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ARIZONA DEPARTMENT OF MINES AND MINERAL RESOURCES AZMILS DATA

PRIMARY NAME: CONGRESS

ALTERNATE NAMES:
- CONGRESS MINE, PATENTED 878
- FRACTION, PATENTED 883
- NIAGARA
- NIAGRA
- GOLDEN KEY
- HERSKOWITZ PROPERTY
- QUEEN OF THE HILLS
- OHAHA
- PLANET MIER
- JAQUAYS
- B AND M
- PATENTED CLAIMS MS 2888 & 3523

YAVAPAI COUNTY MILS NUMBER: 440C

LOCATION: TOWNSHIP 10 N RANGE 6 W SECTION 23 QUARTER N2
LATITUDE: N 34DEG 12MIN 05SEC LONGITUDE: W 112DEG 50MIN 54SEC
TOPO MAP NAME: CONGRESS - 7.5 MIN

CURRENT STATUS: PAST PRODUCER

COMMODITY:
- GOLD
- SILVER
- COPPER SULFIDE
- FELDSPAR

BIBLIOGRAPHY:

- ADMMR CONGRESS MINE FILE
- ADMMR CONGRESS COLVO FILE
- ADMMR NIAGARA MINE & MILL FILE
- ADMMR GOLDEN KEY FILE
- REPORT OF THE GOVERNOR OF AZ 1899 P 54-56
- WILSON, E.D. ETAL. AZ LODE GOLM MINES AZBM
- METZGER, O.H. GOLD MINING & MILLING IN THE WICKENBURG AREA USBM IC 6991 1938 P 45

CONTINUED ON NEXT PAGE

CONSULTING
DESIGNING
DEVELOPING

H. C. COLBURN
L. M. HAVERLY
W. L. MICHALSKY

APEX ENGINEERING COMPANY
903 FAIR OAKS - SOUTH PASADENA
ROOM 201—SYCAMORE 9-5023

August 9th, 1949

Dear Brother;

I am in receipt of yours of Aug. 6th and also Davids of Aug 8th. Was about to write you Sat night when David called up so let it go until I had made further tests. Tried the English carburettor last night and could not even get it running with it. It has a $\frac{3}{4}$" venturi and of course that is too large for the lower range of speeds of this engine. So I stick to the Carter which is ceftainly all right up to its capacity. We had decided long ago that two carbs. were indicated - hooked up progressively and now I have proved it, I am going to get another one and put it on as we had decided. I made some flash tests at a speed of 1850 which seems to be the limit of the carb at this speed. I got a H P of 9.8 at this speed which is the limit of load which the engine will take at this speed with one carb. This means better than 20 H P at 3600#. I figure that we will eventually obtain 1.58 H P per cubic inch and I beleive I am right. All we need is another carb.

However there are some refinements that I want to make, viz- advancing the exaust piston one more tooth, which I am going to do tomorrow if I can get hold of some socket wrenches. But the chief change that I want to make is in the shape of the combustion space - it is a bottleneck and I cannot get enough fire in the exhaust cylinder. There are too many sharp corners and I am going to take the head off and hand grind the corners off. This will lower the compression a little but that will not hurt as I get a manifold pressure of 7 psi at 2800. I have proven definately that the engine is over-ported. I intentionally designed it this way knowing that we had the port control. I will eventually have to redesign the cylinder head with a stream-lined combustion space - this will require a new casting but that will not cost much as we have the pattern and the maching work will consist only in facing off and drilling the holes. This and two carbs just <u>might</u> give us 25 H P. It is something to shoot at anyhow. Will streamline the present head all that I can without breaking through and that will give me a line on which way I am going. Outside of the designing, this will be a very simple change but I will have to do some careful work on the drawing board/ I will have to hollow out a piece of board the shape of the chamber, then get the volume in C Cs by means of the displacement e method by means of a measured quantity of water necessary to fill it. I should have done this in the first place but there was no pattern shop available to mess around in. I can handle it here now and I beleive this to be the solution. I see that I have got my carbon in the wrong w way also, so save this letter for reference.

Now about the dynanometer. As a whole it is unsatisfactory for two reasons. One is that Christian can only get over there two nights a week and then only at six oclock in the evening. The other nights he is in charge of the electrical timing equipment at the Culver City speedway. This makes it bad for me as I get home so late. The other is that, you will remember that the chap we talked to at Claytons said that, at low powers there would be only a cup full of water in the unit. Well this water gets batted around in there and sometimes it takes hold and then it lets go, making the hand on the dial jump all over the map.

August 3, 1948

Mr. Byron Moyer
3327 De Forest Drive
Cincinnati 9, Ohio

Dear Mr. Moyer:

In regard to an engineer to do some sampling at the Congress Mine, we would recommend:

Mr. L. L. Farnham, Mayer, Arizona;
or
Mr. Fred Gibbs, Sunnyslope,
Prescott, Arizona.

We would also suggest that you contact Mr. George M. Calvocoresses, Luhrs Tower, Phoenix. Mr. Calvocoresses is an engineer of long standing and experience and, while we understand that his health no longer permits active field work, we believe he made an extensive examination of the Congress a couple of years ago and should have data that it might not be possible to obtain now.

If you do not need an engineer and a miner who knows how to sample would be sufficient, we would recommend Mr. W. A. Snyder. Mr. Snyder can be reached at 227 West Georgia, Phoenix, c/o V. P. Marley.

Please be assured that this department is anxious to help you in any way possible, and we hope you will succeed in making a profitable enterprise out of the old Congress.

Yours very truly,

CHD:mh

Chas. H. Dunning
Director

BYRON MOYER GOLD MINE

KIRKLAND

ARIZONA

Dept of Mineral Resources,
Phoenix, Ariz.

Gentlemen:

Can you give me the names of two men, preferably mining engineers who are, or will be available within the next two weeks to sample part of the Old Congress Mine at Congress, Ariz?

I do not need a complete report on the property; what I would like to have is an assay report on approximately 75 to 100 samples to be made in general throughout the old workings, probably about half of the samples to be from the fill or gob and the balance from exposed quartz faces.

This will be a check up on some sampling and assaying I had made recently.

I have a lease on the property from E.A. Colburn and my personal sampling makes this property look like a very hi-grade risk, and I have been able to interest enough money here in Cincinnati to go along with me on a 100 ton mill for the mine if the above report will verify within reasonable limits the report I have made.

I would prefer that this info does not get to the newspapers until after I have the new report.

Respectfully yours,
Byron Moyer
Byron Moyer,
3327 De Forest Dr.,
Cincinnati, 9 Ohio.

Aug 2, 1948

Please answer via Air Mail.

George M. Colvocoresses
Mining and metallurgical Engineer
1102 Luhrs Tower
Phoenix, Arizona.

August 30, 1948

Messrs. Colburn, Byron Moyer, Richard Heilman, and associates

SUPPLEMENTAL REPORT ON CONGRESS MINE

Gentlemen:

Although my examination of the Congress Mine in 1935, 1942, 1943 and 1944 were made first for the purpose of determining the advisibility of treating the tailings and dumps and next with the idea of conducting a large scale operation for the treatment of tailings, dumps, mine fills and low grade ore in place;- the results as embodied in my long report of August 1943, to which I later made some additions, including much information which would be valuable in guiding a small operation treating only high grade ore. In this connection the following supplimental notes are submitted and in order to call particular attention to portions of my report which have a bearing on your present problems, I have side lined certain paragraphs in pencil and also made a number of notes on the margin of the copy which I shall furnish you.

1. The remaining tailings will probably not pay to work, but it will be advisable to investigate the sub-soil where some samples we took in 1943 showed material carrying $18.00 per ton, but this may since have been removed.

