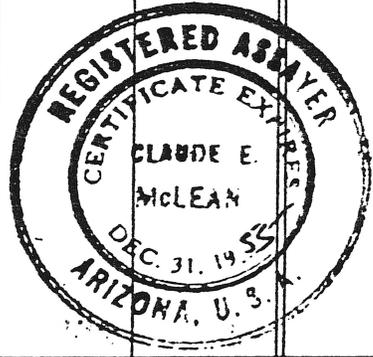
Submitted by: Same

## ASSAY CERTIFICATE

Gold figured at \$ 35.00 per ounce.

Silver figured at \$ 0.90 per ounce.

Lab. No.	Identification	Gold		Silver		Percentages	
		Oz. per Ton	Value	Oz. per Ton	Value	COPPER (Cu)	URANIUM (U <sub>3</sub> O <sub>8</sub> )
120578	#1+ $\frac{1}{4}$ "-2" Wt 30 lbs.+ 2" = 4 lbs.					0.60	Nil
120579	#1- $\frac{1}{4}$ , Wt 24 lbs.					0.65	Nil
120580	#9+ $\frac{1}{4}$ "-2", wt 30 lbs.+2"= 6 lbs.					0.20	Nil
120581	#9- $\frac{1}{4}$ , Wt. 14 lbs.					1.40	Nil
120582	#10+ $\frac{1}{4}$ "-2", Wt 39 lbs.+ 2"=3 lbs.					1.20	Nil
120583	#10- $\frac{1}{4}$ , Wt 11 lbs.					1.00	Nil
120584	#11+ $\frac{1}{4}$ "-2", Wt 28 lbs. + 2"= 5lbs.					Nil	Nil
120585	#11- $\frac{1}{4}$ ", Wt. 19 lbs.					0.55	Nil



Respectfully submitted,  
 ARIZONA TESTING LABORATORIES

*Claude E. McLean*  
 Claude E. McLean

Charges: \$52.00

# ARIZONA TESTING LABORATORIES

A DIVISION OF CLAUDE E. McLEAN & SON LABORATORIES, INC.  
 PHONE AL 3-6272      817 WEST MADISON ST.      P. O. BOX 1888      PHOENIX

*Chemists... Engineers*

For **Mr. Charles H. Dunning -for**  
**Iron Cap Mine**

Date **May 19, 1955**

Sample of **Ore**

Received: **✓**

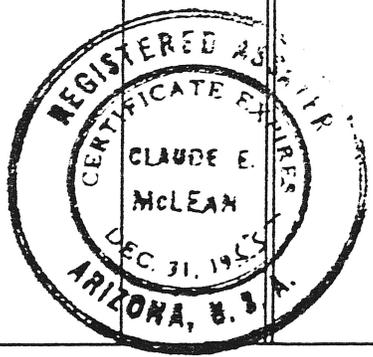
Submitted by: **Same**

### ASSAY CERTIFICATE

Gold figured at \$ **35.00** per ounce.

Silver figured at \$ **0.90** per ounce.

Lab. No.	Identification	Gold		Silver		Percentages	
		Oz. per Ton	Value	Oz. per Ton	Value	COPPER (Cu)	URANIUM (U <sub>3</sub> O <sub>8</sub> )
120578	#1+ $\frac{1}{4}$ "-2" Wt 30 lbs.+ 2" = 4 lbs.					0.60	NIL
120579	#1- $\frac{1}{4}$ , Wt 24 lbs.					0.65	NIL
120580	#9+ $\frac{1}{4}$ "-2", wt 30 lbs.+2" 6 lbs.					0.20	NIL
120581	#9- $\frac{1}{4}$ , Wt. 14 lbs.					1.40	NIL
120582	#10+ $\frac{1}{4}$ "-2", Wt 39 lbs.+ 2"=3 lbs.					1.20	NIL
120583	#10- $\frac{1}{4}$ , Wt 11 lbs.					1.00	NIL
120584	#11+ $\frac{1}{4}$ "-2", Wt 28 lbs. + 2"= 5lbs.					NIL	NIL
120585	#11- $\frac{1}{4}$ ", Wt. 19 lbs.					0.55	NIL



Respectfully submitted,  
 ARIZONA TESTING LABORATORIES

*Claude E. McLean*  
 Claude E. McLean

Charges: \$ 52.00

✓  
IRON CAP

✓  
Louis W. Racine and Shapan,  
328 Hatcher Road  
Sunnyslope, Ariz.