2. As to the dumps while these will not average over $3.00 per ton, there are some portions which might be worth sorting over and perhaps screening since it is of record that on one occasion 147 tons were sorted from the dump and assayed $18.55 per ton. Some of my samples from the dumps ran better than $10.00 per ton but these were averaged with lower grade material.

3. From all sampling it appears that all mine fills down to the 1500' level will average at least $5.00 . Here again are sections which are much richer than the average, but we purposely cast out high grade samples. Some idea of the probable value of each portion of the fill can generally be obtained by visual inspection after washing, as the presence of quartz and sulphides nearly always indicates gold values except in the Queen of the Hills where there is a lot of nearly barren quartz. Before actually preparing to mine any of this material, I suggest that some grab sample be taken from the best looking sections, as I obtained several samples which ran better than $8.00 per ton particularly from Congress near No. 2 shaft on the 925' level.

4. The mine was unwatered in No. shaft to the1950' level in 1941 and Ramsden told me that he found some very good ore on the 1925' level in No 3 shaft and extending up to 1700'.

HIGH GRADE ORE

The existance of high grade ore remaining in the old Congress workings has been made the subject of persistent rumors many of which I believe to be unfounded or greatly exaggerated. However, as a matter of record, I think it proper to repeat some of these for what they may be worth. Near the surface, especially in the vicinity of No. 1 shaft there still remain small sections of pillars and sills of high grade ore some of which has been gouged out by lessers during recent years and shipped to the Hayden smelter after the Congress Corpation shut down their mill. This ore was difficult and expensive to mine and probably had an average value in the order of $20.00 per ton but was hand sorted until

the shipping produc became much richer. Prof[illegible] to the miners seem to have been small since the work was intermittent and had been practically discontinued during the latter part of 1944.

The tonnage of such ore now remaining in this section of the mine must be small and cannot be considered in any estimate although it is quite likely that after regular mining and milling operations are resumed, new leasers may furnish a few hundred tons or more per annum. Frank Stone of Prescott who once did some leasing on the mine claims to have climbed up 90' in an incline raise from the 600 to 700' level east of No. 2 shaft and there to have found and sampled a cross vein with a width of 18" to 2' that carried up to 4 oz. of gold. This story was related by Hercovitz who apparently does not know just where this raise is located and in any event it is probably now inaccessible except after some preparitory work. Regarding the Queen of the Hills workings Stanton could give little information since most of this work was done after he was no longer manager of the mine, but it is of record that leasers operated here with some profit during the 1930's and that the mine workings are much more extensive than shown on the map and at one point a winze had been sunk to a depth of 1750'. Samples taken in some of the pillars ran better than $10.00 per ton and several reliable men stated that a substantial tonnage of similar grade ore remained in sections of the vein which they had examined prior to 1940. It is my opinion that a comparitively small amount of cleaning up would permit the examination of much of these workings which are now inaccessible and I suggest that special attention should be paid to the Queen of the Hills which seems to have been much less thoroughly prospected and developed than other portions of the property and which probably contains the faulted segment of the Congress vein.

LOWER GRADE ORE

As to the lower grade ore remaining in various portions of the workings, I can add nothing to the previous statements and those in my report except to mention that Snow confirmed the findings of Colburn, Price and Ramsden to the effect that many samples cut in the vein between the old stopes would run from $7.00 to over $10.00 per ton and some of my samples carried $9.00 although all high grade material was purposely avoided. Stanton and others who were familiar with the old mine mentioned the fact that there had been left in the upper levels of the Niagara vein ore which assayed a shade below the old limit of 0.35 oz. per ton and which could be reached for sampling from No. 5 shaft if a little cleaning up was done in the shaft and drifts. While no accurate estimate of this ore was made, the tonnage was represented as being quite substantial and some portions of it should carry better than 0.4 oz. per ton.

Metallurgy

In further reference to the treatment of the higher grade ore to be produced from the small scale operations (about 50 tons p per day) it seems that this might best be started through the use of flotation with shipment of concentrates to the smelter. These concentrates and even the flotation tailings could later be cyanided (with or without roasting) if extra recovery would make this worthwhile.

I have a recor of gravity concentrates shipped by the Congress Company to the Humboldt Smelter in 1906 which carried 7 oz. to 8 oz. in gold and 13 oz. in silver, and I believe that a high recovery of values could be ontained on most of the ore by modern flotation alone whereas the installation of cyanide equipment would involve much extra expense and the operation of a small cyanide plant is comparitively costly

CONCLUSION

To sum up the situation I call your attention to the estimate of ore reserves given on page 104 of my long report and especially the possible ore amounting to 200,000 tons with an average value of $11.00 per ton. Neither the quantity nor grade of this material can be made the subject of an engineering estimate based upon mathematical data but it is based largely on conversations and correspondence with competent engineers who were familiar with the old workings of the mine and it has been checked to some extent by my own findings and those of other engineers who assisted me or were associated in our investigations. Of course all cost estimates in the long report must now be substantially revised upward and without attempting to go into details I have figured that the cost of developing, sorting and mining ore will be in the order of $6.25 per ton in place of $5.00 and milling, etc. will cost about $1.75 making a total operating cost of $8.00 and leaving a profit of $2100 per ton on this classeof material if an average recovery of $10.00 can be obtained. The total expected profits from the operation after deducting the repayment of capital which must be invested, may not seem to make the venture particularly attractive, but one must bear in mind the chance (and I think it is a very good one) of finding and mining considerable ore of a much higher grade some of which may well run to a value of $20.00 per ton as produced in the old operations and considering that all mining is at best a speculative venture, I feel that there is a strong probability that the initial investment will be repaid and a reasonable probability that a very substantial profit may be earned either because of the development of higher grade ore or because of the anticipated increase in the price of gold. Moreover, it should be noted that all of the samples listed in the report were purposely taken without sorting while such sorting, at a comparitively small expense, would have raised the grade of those taken from ore in place and also from portions of the gob from 15% to 30%. In carrying on a small operation you will undoubtedly find it advisable to apply both selective mining and sorting and may thus be able to bring the average value of mill heads to perhaps $13.00 per ton which would be most desirable.

FIRST PROCEDURE

The condition of the workings which I visited and sampled some five years ago has doubtless changed somewhat for the worse and before mining and milling is actually started, it will be essential to have made accessible a sufficient number of faces of pay ore to permit the desired daily production. In order to be reasonably sure of producing 50 tons of pay ore or gob I feel that first of all, and before making any large purchases of equipment, it would be your best policy to employ a competent y oung engineer with a small crew of miners who could work under the direction of Mr. Colburn, clearing out the drifts or stopes where pay ore is known or believed to exist and re-sampling these ore shoots or sections of the gob with proper sorting followed by preperation for the a actual extraction of the pay ore. By following this program you should be able to avoid the mistake of going to more than a trivial expense in preparing to develop and mine ore shoots which are not sufficiently rich to pay the working costs.

CAPITAL EXPENDITURES

I have refigured the capital expenditures which will probably be involved in this undertaking and assuming that you can purchase the present power plant for $12,500.00 and obtain good second hand machinery for your other principal items of equipment, I think that the $80,000.00 which you propose to provide should be sufficient provided you do not attempt to cyanide either the concentrates or tailings from the flotation plant. Should such

cyanide treatment prove to be necessary or advisable, I believe that you should arrange to have available an additional $10.000. or preferably $20,000.00 which last figure would raise your total capital investment to $100,000.00 and serve to provide acertain amount of working capital which is often of great importance.

My conclusions are again made on the assumption that there will be no further advances in the cost of labor or other commodities resulting in serious inflation with a decrease in the value of our currency which would make present estimates entirely worthless as long as the value of gold is fixed at 435.00 per ounce.

Yours very truly,

(signed) G. M. Colvocoresses.

STATEMENT

WICKENBURG ORE MARKET

OPERATED BY JOHN C. HERR

WICKENBURG, ARIZONA, Dec. 21st 49, 194

IN ACCOUNT WITH

Congress Spur Mng Co.