✓  
The above parties say they own the IRON CAP  
PROPERTY at Copper Hill.

✓  
Was optioned to Jerry Russell & Co.  
Before them to Sutton, ✓ Riddle & others for  
✓ which Tenney was atty.

Also has copper property near 7 springs.  
Says it is 60' wide & prob. 2-3 M ft. long.  
Are about 3% Cu with some narrow stringers  
(up to 2 ft.) of 6-7-%. Needs drilling &  
he is to make an owners report.

1958  
FPK



THE LIBRARY OF CONGRESS

WASHINGTON 25, D. C.

LEGISLATIVE REFERENCE SERVICE

June 2, 1955

Honorable Carl Hayden  
United States Senate  
Washington 25, D. C.

Dear Senator Hayden:

This is in reply to your request on behalf of the Arizona Department of State which wished to know whether or not about nine tons of pitchblend were shipped from an Arizona mine (perhaps the Iron Cap Mine, at Globe) to Madame Curie in France sometime between 1906 and 1916.

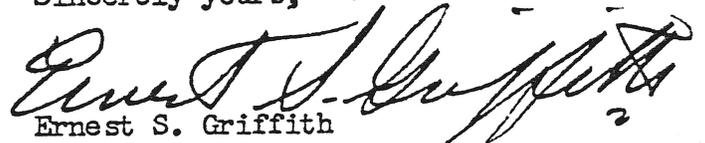
Our inquiries of the United States Bureau of Mines, the Atomic Energy Commission Library, and our search have not revealed evidence of such a shipment from any Arizona mine. The Department of Commerce, Bureau of the Census, is unable to determine whether or not such a shipment was or was not made.

We checked the annual reports of the Mines Handbook and the Copper Handbook (later called the Mines Register and Copper Handbook), in addition to other annual reports such as the Minerals Yearbooks (and Mineral Resources) of the U. S. Bureau of Mines, and other publications regarding the activities of the Iron Cap Mining Co., which was sold early in the 1900's to the National Mining Exploration Co., with headquarters in Boston, Mass. This mine was located at Copper Hill, Arizona, which is close to Globe. The name of the mine was later changed to Iron Cap Copper Co. It was reorganized to become a corporation and was allied with the Christmas Copper Corp., an operating subsidiary. The Mines Register for 1937 says that "The cos. are advised that the State of Arizona took tax title on or about Jan. 1, 1935, . . ." We searched the history of this mine in federal, state, and general publications, but we found nothing to indicate that either this or any other Arizona mine made a shipment of pitchblend to Madame Curie. We consulted, among numerous other publications, the following by the Arizona Bureau of Mines, "Uranium and radium," Bulletin no. 117, published in 1921, and numerous entries in a "Bibliography of literature regarding Arizona mining and geology," Bulletin no. 23, published at a previous date.

We found several statements to the effect that uraniferous ores from Uravan, in Paradox Valley, Colorado, were sent between 1898 and 1900 to Madame Curie or her agents in Paris. Perhaps these are the shipments which some people might believe came from Arizona, since Uravan, Colorado, is close to Utah, and not far from Arizona.

We enclose a report we prepared entitled, "The probable sources of the uraniferous ores used by Marie and Pierre Curie in discovering and using radium."

Sincerely yours,



Ernest S. Griffith  
Director

Enclosure

CARL HAYDEN, ARIZ., CHAIRMAN

RICHARD B. RUSSELL, GA.  
DENNIS CHAVEZ, N. MEX.  
ALLEN J. ELLENDER, LA.  
LISTER HILL, ALA.  
HARLEY M. KILGORE, W. VA.  
JOHN L. MC CLELLAN, ARK.  
A. WILLIS ROBERTSON, VA.  
WARREN G. MAGNUSON, WASH.  
SPESSARD L. HOLLAND, FLA.  
JOHN STENNIS, MISS.  
EARLE C. CLEMENTS, KY.

STYLES BRIDGES, N. H.  
LEVERETT SALTONSTALL, MASS.  
MILTON R. YOUNG, N. DAK.  
WILLIAM F. KNOWLAND, CALIF.  
EDWARD J. THYE, MINN.  
JOSEPH R. MC CARTHY, WIS.  
KARL E. MUNDT, S. DAK.  
MARGARET CHASE SMITH, MAINE  
HENRY DWORSHAK, IDAHO  
EVERETT MC KINLEY DIRKSEN, ILL.  
CHARLES E. POTTER, MICH.

EVERARD H. SMITH, CLERK  
THOMAS J. SCOTT, ASST. CLERK

## United States Senate

COMMITTEE ON APPROPRIATIONS

June 3, 1955

Mr. Charles H. Dunning  
1635 W. Earll Drive  
Phoenix, Arizona

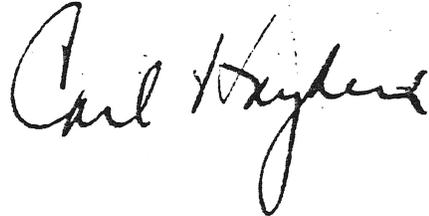
Dear Dunning:

This refers to my letter of May 17, concerning your request for a verification of an alleged shipment of pitchblend from the old Iron Cap Copper Mine at Globe to Madam Curie in France.

I am enclosing a complete report prepared by the Legislative Reference Service of the Library of Congress. I am sure that you will find this report interesting and the records disclose that the shipment in question was sent from the United States Vanadium Company's mine in Uravan, Colorado. I hope that the information contained in this report will serve your purpose.

With cordial good wishes, I am,

Yours very sincerely,



Legislative reference service

June 2, 1955

Honorable Carl Hayden  
 United States Senate  
 Washington, 25, D. C.

Dear Senator Hayden:

This is in reply to your request on behalf of the Arizona Department of State which wished to know whether or not about nine tons of pitchblend were shipped from an Arizona mine (perhaps the Iron Cap Mine, at Globe) to Madame Curie in France sometime between 1906 and 1916.

Our inquiries of the United States Bureau of Mines, the Atomic Energy Commission Library, and our search have not revealed evidence of such a shipment from any Arizona mine. The Department of Commerce, Bureau of the Census, is unable to determine whether or not such a shipment was or was not made.

We checked the annual reports of the Mines Handbook and the Copper Handbook (later called the Mines Register and Copper Handbook), in addition to other annual reports such as the Minerals Yearbooks (and Mineral Resources) of the U.S. Bureau of Mines, and other publications regarding the activities of the Iron Cap Mining Co., which was sold early in the 1900's to the National Mining Exploration Co., with headquarters in Boston, Mass. This mine was located at Copper Hill, Arizona, which is close to Globe. The name of the mine was later changed to Iron Cap Copper Co. It was reorganized to become a corporation and was allied with the Christmas Copper Corp., an operating subsidiary. The Mines Register for 1937 says that "The cos. are advised that the State of Arizona took tax title on or about Jan. 1, 1935 . . ." We searched the history of this mine in federal, state, and general publications, but we found nothing to indicate that either this or any other Arizona mine made a shipment of pitchblend to Madame Curie. We consulted, among numerous other publications, the following by the Arizona Bureau of Mines, "Uranium and radium," Bulletin No. 117, published in 1921, and numerous entries in a "Bibliography of literature regarding Arizona mining and geology," Bulletin No. 23, published at a previous date.

We found several statements to the effect that uraniferous ores from Uravan, in Paradox Valley, Colorado, were sent between 1898 and 1900 to Madame Curie or her agents in Paris. Perhaps these are the shipments which some people might believe came from Arizona, since Uravan, Colorado, is close to Utah, and not far from Arizona.

We enclose a report we prepared entitled, "The probable sources of the uraniferous ores used by Madame Marie and Pierre Curie in discovering and using radium."

Sincerely Yours,

/s/ ERNEST S. GRIFFITH,

Ernest S. Griffith,  
 Director

Enclosure

COPY

THE PROBABLE SOURCES OF THE URANIFEROUS ORES USED BY  
MARIE AND PIERRE CURIE IN THE DISCOVERY AND USE OF RADIUM

After the discovery of the radioactive properties of uranium by Henri Becquerel in 1896, Pierre and Marie Curie began research into radioactivity. In 1898 they obtained polonium and radium from pitchblend, a form of uranium.