Congress Ariz.

#83826

Credit Smelter check ----		510.72
Brokerage 50 cents ton	24.50	
Oct assaying --------	4.50	
Dec. " ---------	3.00	
Credit silver umpire----		2.50
Hauling 99060#$1.50 ton	74.29	
15% Royalty-------$436.43	65.46	
	$ 171.75	
Check to Balance---------	341.47	
	$ 513.22	$ 513.22

3447
2476
36623

1M 2-49 Cairns

American Smelting and Refining Company

Hayden, Arizona

PURCHASE SCHEDULE F

Date Effective April 28, 1949

Mine Congress & Others **Location** Martinez Mining Dist., Yavapai Co., Arizona

Shipper E. A. Colburn, Jr. **Address** Box 153, Congress, Ariz.

Character Ore Siliceous Gold Ore and Gold Concentrates **R. R. Station** Congress Jct., Arizona

The following purchase terms are subject to the General Clauses shown on the back of this sheet, and are subject to change on 30 days notice. Unless shipments are begun within 30 days this quotation is automatically cancelled.

DELIVERY: F. O. B. unloading bins American Smelting and Refining Company, Hayden, Arizona. The rates quoted are based upon shipment in gondola equipment. Extra unloading charges of $1.00 per dry ton will be assessed for products received in box cars.

PAYMENTS

GOLD: If .03 of an ounce per dry ton or over pay for 92.57% at the net realized price. Under present Mint price this is equivalent to paying for 100% at $32.3185 per troy ounce.

SILVER: Pay for 95% (minimum deduction of ½ ounce) at the average Handy & Harmon New York Silver quotations for the calendar week, including date of delivery of last car of each lot at plant of Buyer, or, if higher, at the realized Mint price provided silver qualifies for Government purchase and affidavit is furnished, less a deduction in either case of 1½c per ounce.

COPPER: Deduct from the wet copper assay eight pounds and pay for ninety-five per cent of the remaining copper at the daily net refinery domestic quotations for electrolytic cathodes as published in the E. & M. J. Metal and Mineral Markets of New York averaged for the calendar week including date of delivery of last car of each lot at the plant of the buyer less a deduction of 3.0 cents per pound of copper accounted for. Nothing paid for copper if less than one-half per cent by wet assay.

Credit $1.00 per ton when assay for Si02 is 60% or over.

No payment will be made for any metal or content except as above specified.

DEDUCTIONS

BASE CHARGE: $ 4.50 per net dry ton of 2,000 pounds; provided the sum of payments for gold, silver, and copper does not exceed $ 15.00 per ton. Add to the base charge ten per cent of the excess over $ 15.00 to a maximum charge of $ 6.00 per dry ton. The base charge just specified is for ores containing at least eight pounds of copper per ton; when a smaller quantity is contained, there will be added to the base charge a sum equivalent to the value of the deficiency between actual contents and eight pounds per ton computed according to the terms specified herein for copper payment.

ZINC: Allow five units free; charge for the excess at thirty cents per unit, fractions in proportion.

ALUMINA: 10% of the silica content will be allowed free. Alumina in excess of this amount will be charged for at 25c per unit, fractions in proportion.

FREIGHT: All railroad freight and delivery charges for account of shipper. Deduct from settlement freight and other advances made by Buyer.

TONNAGE: Limited to --- tons per month except by special arrangement.

AMERICAN SMELTING AND REFINING COMPANY

By Brent N. Rickard

(over) BRENT N. RICKARD

O. GLENN STAPLEY
PRESIDENT
D. L. STAPLEY
VICE PRESIDENT & GENERAL MANAGER
L. E. STAPLEY
SECRETARY-TREASURER
T. H. STAPLEY
ASST. SECRETARY-TREASURER
W. C. STAPLEY
VICE PRESIDENT

The O.S. STAPLEY Company

STORES AT PHOENIX - MESA - GLENDALE - CHANDLER - BUCKEYE - CASA GRANDE - COOLIDGE
PHOENIX STORE AND GENERAL OFFICES, 723 GRAND AVENUE, P. O. BOX 960, PHOENIX, ARIZONA

29 October 49

E. A. Colburn, Jr.
P. O.Box 153
Congress, Arizona

Dear Sir:

Your letter of October 24th to the Arizona Hardware Co. regarding your 9" stroke Myers pump, was referred to me, as this is pump headquarters for them.

One set of motor rails complete, $7.10, 2 belts for 9" pump, $8.50, one 3HP 60 cycle, single phase motor, $149.00, one taper lock pulley $9.00.

Hoping that this is the information that you require, I am,

Sincerely yours,

THE O. S. STAPLEY COMPANY

Geo Akers

Geo. Akers, Manager
Pump Department

GA:eh

P. O. Box 153,
Congress, Arizona,
December 27, 1949

Dear Brother:

I have both of your letters and am glad to hear that you have again revised the horsepower ratings for the engine. In order to make it sure I believe that we would do well to get it tested on an electric dynamometer, probable over there in L. A. or Long Beach. Certainly we should know for sure just what the horsepower is. This would be better if we could run it a few minutes at a time, and certainly this model engine is built and in operation and should therefore be pushed to the limit ahead of any other experimental types we might have in mind, for the development of the latter will be impossible unless those interested in that kind of a setup are willing to back their judgement with money, or wait until we get the funds from the development and sale of the present engine.

Again I believe that more progress can be made on the present model than to switch to another engine which will call for starting very near scratch again. We have everything we can ask for in this engine, so why switch to something else at the behest of someone who has no financial interest in either. We probably can get money to finance the commercialization of our engine, but certainly not the building and commercialization of any other unless some outside capital is available, which is not yet in sight. Therefore I would not put much time in on a new design until such a time as the funds are available to build it. Its got down to a proposition of root hog or die with us right now and we can't afford to scatter our money and time.

If Newhouse wants to put up some money for a new model that is all well and good, but otherwise, so far as we are concerned there is nothing doing along that line. We will have as much as we can do to put this one over.

I doubt very much if the heat of compression on the blower accounts for all the heat we get. The horsepower not only drops but the engine eventually stalls and can't be started again until it is cool. There must be some other serious friction drag to cause all the. It may be elsewhere in the engine, but once we get the new blower we can probably determine if this is so. Another thing I noticed was that the breather started to throw out smoke at about 5 min. and looked as if the oil were heating up badly. These are only details which will have to be corrected, but never-the-less they are important when we are trying to make a demonstration. The engine handles wonderfully and all that, but should have further work done on it before we seriously try to demonstrate to prospective purchasers.

I hope that you will be rested by your visit there, as we will have to jump into it when you return. We have the casting for the exhaust and I will draw up the guard for the flywheel yet this week and have it made or try and make it myself with the help of a good welder. So we will have those items out of the way.

Hope to hear from you relative to the blower soon.

Your Aff brother

NED CREIGHTON
PHOENIX, ARIZONA

June 27, 1949

E. A. Colburn, Jr.
P. O. Box 153
Congress, Arizona

Dear Mr. Colburn:

On talking the matter over with Mr. Mason, I do not believe we would want to break up and sell parts of our mill, and right at this time, we are concerned in a trade as we have a deal more or less in prospect and I am leaving tonight for Denver in connection with such.

The Western Machinery Company, Mr. Keller, tells me that he has a mill outfit all ready to go over in Mohave County which can be bought for $2000 to $2500 complete, as is, where is.

I hope to have the pleasure of meeting you sometime.

Yours truly,

Ned Creighton

nc;lmb

NED CREIGHTON
PHOENIX, ARIZONA

May 31, 1949

Mr. E. A. Colburn, Jr.
Post Office Box 153
Congress, Arizona

Dear Mr. Colburn:

I have just been able to get in touch with Mr. Mason at Aguila. I think the best bet would be for you to write him and tell him when you would like to call and look at our layout (surface). He is in camp on Sundays and evenings after 5:00, and if you let him know when he could expect you, he would for sure meet you.