In her book entitled "Pierre Curie", Marie Curie gives her version of the sources of materials used in her experiments. She says that:

We knew by our experiments that in the treatment of pitchblend at the uranium plant of St. Joachimsthal, (Bohemia), radium must have been left in the residues, and, with the permission of the Austrian government, which owned the plant, we succeeded in securing a quantity of these residues, then quite valueless—and used them for the extraction of radium . . . Sometime later, the Austrian government, on the proposition of the Academy of Science of Vienna, let us have several tons of residues at a low price. With this material was prepared all the radium I had in my laboratory up to the date (1921) when I received the previous gift from the American women.

Source: Curie, Marie. Pierre Curie, New York, N.Y. Macmillian Co. 1923, p. 185.

The above statement does not mention any shipment of pitchblend from either the Colorado plateau or from Arizona. She acknowledges the gift of one gram of radium presented to her in 1921 by President Harding on behalf of the women of the United States. This gram of radium was purchased from the Standard Chemical Co. of Pittsburgh, Pa., which owned mining properties in Colorado.

Pierre Curie was run over by a dray and instantly killed in Paris on April 19, 1906. There are several statements in the literature that uraniferous ores containing pitchblend were shipped from the Colorado Plateau to Paris and used by Pierre and Marie Curie in their experiments. Such shipments would have had to be made before 1906, the year Pierre Curie died.

An interesting inference is contained in a recent (1954) publication entitled "Facts you should know about uranium." It says on page 3, that:

After Pierre Curie was killed in a dray accident in Paris on April 19, 1906, his wife continued research on radium . . . Few of us realize that the ore used by the Curies for their historic experiments was shipped to Paris from the Colorado plateau.

Source: Facts you should know about uranium. Salt Lake City, Utah, Uranium Publishers, Inc. 1954, p. 3.

William J. Hammer, in his book on "Radium and Other Radio-Active Substances; Polonium, Actinium, and Thorium," (New York, D Van Nostrand Co., 1903) says, p 13, that

Prof Curie informed the writer that he had secured some excellent radioactive pitchblende from the United States (Colorado).

The United States Vanadium Corporation, in its pamphlet, "Mesa Miracle . . .", published in 1952 (copyrighted by the Union Carbide and Chemical Co.), says, on page 10, that:

The Navajos and Utes who roamed the great Colorado Plateau . . . decorated their bodies with brilliant red and yellow war paints . . . What they were using was powdery carnotite, the same mineral from which uranium is obtained today.

Many years later, these same carnotite ores were mined to extract the radium that they contained. The ore was shipped from the Plateau to Paris to be used in the experiments being conducted by the famous French scientists, Marie and Pierre Curie. In fact, the Colorado Plateau was the world's chief source of radium for 10 years during and after the first World War.

The president of General Vanadium Co., Thomas F. V. Curran, wrote an article entitled "Carnotite in paradox Valley, Colo.," which was published in the Engineering and Mining Journal, v. 92, Dec. 30, 1911. This article states, on page 1288, that:

Eighteen or 20 miles north of Breckenridge is Paradox, a small town. Close to it is the Copper Prince mine, said to contain a fissure vein of carnotite. More than a decade ago, agents of Doctor and Madame Curie operated this mine and a small factory at Uranium. Over 400 tons of carnotite averaging 10 per cent uranium oxide were taken from the mine, which was abandoned owing to the failure of the extracting process employed.

The Works Progress Administration, through the Writers Program, Colorado, in its American Guide series, prepared a study entitled "Colorado: A Guide to the Highest State", published in 1941. This book says, on p. 422, that:

Right on this graded road to Uravan, 13 m. (4,995 alt.), a mill operated by U.S. Vanadium Company (open weekdays). The name is a combination of the first syllables of uranium and vanadium, found with carnotite, a yellow viscous ore mined here. This radioactive ore, one of the first of its kind to be discovered in the world, was used in the discovery of radium. Carnotite was first mined here in 1881 for small amounts of gold found with it. In 1898, after the Smithsonian Institution had found that the ore contained uranium, several tons were shipped by two French scientists, Poulot and Voilleque, to the Schools of Mines in Paris, where they were delivered to Madame Curie and used by her in experiments that resulted in the extraction of radium. The ore was named for M. Carnot, inspector-general of mines in France.

Gordon Kimball, of Ouray, Colorado, claims that he shipped carnotite to Charles Poulot who declared that the ore contained uranium. Mr. Kimball relates this as

follows:

In 1897, I met in Denver a French chemist named Charles Poulot who was in the market for ores containing rare metals, especially uranium . . . I had long been familiar with certain deposits on Roc creek, in the extreme western part of Montrose County, Co. Co. that had been located many times for copper values. From Capt. S.N. King of Utah, one of the early locators of these veins, I learned that quite a large deposit of yellow mineral, called by the owner yellow chrome ore, had been exposed in one of these claims several years before. In the spring of 1898 I obtained several samples of the "yellow stuff" and sent them to Mr. Poulot, who pronounced them uranium ore and gave the mineral the name of antonite or uranochre . . .

In May, 1898, after obtaining a short term bond and lease, I started development work. During June I mined 10 tons of ore (practically all from one pocket), sacked and packed it on burros across the mesa to Paradox valley, a distance of twelve miles. From there it was shipped . . . to Denver . . ., where it was sampled and sold for \$2,600, or at the rate of \$12.50 per unit. The entire lot averaged 21.5 per cent oxide contents. This ore also carried over 15 per cent vanadium, for which our purchasers in France, on re-sampling the shipment, exacted a penalty instead of allowing value. In order to develop a market, I then had five cabinet specimens sent to the Colorado State School of mines and to prominent chemists and scientists. It is not improbable that it was one of these specimens which, on analysis, was named after the eminent scientist, M. Adolph Carnot.

Source: Kimball, Gordon. Discovery of Carnotite. Letter to Editor, Engineering and mining journal, v. 77, June 16, 1904, p. 956.

Several comments which are in substantial agreement with the above statements are contained in the Biennial Report of the Colorado State Bureau of Mines, Denver, for the years 1905-6, as follows:

In no place is lack of information concerning the reported values of uranium and vanadium of the southwestern and western part of Colorado more keenly felt than in the State Bureau of Mines. Since the reported discovery of these values in the mineral carnotite in 1899, a rising interest has grown . . .

That these deposits were known for a long time by early settlers in San Miguel and Montrose counties, Colorado, and in Mesa county, in Utah, and that the Ute and Navajo Indians made several uses of the pigment seems reasonably sure from statements of the present inhabitants, and from statements gathered from the Navajos by one of us.

No identification of them as containing a new and valuable mineral species occurred, however, until Messrs. Poulot and Veilleque, two French gentlemen, engaged in chemical business in Denver, Colorado, conducted a personal investigation and placed rich material from the Roc creek district in the hands of H.M.C. Friedel and E. Cumenge, who in the spring of 1899 announced a new uranium mineral described by them as urano-vanadate of potassium, which they named carnotite . . .

The high uranium contents and the general distribution gave rise to immediate activity in the Hydraulic and Roc Creek regions and, somewhat later, in the McIntyre region. A small shipment of ore was made from McIntyre region. A small shipment of ore was made from McIntyre Canon at this time, the returns on which were not made public. It is stated that Mr. Gordon Kimball shipped five carloads, 200 tons, of ore as oxide of iron from the Copper Prince mine at Roc Creek . . .

Source: Fleck, Herman and Wm. G. Haldane. A study of the uranium and vanadium belts of southern Colorado. Colorado. State Bureau of Mines. Report for the years 1905-6. Denver, 1907, pp. 47-48.

(Warren W. Scott,  
Economics Division  
June 2, 1955)

May 11, 1955.

Senator Carl Hayden,  
Senate Office Bldg.,  
Washington, D. C.

Dear Senator:-

I have been employed on certain consulting work re the Old Iron Cap Mine at Globe. There is a rumor extant that sometime between 1906 and 1916 that the mine contributed a portion ( 9 tons the rumor has it) of a shipment of pitchblende that the U.S. shipped to Madam Curie for experimental purposes.