You just address him as H. F. Mason, Aguila, Arizona. All you would need to let him know is when you would be over to see him.

Yours truly,

Ned Creighton

lb

CONSULTING
DESIGNING
DEVELOPING

H. C. COLBURN
L. M. HAVERLY
W. L. MICHALSKY

APEX ENGINEERING COMPANY
803 FAIR OAKS - SOUTH PASADENA
ROOM 201—SYCAMORE 9-5023

Dec. 20, '49.

Dear Brother;-_

Arrived O K last night and I have been as busy as a cat on a tin roof all day today and have kept the telephone wires hot. Finally got Henery J. Kaiser on the phone. He said that he would not be interested in doing anything with the engine personally as he was too busy at the steel plant but suggested that I take the engine out to the K*F Plant in Long Beach, said he would fix it up for them to examine and test the engine there. Well, I know what that means, I would be up against Tom Johnston and I would not trust him as far as I could throw a cat by the tail. Anyhow, I would not put it past Kaiser to steal the engine as he has done such things in the past.

Fred Blauvelt of the Army Air corps is back at Wright Field. They expect him home for Xmas but I have learned from people that know him that if he got mixed up in it, that he would want to sit in on a big chunk of the profits - so I am inclined to drop him and take it up with the Air Corps direct by correspondence. I will get a letter out to them this week. I have not been able to contact Dr. Burt as yet but understand that he is still working for Lockheed. As you see I have had no luck so far but may be able to turn up something. Through the Ford Dealer here in S. P. I got in contact with a high up Ford offical here and he was much interested. I will follow it up and it might lead to something. It would be better than K-F anyhow.

I called up a couple of Engineers that I knew and who know me very well and told them about the engine performance. The first one said,"wait a minute, say that again". I repeated it and he said,"If I did not know you so well I would figure that you were pulling my leg, you did not by any chance get hold of some loco weed over there in Arizona did you. I asked him what he thought it should develop and he said around ten H P and at that it was way ahead of everything else out. The other one said practically the same thing and kidded the daylights out of me. So you can see what we are going to be up against when the thing is put up to engineers. We have got to get hold of some individual with money who won't call in any engineers and then let the engine prove by its performance what it will do. We have got to hook it uo to somethign like a car. I have been afraid of this all the time and that is why I wanted to tone down the performance figures before making them public and I think this is the wise course. We know what we are getting and know that it is right but we will never make anybody beleive it with any dynamometer tests. We have got to build an engine and get it in a car - that is going to be the only way. Get an individual to do this and then we can go on from there. We are not going to get any big money out of any promotion. We have got to make it after we get into production and then it will be easy and plenty of it.

You know just before I left over there I figured the M E P by calculus and I am not much good at that. I got it it 180 lbs. Well I figured the H P from that this morning and at 1700 rpm it gives just 9.2 H P. When I was home Thanksgiving I figured it by formula and got 315 lbs which gives 16.2 H P at 1700. I wanted to be sure so this

by the graphic method on the drawing board and get 312 lbs, which proves the formula I used was right. This gives 16 H P at 1700.

Now just before I left I revised the figures on the calibration of the fan brake and deducted 17% for altitude effect. I put these figures in parenthis just under the original figures on the sheets I gave you to copy. I wish you would look these up and see what they are for all speeds of 1700. They are in the red note book right in front. I also wish that you would revise your fuel tests - a couple of the low ones, just for curoisity. When I give the fuel tests to the engineers, they ask me if I am using gasoline, or what for fuel. They say that I can't take any fuel having a heating value of 19,500 B T Us per pound and get these results. Well, this we can but if we had the engine on an electric dynamometer and they ran the tests themselves - they would not beleive them. This is what we have been up against and will continue to be up against - so we had better tone them down somewhat. When we get a deal made, then it is all right to spring this stuff on them as they will think that they got a lot more for their money. I think that we had better not claim over 10 - 12 H P for the engine as this is plenty good and will be beleived. Same with fuel consumption.

I have been checking over my figures on the air brake and find that I have figured it correctly all the way through. There is only one thing and that is that the formula does not take into account radii of less than 8 inches. Therefore on our six and seven we probably get a high reading. However the 8 & 9 are O K and can probably be depended upon. So we will confine ourselvs in the future to the latter positions.

I will keep working right along on this but I fully beleive that our chances are much better over there than they are here. I have a party with a lot of money who will be in Wickenburg by Jan 4th next and I think I can do something with him. Will write again before I come back

Your aff. brother,

Bert.

P.S. - Hyder Motors gave the Title to the Ford to Glen Cook over two weeks ago. If you see him, ask him for the papers.

Bert.

P. O. Box 153,
Congress, Arizona
January 19, 1949.

Mr. S. T. Smith,
610 South Broadway,
Los Angeles 14,
Calif.

Dear Mr. Smith;

I have your letter of November 11th. relative to our ranch near Yava, Arizona.

We have recently decided that we will lower the price for a quick sale to $12,500. and thought that it would be best to let you know of the changed price, for I am sure that you will want to take advantage of it.

Please bear in mind that we have more than $18,000 in cash in the place beside a lot of labor not counted. This expense was made prior to the war when cost were much lower than at present. I am now entirely occupied here at the mine and expect to be for some years, so I do not have the time to give to the ranch, and beside I am getting no younger and must consolidate and liquidate my estate if possible.

The weather has been bad since the first, but as our weather follows closely after that in Los Angeles you will know when weather conditions will be improved for an examination of the ranch. Our storms all reach the coast first and then about twelve hours later arrive here, so that will give you an index for reference.

Very truly,

E. A. Colburn, Jr.

CONSULTING
DESIGNING
DEVELOPING

H. C. COLBURN
L. M. HAVERLY
W. L. MICHALSKY

APEX ENGINEERING COMPANY
903 FAIR OAKS - SOUTH PASADENA
ROOM 201—SYCAMORE 9-5023

Dec. 30, 1949.

Dear Brother:-

Referring to our phone conversation this morning would say that I knew that the blower was heating up - it naturally would at the pressures that we are using. That is why I did not run any duration tests. I wanted to get the H. P. and fuel tests made first. I knew that we would have to do one of two things - either get a new shell cast up with cooling fins on it, or buy a new blower so that we could run over two or three minutes at a time. I knew that the best deal would be to get a new blower but did not know where to obtain one. Well I know now - I can get either the Roots type or the vane type at International Motors in Hollywood- we were there once looking at the Renault. Both types are made in England and I will pick out whichever one that I can adapt best to the engine. I am strong for English made stuff. Everything is closed now until Tuesday and I will go over then - good thing I have a car here but the traffic is something fierce. The vane type is called the Shaw and it is the same outfit where I got the disc clutches that I used in the Colburn Car. It should be O K if I can get the right size.

Yesterday morning I went out to see the Newhouse Automotive Industries - the largest outfit handling parts for converting Ford and mercury engines into racing engines. They soup them up to 200 H P for the Ford and 220 for the Mercury. These are the true Hot Rods. This conversion costs from $700. to $1200. but they get results. There is a whale of a demand for these engines and also engines for midget racers. these are practically all using Offenhausers, which are a four cyl job and vibrate plenty. But they have to have a small short chunky engine and that is why they use them as there is nothing else. They get about $2,000. each for them.. I had a two hour talk with Newhouse and he is a man after my own heart. He is the first engineer I have ever talked to that beleived me and the results that we have been getting. The reason? he is smart - and why is he smart? Because he got his experience the hard way, in the hard school of experience - as I did and not from any damn College. As it happened, I had already worked out the specifications for a four pair Vee engine. Bore 2½ by stroke 2¾ - Displacement above ports of 107 Cu In. This will give 300 H P at 3,000 and don't worry about my not getting up to this speed with this engine with the cylinders close together. A single crankshaft with two throws. David will like this. Well I explained this to Newhouse and did he get hopped up. Wants the Distributorship for So. Calif. Hell, I would give him the whole darned State and kiss him into the bargain.We can sell these engines for around $1200. 00 each and they will cost about $300.00 to build after tooling up.

Newhouse knows all the race car boys and the Hot Rod fellows two and I know we can go to town on this. With an outlet like this we can easily get the money to build them. I can't go out and raise a million dollars or any reasonable part thereof - but by golly, I can go out and sell engines. With commitments, we can get all the money we can use. If you want to do anything - go ahead and do it, instead of trying to get somebody else to do it.

I have enough of the lay-out completed to see that it is going to be one compact little chunk of an engine and light too. It can be used fine in a rear mounting position or anywhere else. Added to that is the extreme low cost of production. I am satisfied that it is the best set-up for a multi-cylinder engine (David will like this too). It was also Daves idea that I contact these hot-rod boys. I did not do this with the idea of getting any backing from them, but just to get orers and more orders from them. You know some of these boys that are following these races around the country are making over $4,000.00 per month. They can afford to pay for a good engine. Well, this new angle should pay out big. I know darned well that I could sell over a million dollars worthof engines the first year all by myself.

I have been doing a lot of figuring and rechecking on both the potential H P of the engine and the air brake. The engine should develop 2.85 H P per cu. in. That would make our engine show 30 H P at the peak and it does it. It also shows that our little air brake is darned near right on the button. The only mistake that I have made was in not putting cooling flanges on the blower shell but at that time I was only figuring on pressures of less than three pounds and six to seven makes a heck of a difference. Yes, the air gets preheated and then the speed and power fall right off. This is what happened to both carburettors and was the fault of neither. It is just as well that you found it out while I was over here. The little engine will never be superceded as that is the only way we can build a single unit job and there will be a large field for them after we get going.

I also went to see Lewie Shell, a Dist. for hot rod parts and he confirmed what I learned from Newhouse. So you see, Ihave been darned busy, but it has been time plenty well spent and is going to bring results

The thing that pleases me most is to find an engineer that can see the light and beleives what I tell him. For years I have been up against the opinions of a bunch of half-assed, college bred engineers? that did not know sic-em. Asking me if I had been eating loco weed and what brand of corn lickker I had been inhaling anyhow. After a few years of this I had begun to think that maybe I was a crack pot after all and was clear off the beam. But it was the other fellows and not me. There is not a darned thing that can possibly take the place of experience and common horse sense. I have made this statement often and now it goes double. The next two days I will be busy on the drawing board and get the engine pretty well roughed out. I will- of course incorperate the port rings and try and work out automatic operation for them. Thus we can patent an improvement on the Patent and thus extend its time. And that is not all I can probably work out for Patents. There will be a party in Vicksburg who, I think can be talked into potting up some preliminary money, especially since I have turned up what I hav e here. Just let me at him.

Henry J. Kaiser Jr got married the day after I talked to him. He is now Pres. of the K*F. Western division and therefore he personally can not engage in any similar enterprise. However, this will not prevent them from buying engines from us if they want to stay in the swim - and the same goes for others. Well I must close now. A merry Xmas and a Happy New Year to all of you. And beleive me it is going to be Happy too.

Your aff. brother,

Bert

NED CREIGHTON
PHOENIX, ARIZONA

May 21 - 1949

Mr E.A. Tolburn Jr
Congress. Ariz

Dear Sir:-

I shall be in Phoenix during the rest of may and a part of June. My associate Mr Mason is at the property near aguila at times but right at this time is working at a camp south of Aguila.

I am writing him and will find out when he can contact you and you will hear from me in a few days as to whether he can go to Congress if I make an appointment or whether he wishes me to see you.

I thank you for your inquiry and you will hear from me at once after I hear from Mason

Ned Creighton
P.O. Box 2689
Phoenix Ariz

P. O. Box 15,
Congress, Arizona,
May 24, 1949

Mr. A. M. Crawford,
Crawford and Baker,
Attys at Law,
Prescott,
Arizona.

Dear Mr. Crawford:

I have your letter of May 21st. It came late last night.

I am not favorable to an extension of the Moyer lease at this time, but have written Mr. McDaniel regarding the matter and he will transmit to you my ideas along this line.

Certainly, we want Mrs. Moyer to get what she can from any deal she is instrumental in putting over, but how it can be done will depend upon Mc Daniels advice in the matter. Therefore will you take it up with him and doubtless something can be arranged as we have made no definate commitments as yet except to notify other parties if anything serious in the way of a deal develops.

Very truly,

E. A. Colburn, Jr.

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APEX ENGINEERING COMPANY
903 FAIR OAKS - SOUTH PASADENA
ROOM 201—SYCAMORE 9-5023

Saturday Aug,13, '49.

Dear Brother;

Yesterday morning early I drove over to Phillipswith the blower blower and cylinder head. He is very busy(having put on two more men since we were there) and is working Saturdays, Sundays and nights. He can't get the job out until next Wed. Which means that I can get the engine all set up and ready for tests by next Thursday night. I can't lug that stuff over on the street cars again as I think I got a kidney pulled loose bringing them over. In addition, the oil pump on my engine is not working good. I think that there is sludge around the pump and over here it got cold and stopped the pump up, I can only get half pressure. I sure hate to drive over there. Will get the oil drained out and the engine flushed and that may help. To get back to the engine. We decided that instead of hand grinding out the head, to mill it out and get it accurate. The pattern of carbon in the head clearly indicates what should be done. This will obviate the need of a new head - I hope.I also bought a new Carter yesterday and these two changes will make the engine 100% I think. We knew that we would have to have another carb long before we brought the engine over here. What knocked out our last tests with the English Villiers carb was that the top intake piston ring that we installed had worked around so that the gap in the ring came right over one of the intake ports. I will fix it so that it cannot turn.

Phillips agrees with me that the second carburettor is necesary and brought to my mind something that I had forgotten and that is the old German Mercedes carb. It consisted of a barrell in whick were placed four venturi tubes. On top of them was a disc which, when rotated opened each tube progressively. Phillips has used them on his racing cars. He says that all carbs used on auto. engines in this country has to have an acceleration pump whish gives a richer mixture for acceleration and hill climbing. This is done to overcome thedisadvantages of a single tube carb. carb. and results in bad fuel economy as the mixture is too rich during the periods of acceleration. Therefore the low gas mileage obtained with most automobiles. I am going to design a carb with at least two and pos - ibly three tubes. It would be very simple and easy to work out. Who knows but what we could build them for all other cars as they will work justaas well on four cycle engines as two cycle.

Now about the blower, it is most satisfactory in every respect except for one point that may give trouble in long service and that is the springs, they might weaken up or start breaking in time. Phillips has drawings of an English blower of the vane type the same as ours except that the vanes have no springs back of them and the vanes never touch the bore of the shell - they clear it by 0.001" the same as the roots. Therefore there would be no friction. There will be a slight air slippage but that could be taken care of in the design. The vanes are metallic and at the lower corners have a lug extending beyond the end faces of the rotor. These lugh run in an eccentric groove in the end plates of the blower thus pushing the out and pulling them in. Guess you have got the picture. Perfectly simple and simply perfect. Lubrication could be taken care of. When we get an order for engines we can incorporate these refinements.

Phillips was driving at Indianapolis when Leon Duray had his car back there. He said that Duray had the fastest car on the track but that it had two bad defects. It would not handle and it was in very bad dynamic balance. He said that if we could overcome these two defects we would have a world beater. I told him that we had already overcome them and he said that if that was the case, that was all that we needed. You see it pays to have me down here where I am in contact with other engineers, I get ideas. Just a word dropped here and there is all that I need d Phillips has had a lot of racing experience at Indianapolis and knows he the history of the game and equipment. I would not advise any of these changes to be made on this engine, it will be plenty good enough to put over as is. Then when we come to get out the production model, we can incoprorate them. This is the experimental model and was never intended to be a production model. Such things are never done.