I am unable to check this story for sure. Some of the old timers have some vague recollection of such a thing, others recall nothing of the sort.

Certainly a portion of the dump contains scattered nodules of fairly high grade primary uranium ore. There is no indication as to whether it was connected with the copper vein or not ( probably not) or as to where it occurred in the mine.

My thought was to ask you whether it would be possible or feasible to employ some trained researcher to make a search in the library of Congress for any information pertaining to such a shipment. We do not even know the year except that it should fall within the above bracket. If we could establish a date then local files might be more intelligently searched.

I have no blank check to order such done but would like your opinion as to whether it would be feasible, and the approximate cost. One would think there should be some record of such an export shipment.

With kindest personal regards,

Yours Sincerely,

*Grant  
Fook*

# ARIZONA TESTING LABORATORIES

A DIVISION OF CLAUDE E. McLEAN & SON LABORATORIES, INC.  
 PHONE AL 3-6272 817 WEST MADISON ST. P. O. BOX 1888 PHOENIX

For Mr. Charles H. Dunning -for  
 Iron Cap Mine

Date May 19, 1955

Sample of Ore

Received: -

Submitted by: Same

## ASSAY CERTIFICATE

Gold figured at \$ 35.00 per ounce.

Silver figured at \$ 0.90 per ounce.

Lab. No.	Identification	Gold		Silver		Percentages	
		Oz. per Ton	Value	Oz. per Ton	Value	COOPER (Cu)	URANIUM (U <sub>3</sub> O <sub>8</sub> )
120578	#1- $\frac{3}{4}$ "-2" Wt 30 lbs.+ 2" = 4 lbs.					0.60	Nil
120579	#1- $\frac{1}{2}$ " , Wt 24 lbs.					0.65	Nil
120580	#9- $\frac{1}{4}$ "-2", Wt 30 lbs.+2"= 6 lbs.					0.20	Nil
120581	#9- $\frac{1}{2}$ " , Wt. 14 lbs.					1.40	Nil
120582	#10- $\frac{1}{4}$ "-2", Wt 39 lbs.+ 2"=3 lbs.					1.20	Nil
120583	#10- $\frac{1}{4}$ " , Wt 11 lbs.					1.00	Nil
120584	#11- $\frac{1}{2}$ "-2", Wt 28 lbs. + 2" = 5 lbs.					Nil	Nil
120585	#11- $\frac{1}{4}$ " , Wt. 19 lbs.					0.55	Nil

Respectfully submitted,  
 ARIZONA TESTING LABORATORIES

Charges: \$52.00

*Claude E. McLean*  
 Claude E. McLean

June 13th, 1955.

Senator Carl Hayden,  
Senate Office Bldg.,  
Washington, D. C.

Dear Senator Hayden:-

I received your letter and the report on the Iron Cap Mine and certainly want to thank you for this fine service. It certainly pays to go all the way up when one wants factual information instead of hearsay.

Whenever you are in Phoenix again, if you have time, give me a ring.

Yours Sincerely,

A handwritten signature in dark ink, appearing to be "CHB", written over a horizontal line.



## THE LIBRARY OF CONGRESS

WASHINGTON 25, D. C.

### LEGISLATIVE REFERENCE SERVICE

#### THE PROBABLE SOURCES OF THE URANIFEROUS ORES USED BY MARIE AND PIERRE CURIE IN THE DISCOVERY AND USE OF RADIUM

After the discovery of the radioactive properties of uranium by Henri Becquerel in 1896, Pierre and Marie Curie began research into radioactivity. In 1898 they obtained polonium and radium from pitchblend, a form of uranium.

In her book entitled "Pierre Curie," Marie Curie gives her version of the sources of materials used in her experiments. She says that:

We knew by our experiments that in the treatment of pitchblend at the uranium plant of St. Joachimsthal, [Bohemia], radium must have been left in the residues, and, with the permission of the Austrian government, which owned the plant, we succeeded in securing a quantity of these residues, then quite valueless--and used them for the extraction of radium . . . Some time later, the Austrian government, on the proposition of the Academy of Science of Vienna, let us have several tons of residues at a low price. With this material was prepared all the radium I had in my laboratory up to the date [1921] when I received the precious gift from the American women.