I do not think it wise to make an issue of the power output of this engine as the sole consideration and goal to aim at. I figure that we can get 1.5 H P per cubic inch. Nobody else is anywhere near that figure so why make power output the sole objective. What we have got to prove is the lack of vibration and handling. These are the two headliners and the power is incidental provided we have more than the others. If anyone takes it up, they will want more cylinders anyhow except in the case of small engines, which we have.

I would like to have you both over here for next Thursday if you can make it as I think you will see something. If you come over I would like to have you bring the following items. First the set of socket wrenches, all the extra springs for the blower, truarc tools and all the rings that you can find, my pump oil can which was around the lathe. all of the piston rings - in the cupboard. Any of the small junk which you may find around there. The truarc tools were on the shelf at the back of the shop and the springs were in a small box on the bench under them or in the cupboard. If you have moved the shop out, you may have a heck of a time in finding anything. I wish that I had that whole shop down here but when we make a deal, we can move it over. Austin will know whee those things are if you have not moved the shop.

Phone me if you can come over but you probably will anyhow before you get this letter. With these changes made I will be able to go out and get some publicity. I have several leads that I can work on but not until the tests are completed. Well, everything looks good. I am sorry for the delays but they could not be helped and much has been learned from them already. Guess this is all the news for now so I will get this in the mail.

Your aff. brother,

Bert,

Oct. 9, 1952

Mr. E. A. Colburn, Jr.
P.O. Box 153
Congress, Arizona

Dear Mr. Colburn:

We were glad to hear from you again and to know that you & yours are all OK.

I hardly know what to say about Bogle's intention of moving all the wooden houses off the property, but rather doubt that he would bother your house. I expect to return home in late November or early December and will see you then, also Mr. Bogle. I have heard nothing from the Bogles since last Xmas time, so can't give you any information as to their plans.

Thanks very much for your efforts at repairing the roof of our house there. The key to the house is over the window of the garage, so that any time you wish you can enter the house.

Our two years of duty here in Athens ends Oct. 23 and we are eligible for home leave then. We plan to leave here in late October and go to Rome, up thru Italy to Munich, Germany, thence to Brussels and to London, where I have a business conference for a few days enroute to U.S.A. Also in Washington I am slated for a conference prior to going West.

We expect to see our eldest Son Jim in Germany, and if

he can get leave for 10 or 15 days, we shall take him to London with us while we are there, and then he wants to return via Paris to Nurnberg where he is stationed. Thank goodness he is in Germany and not Korea now.

We shall see you of course and will be looking forward to giving you folks all the dope.

I hope our absentee ballots arrive here before we leave here, as we are anxious to vote this year. We are of the opinion that we need a new administration in Washington.

We hope that Dave is doing well on his lead mine, and that all of you are enjoying good health. Our kindest personal regards and best wishes to Mrs. Colburn and yours good self, from Pearl and me.

Sincerely,

O. D. McPherson

February 7, 1952.

Congress Metals, Inc.
% Bogle Farms,
Chandles,
Arizona.

Gentlemen:

I was down to the mill today looking around and found that the motor driven air compressor used for inflating the starting bottle for the Diesel engine is missing.

With the thought that perhaps you had sent up for it I am writing to determine whether you did do so or not, befor notifying the Deputy-sherriff.

If you sent for this machine it will not be necessary to notify me, or even if you did not do so, for that matter, as I have no interest in the matter except I hate to see the property stolen. But I feel that if the goods are stolen you should know about it.

Very truly,

E. A. Colburn, Jr.

February 28, 1952.

Dear Brother:

I have your letter of the 24th. and was very much surprised that you had made tests confirming the runaway that you had with the engine. I remember that you were very much excited about that runaway when next I saw you, but thought that perhaps you had been mistaken in the speed you got, and then when the relieving of the pistons did no good I did not know what to think about it. Certain it is that the engine has always got too hot as shown by the smoke out of the crankcase, and when one stops to think about it that extra heat over and above the heat at which water boils would do a lot of expanding of the gases in the cylinders. Of course the blower does heat up considerably on account of the heat of compression, but we did not have that trouble with the old engine and that blower was aircooled, so probably it is not so much the fault of the blower. In this engine there is an ideal condition for the transfer of the heat from the cylinder walls to the mixture, impinging against hot walls from the inlet, then up beside hot walls to the head, another change of direction and a hot head then another 90 deg change in direction and down another hot cylinder. I hope that this expansion is the real cause of the slow running and dragging down, for it can be fixed even if we have to build a water cooled block.

However, there is another way beside those you suggested to try it out without too much expense and that would be to water cool the cylinders and perhaps the inlet manifold and lower part of the blower. Take the cylinders alone to start with. The bottom plate of the tin water container could go between the cylinder block and the crankcase with end walls cut to fit the inlet and exhaust openings and extending upward above the top of the head flanges. Probably the block would have to be planed down the equivelant of the tin thickness and gasket thickness and the spark plug would have to be enclosed in a steel tube to keep the water out. Then an inlet and overflow pipe could be put in and water circulater past the cylinders. The blower and inlet could also be water cooled by extending the tank out past them and the water level would be just about up to the blower shaft. There might be some difficulty here, however, in making the joints where blower is fastened to inteke tight against water and also where control lever goes into inlet, but probably these could be plugged up. Seems to me that the simple water cooling of the cylinders would give us the dope about it, or at least all that would be required to see whether we wanted to build a new water cooled block and inlet.

I wish that you would be thinking it over and let me know. I had figured on welding a aluminum bottom plater on the lower flanges of the cylinders, but upon talking to some welders was more or less discouraged, especially as I remember out attempt to weld the head that time. You remember it was abotch. Possibly a bottom plate could be fitted between the two bottom flanges of the cylinders by using liquid solder, but am afraid that it would be a pretty bum job. Think it would be best to run the tank down to the crankcase.

The spark plug would be relatively simple, but we might have to use a smaller one which are available. A tube or sort of a funnel could be used with one end plugged and a hole in it through which the spark plug could be screwed. A water tight gasket would be necessary.

You be thinking it over and give me the benefit of your experience.

Ruth and Frank came home about a week ago and Frank went on back last Friday night. He seemed to enjoy his vacation. Ruth left today to go down and see Doris in Phoenix. Shirley had to go down to see the dentist for Davie so Ruth went along. She will go to Los Angeles to visit some friends Saturday and then on to her home. Frank has a Pontiac Station Wagon and it runs very nicely. He is making very good money now and will probably stay up there at Antioch for at least two more years, as they are enlarging the station he helped build and are building another large power plant there. You know he is a steam fitter. He made $7,100 last year. Guess he makes more money than any of the sons-in-law. Guess David spends more than that, but he don't make it by any means. While they were here we went out to see Bennie and Betty one day. Bennie is putting in a small laboratory table in the assay office and will run tests on that. He is getting along all right. No word from the government yet on the mine loan. I tried out magnetic seperation on the old tailing but it did no good, guess that they didn't roast it enough or overroasted so that the mineral particles lost their magnetism. I have written Humphreys about their concentrator, but would bet money they can't treat it either. Did get a $550. concentrate fro Goodys riffle, but the saving was below 10%, so that was no good. Guess cyanide is about the only thing that will do the job and the dump is too low grade for that with the present gold price. Its just as well that we don't own the dump.

Now that you are getting to feeling better I expect that you will gain in weight, but that don't matter as long as you feel well. Have had the flu lately and Etta is up and down most of the time with that or stomach trouble, so we are more or less under the weather. It has warmed up quite a bit and has been quite nice weather for some time past, some wind, however although not real hard blows.

Your aff. brother,

H. C. C.
South Pasadena,

Feb. 24, '52.

Dear Brother:-

Yours of Feb 18, arrived yesterday, which day also happened to be my birthday, so I am now 75 years old. Am feeling much better and if I had of been feeling as good when I sold my car, I would have never sold it. I sure cut off my only avenue of escape but at that time I did not care wether school kept or not. It is now pretty well agreed that the removal of my teeth was the contributing cause for my slipping, aided by the worry encountered by the three months delay in getting my Pension. Am not putting on any weight but am sure feeling a lot better and am eating anything.

I will postpone any discussion about the steam car, gas turbine car etc, until a later edition when I will have more information on both subjects. I want to talk about the little engine and what can be done with it. I have checked over all the calculations I made on the fan Dyno. There are 148 of them and every one is correct except the one for the blades and settings that were on the thing when Mr. Lair was down there. I was not myself when he was there and this mixup occured. I put those blades on for the last tests I made before leaving there. I had been trying for more speed and made several runs without any blades but as a precaution against possible overspeeding, and left them there, not knowing thet the engine was going to be tested during my absence. I found out that the engine when warmed up would not run over 1400 r p m with no load, I also found that it would carry a load of 10 h p for a half hour at a time using the largest blades. This statement, I am going to stick to in spite of hell and high water. I have checked it with both the largest blades and the medium blades at different radaii settings and they check each other and with the formula. If I had of been there, I would have put the large blades on, giving it a load of ten h p at 1400. Then any engineer could have easily checked by the formula, which is absolutely correct. I have both the R A F and the German formulae and they don't vary over 1½%. I always did tell you and David that this was a good ten h p engine and I still say so as in its present form. However, it can be made to develop over twice that power by speeding it up and I will tell you how to do it. We have made mistakes (naturally in any development) but the biggest one we made and the one responsible for all the trouble was in making the engine air cooled instead of water cooled. It cools all right but it does it mainly by transferring heat to the scavenging and charging mixture thereby greatly expanding it and lowering the compression and consequently the combustion pressures. When starting cold and opening the throttle right up, we had difficulty in keeping the head gasket from blowing out. It even stretched the cyl. head bolts and yet when the engine got warmed up, it would not blow a loose cork out of a bottle.

The whole trouble is the preheating and expansion of the air-gas mixture. It starts the preheating job in the blower, adds to it by the then heated intake manifold but the final and fatal touch is added by pushing the mixture through two darned hot cylinders and a combustoin chamber that is also hot but it causes the mixture to change it's direction. Here is the proof. You will remember that time when the engine got away from me? This greatly puzzeled me for a long time but I finally got the answer and proved it. It has been my lifelong habit to never give an engine under test the gun until it has been run slowly for a few minutes in order to get the lub oil warmed up and to be sure that it has reached all wearing parts. This is a habit hard to break and what is more, it never should be broken. On the occasion under discussion, I had

no throttle control lever on the starting position. I must have started with the throttle pretty well open when the engine took off. The starting motor orgon to scream and as quick as I could, I slacked the belt, threw it off and made a dash around the engine to get at the throttle valve. Just as I got to it, I looked at the Tach. and it scared me to death, the needle had passed the 3500 r p m mark and was headed for the 4000. I chocked it right down to about 1000 for a few minutes and then opened it up again but all I got was 1500. I should have known right then but figured that the pistons were too tight as it don't take too much friction in the cylinders in a small engine to slow it down or even stall it completely. You will remember that I took the pistons out and had them ground down- taking .002" from tha dia. This did not help any so I finally decided to either find out what was the matter, or break the engine in two. You know that there were no funds available to repair a serious crack up and that was always a handicap that I had to work against. Well I took all load off the engine, started it cold and gave it the gun. It went past 4000 and I slowed it down as it would not hold this speed for more than a minute. In five minutes, I opened it up again but 1500 was all I got. I repeated this test the next morning except that I put on blades that would give a loading of eight h p at 1500 and it went right up to 3600 but did not hold it for more than 50 sec. when it commenced to sag right back. So there it is, plain as the nose on your face. On the first "run away" the engine showed 31 h p at 3590.

Now what to do about the present engine. The logical thing to do of course is to build a water cooled job but we have no funds for that. A complete engine would not have to be built but replace the present block with a water jacketed one andmore particulary a well water jacketed intake manifold. As an added precaution it would not be amiss to water cool the entire blower. I would stake everything that I ever expect to have that it would turn up to over 6,000 r p m.

We could probably increase the speed and power output of the present engine by the following method. It would be relatively inexpensive and should increase the speed to a zone lying between 2500 and 3000 r p m with an output of from 15 to 20 H P. First take the blower that I designed and have a new shell cast for it with deep cooling flanges all over it. Design a new intake manifold, also with as many flanges as you can get on it. Then take the blades off the flywheel, they are inedaquate anyhowand also the housing to the cylinders. Then get a good powerful electric fan and blow a good stream of air on the whole assembly while running. Put a hardened and ground steel liner in the blower (preferably Nitraloy) and you will have it. This setup would give us plenty of data to use in designing subsequent engines and would save quite some money and besides that - we might be surprised. Anyhow it is something to work on.

Yes, I am in favor of using a Prony brake. We have a darned good watercooled job and it will slip right on the engine. With this outfit, we could work out a constant for the brake which would be an integral number - say 3. Then just multiply the speed of the engine on test by the reading of the scale beam in pounds and divide by 3, and there you have it.Thus anyone either running or supervising teast on the engine could almost see at a glance just what the performance is.

I am liable to get the job of designing and building small engines of 1½ and 3 H P. More about it when I find out. I must close now but will write as soon as I get some dope to present. In the meantime, Good Luck.

Your aff. brother,

Bert.

H. C. C.
South Pasadena.

Feb. 16, '52.

Dear Brother;-

Flash,- I just got another brain storm and I beleive that this is IT. I was casting about in my mind for some possible way to improve the design of the steam car and the only thing I could rhink of was to use a steam turbine instead of the recriprokating engine. Then I says to myself - why not a gas turbine, driving angelectricne generator to electric motors in the rear wheels. But where was there such an animal? Well, I found it, the Solar Aireraft Co. of San Diego in cooperation with the Bureau of Ships, U. S. Navy are building a Portable Gas Turbine- driven pump. It is easily carried around by two men, turbine, pump and all. Ordinary Diesel fuel is used. The Solar Co. are building jet engines for Military Aircraft and should know what they are doing. The proposition is well worth spending time and effort on and I am sure going after it.

I don't know what the turbine alone weighs but it can't be very much by itself. I will get all the dope by correspondence. They invite inquiries in regard to different applications of the turbine. I should go down there but that is impossible and I can get the dope in t time by correspondence, but I am in a hurry. I do know that the turbine develops 45 H P at 40,300 R P M. They connect this to a reduction gear and reduce this speed to an output of 4,500 r p m for driving the pump. this could be easily reduced to a speed of 3600 for driving a generator. Then I would put a motor on a De Dion divided rear axle. The turbine and generator could be located either front or rear according to the weight balance of the car dictated. There would be no propellor shaft tunnel sticking up above the floor about ten inches as in present gas cars and the car could be built very low.

You may not think that 45 H P is enough but I figure that it is plenty and if it proved not to be enough, they would build them larger for us. The Rauch-Lang electric had a three H P motor and they did right well. I have seen them back at the Factory place a car with the front end up against a brick wall, throw on the juice and spin the rear tires until they burned the treads right off. You will remember the Babcock Electric speed wagon that father had? I have driven it 45 mi per hr on the level and it would hold it as long as the battery charge lasted. This car had a 2½ h p motor. in Denver, Oliver Fritchle built a speed wagon that wold show 60 mi per hr as long as the charge lasted and this was with a 5 h p motor.