Source: Curie, Marie. Pierre Curie. New York, N. Y., Macmillan Co. 1923, p. 185.

The above statement does not mention any shipment of pitchblend from either the Colorado plateau or from Arizona. She acknowledges the gift of one gram of radium presented to her in 1921 by President Harding on behalf of the women of the United States. This gram of radium was purchased from the Standard Chemical Co. of Pittsburgh, Pa., which owned mining properties in Colorado.

Pierre Curie was run over by a dray and instantly killed in Paris on April 19, 1906. There are several statements in the literature that uraniferous ores containing pitchblend were shipped from the Colorado Plateau to Paris and used by Pierre and Marie Curie in their experiments. Such shipments would have had to be made before 1906, the year Pierre Curie died.

An interesting inference is contained in a recent (1954) publication entitled "Facts you should know about uranium." It says, on page 3, that:

After Pierre Curie was killed in a dray accident in Paris on April 19, 1906, his wife continued research on radium . . . Few of us realize that the ore used by the Curies for their historic experiments was shipped to Paris from the Colorado Plateau.

Source: Facts you should know about uranium. Salt Lake City, Utah, Uranium Publishers, Inc. 1954, p. 3.

William J. Hammer, in his book on "Radium and Other Radio-Active Substances; Polonium, Actinium, and Thorium," (New York, D. Van Nostrand Co., 1903) says, p. 13, that:

Prof. Curie informed the writer that he had secured some excellent radioactive pitchblende from the United States (Colorado).

The United States Vanadium Corporation, in its pamphlet, "Mesa Miracle . . .," published in 1952 (copyrighted by Union Carbide and Chemical Co.), says, on page 10, that:

The Navajos and Utes who roamed the great Colorado Plateau . . . decorated their bodies with brilliant red and yellow war paints . . . What they were using was powdery carnotite, the same mineral from which uranium is obtained today.

Many years later, these same carnotite ores were mined to extract the radium that they contained. The ore was shipped from the Plateau to Paris to be used in the experiments being conducted by the famous French scientists, Marie and Pierre Curie. In fact, the Colorado Plateau was the world's chief source of radium for 10 years during and after the first World War.

The president of General Vanadium Co., Thomas F. V. Curran, wrote an article entitled "Carnotite in Paradox Valley, Colo.," which was published in the Engineering and Mining Journal, v. 92, Dec. 30, 1911. This article states, on page 1288, that:

Eighteen or 20 miles north of Bedrock is Paradox, a small town. Close to it is the Copper Prince mine, said to contain a fissure vein of carnotite. More than a decade ago, agents of Doctor and Madame Curie operated this mine and a small factory at Uranium. Over 400 tons of carnotite averaging 10 per cent uranium oxide were taken from the mine, which was abandoned owing to the failure of the extracting process employed.

The Works Progress Administration, through the Writers Program, Colorado, in its American Guide series, prepared a study entitled "Colorado: A Guide to the Highest State," published in 1941. This book says, on p. 422, that:

Right on this graded road to Uravan, 13 m. (4,995 alt.), a mill operated by U. S. Vanadium Company (open weekdays). The name is a combination of the first syllables of uranium and vanadium, found with carnotite, a yellow viscous ore mined here. This radioactive ore, one of the first of its kind to be discovered in the world, was used in the discovery of radium. Carnotite was first mined here in 1881 for small amounts of gold found with it. In 1898, after the Smithsonian Institution had found that the ore contained uranium, several tons were shipped by two French scientists, Poulot and Voilleque, to the School of Mines in Paris, where they were delivered to Madame Curie and used by her in experiments that resulted in the extraction of radium. The ore was named for M. Carnot, inspector-general of mines in France.

Gordon Kimball, of Ouray, Colorado, claims that he shipped carnotite to Charles Poulot who declared that the ore contained uranium. Mr. Kimball relates this as follows:

In 1897, I met in Denver a French chemist named Charles Poulot who was in the market for ores containing rare metals, especially uranium . . . I had long been familiar with certain deposits on Roc creek, in the extreme western part of Montrose county, Colo. that had been located many times for copper values. From Capt. S. N. King, of Utah, one of the early locators of these veins, I learned that quite a large deposit of yellow mineral, called by the owner yellow chrome ore, had been exposed in one of these claims several years before. In the spring of 1898 I obtained several samples of the "yellow stuff" and sent them to Mr. Poulot, who pronounced them uranium ore and gave the mineral the name of autonite or uranochre . . .

In May, 1898, after obtaining a short term bond and lease, I started development work. During June I mined 10 tons of ore (practically all from one pocket), sacked and packed it on burros across the mesa to Paradox valley, a distance of 12 miles. From there it was shipped . . . to Denver . . ., where it was sampled and sold for \$2,600,00 at the rate of \$12.50 per unit. The entire lot averaged 21.5 per cent oxide contents. This ore also carried over 15 per cent vanadium, for which our purchasers in France, on re-sampling the shipment, exacted a penalty instead of allowing value. In order to develop a market I then had five cabinet specimens sent to the Colorado State School of mines and to prominent chemists and scientists. It is not improbable that it was one of these specimens which, on analysis, was named after the eminent scientist, M. Adolph Carnot.

Source: Kimball, Gordon. Discovery of carnotite.  
Letter to editor, Engineering and mining  
journal, v. 77, June 16, 1904, p. 956.

Several comments which are in substantial agreement with the above statements are contained in the Biennial Report of the Colorado State Bureau of Mines, Denver, for the years 1905-6, as follows:

In no place is lack of information concerning the reported values of uranium and vanadium of the southwestern and western part of Colorado, more keenly felt than in the State Bureau of Mines. Since the reported discovery of these values in the mineral carnotite in 1899, a rising interest has grown . . .

. . .  
That these deposits were known for a long time by early settlers in San Miguel and Montrose counties, Colorado, and in Mesa county, in Utah, and that the Ute and Navajo Indians made several uses of the yellow pigment seems reasonably sure from statements of the present inhabitants, and from statements gathered from the Navajos by one of us.

No identification of them as containing a new and valuable mineral species occurred, however, until Messrs. Poulot and Voilleque, two French gentlemen, engaged in chemical business in Denver, Colorado, conducted a personal investigation and placed rich material from the Roc Creek district in the hands of M. M. C. Friedel and E. Cumenge, who in the spring of 1899 announced a new uranium mineral described by them as urano-vanadate of potassium, which they named carnotite. . .

The high uranium contents and the general distribution gave rise to immediate activity in the Hydraulic and Roc Creek regions and, somewhat later, in the McIntyre region. A small shipment of ore was made from McIntyre Canon at this time, the returns on which were not made public. It is stated that Mr. Gordon Kimball shipped five carloads, 200 tons, of ore as oxide of iron from the Copper Prince mine at Roc Creek . . .

Source: Fleck, Herman and Wm. G. Haldane. A study of the uranium and vanadium belts of southern Colorado. Colorado. State Bureau of Mines. Report for the years 1905-6. Denver. 1907, pp. 47-48.

[Warren W. Scott  
Economics Division  
June 2, 1955]

# IRON CAP COPPER COMPANY

COPPER HILL, ARIZONA April, 27th, 1915.

## SCALE OF WAGES FOR THE EMPLOYEES OF THIS COMPANY.

\*\*\*\*\*

### EMPLOYEES EARNING PER SHIFT WITH COPPER SELLING AT 15¢

<u>15¢</u>	<u>at 16¢</u>	<u>at 17¢</u>	<u>at 18¢</u>	<u>at 19¢ or more</u>
\$2.00	\$2.15	\$2.25	\$2.40	\$2.50
2.25	2.40	2.50	2.65	2.75
2.50	2.65	2.75	2.90	3.00
3.00	3.15	3.25	3.40	3.50
3.75	3.90	4.00	4.15	4.25
4.00	4.15	4.25	4.40	4.50
4.25	4.40	4.50	4.65	4.75
4.50	4.65	4.75	4.90	5.00
5.00	5.15	5.25	5.40	5.50

THE PRICE OF COPPER TO BE DETERMINED BY THE AVERAGE PRICE QUOTED FOR ELECTROLYTIC COPPER IN THE MINING AND ENGINEERING JOURNAL FOR THE IMMEDIATELY PRECEDING MONTH.