It would not cost anywhere as much to develop a car of this type as it would a steam car and as far as financing goes, it would be very much simpler and easier. The design would not be a warmed over design of something already used but something new and radical and should catch on fine. I think I would have very little trouble in this respect and will get after it as soon as I get the design worked out. The exhaust gasses could be brought out through a tail pipe to the rear of the car and be a big help in propulsion. In fact, we would have the first cousin to a jet propelled car and maybe that would not catch on with the Public. It would also cause Stan. Oil and Gen motors to sit up and take a lot of notice. I will shoot more dope to you as soon as I get it lined up and you will be surprised. Am in a hurry so will pull the string for this time. Here it is.

Your aff. brother, Bert.

Perfectly Simple and Simply Perfect.

H. C. C.
South Pasadena.

Jan 20, '52.

Dear Brother;

Received yours of the 14th, yesterday morning. I was going to write you a week ago but it has been slightly damp around here and I have had a lot of repair work to do on the old wreck and ruin of a house. This work is really up to the Duke but he never knows when anything needs fixing and could not fix it if he did knowhow. The Radio and newspapers greatly exaggerated the damage done by this storm. As you know, there are spots around here that are low and flood with every heavy rain that we get. It has not rained much for the past few years and housing projects have built houses all over them without first putting in any drainage system. Consequently they were flooded and a big howl went up. The Govt. spent fifty million on a housing Project and it was all under water. Well they were asking for it. There is not money enough in the U. S. to put in an adequate flood control system here anyhow. The peculiar terrain here is not adaptable for it. L. A. is not a good place to live. Period.

Your comments on the weak points of the White steamer were all well taken and perfectly true. Taking up first the engine mounting, my letter was misleading, I read the copy of it a week ago and was going to write you and correct it. I did not intend to mount the unsprung weight of the engine directly on to a solid rear axle but my letter read like it as I did not want to go into details at that time. The engine as one unit with the differential, reduction gears, low gear and jaw clutch will be mounted on the chassis. Then a De Doin type rear axle will be used with drive shafts and universals to each rear wheel. The same as the Renault is using. This will give us individually sprung wheels, meaning better road and cornering ability, also the engine will be up out of the mud and dirt as I can put a splash pan all under it. That takes care of that and will be fine business.

What you have said about the car not being to anticipate what the road is like ahead and that the driver has to furnish that info. is perfectly correct, so if the driver is not able to see an unfamiliar road ahead, for instance after dark. Or when someone you are demonstrating to unexpectedly steers you up against a hill that you had never seen and you were not ready for - then is when you get caught with your pants down, I was caught that way several times. If you know where you are going and know the road, everything is fine. This trouble is due to the fact that the whole steam generating system is wrong. In the White, the fuel and water regulation are interdependent upon each other in a way and both are controlled indirectly by a thermostat, this unit controls the amount of fuel fed to the fire, it feeds this fuel to the burner when the <u>temperature</u> of the steam falls below a certain point. A device (not a thermostat) should operate when the steam <u>pressure</u> starts to fall and get the fire going. Of course, the higher the steam pressure, the higher the temperature but the two do not vary in a direct ratio, you have to have quite a large difference in pressure in order to get a small difference in temperature. It works out in this way. You are running along a level road, the steam is up and the fire off, you hit a hill you did not know about, you throw in the aux. water fump but before you can get enough water in the boiler so that the fire can come on, your steam is gone. In other words you have got to get some wet steam in there causing a lowered temperature on the thermo. so that it will opem up and give you some fire. There is altogether too great a time delay and it will not work out. The water supply to the boiler should be isolated from the rest of the controlls and made automatic so you can forget about it.

Then the fuel feed device could be a simple one, operated direct from the steam pressure. Then with a drop of say 25 psi, the fire would come on. Upon occasion the steam pressure in the White would drop over 500 psi before the fire came on. This is Monday afternoon, I spent the entire morning in putting in a new service switch and fuse block, also fixing up a bed.

I remember once that we overhauled a Stanley steamer, I took it out to test it. Drove it over to Golden and up Lookout Mtn. now the more steam that I used and the steeper the grade - the more pressure I had until the boiler finally popped off near the top of the grade. Just the opposite to the White. The driver had nothing to do but handle the throttle and steer it. However it had its faults, took too long to get up steam from cold, took too much water as they did not run condensing and the engine dragging its tracks out in the mud. This can all be overcome.

I want a water-tube boiler consisting of three or four coils of concentrically placed steel tubing, connected up properly with manifolds and a steam drum at the top which will also, I want to feed the water in at the bottom of the coils and maintain a water level about 80% of the way up. This can be held within an inch or two by means of a float connected to thefeed pumps. This could be done either mechanically or electrically. Then the fuel feed would be regulated directly and positively by a spring loaded diaphram connected to the steam dome on the boiler and operatinga needle valve in the fuel pressure line. Have changed my mind about the burner of the blower and spark plug lineup. Too expensive. Doble had a lot of good features but they cost like the dickens and there is no place for them in a $1200. Car. I want a pilot light fed by an Autopulse and let it burn all night if you were using the car every day. Then in the morning you would find it with a hot boiler and some steam up. This would also prevent the outfit from freezing up in zero weather. I have many other small inovations in mind and will gradually work them out. I have got to plot some temperature against pressure curves and will get the data from Entropy diagrams. I also want to get all the information I can on the construction of the Doble and I think I know where I can get it. It begins to look aufully good but as always there is that insurmountable mountain of Financing. However, we now have two strings to our bow; a steam engine and a gas engine - both in a good Car design. Pay your money and take your choice. There is a lot more dope on the engine and boiler that I want to give you but will jot it down later. I have got to do some cramming for my Exam tomorrow for my Operators License and am very nervous about it.

So finally the Cousins have disclosed their whereabouts. They have been mad at us - reason they all expected a nice Legacy from mothers Estate and when they got nothing, they blamed both of us. They were all right here until mothers death and we have not heard a peep out of them since. Well we used it up but if we had not have done so, they would have gotten the lions share of it. What is the matter with David - has he gone off his rocker? He never had ability enough to make a dollar but it don't take any tothrow it away as fast as a horse can trot. I must zipper this up. Good luck on your Govt. deal.

Your aff. brother.

P.S. Too damned many interruptions, can't write a connected letter involving any sense.
R.E.

H.C. G.
South Pasadena,

Jan. 7, '52.

Dear Brother;-

Monday morning and I am starting this letter now as it will probably take me several days to complete it. I will just jot thoughts down as they come to me. I will retrogress a little as certain events I can remember clearly. I remember one year when I was back in Chicago, that was during the period when we were selling White Steamers. That year there were more White registered cars in Chicago than the total of all makes combined of gas cars. That was the year just before the White Co. quit building Steamers. I remember when Webb Jay rigged up a stock car for racing and during one whole Summer season he entered every important race. He was never defeated until he went through the fence and that ended his racing carer, fortunately he survived. During this period he made monkeys of the cream of Foreign cars and drivers. There was absolutely nothing to it - he eased up on the turns and then passed them as if they were tied on the stretches. I visited him in the hospital in Chicago and he was all trussed up in plaster casts, pulleys, ropes and weights. He told me all about his experiences. You will remember it, they called his car the "Whistling Billy". Nothing on wheels could stay in sight of him.

I rem ember pulling out of many a mud hole without chains where there were gas cars stuck and they had cahins on. I remember going on picnics over in Jug canyon, 20 miles west of Sedalia, Colo. The hill was over two miles long and no gas car ever climbed it, they finally had to eliminate this hill by building a road around it. Gas cars went down the hill but they never got back up it. They had to go clear to Woodland Park, then to Colo. Springs and thence to Denver. I can remember many an incident where the steamers outperformed. It was a big blow to the advancement of the steam car when the White Co. was gobbled up by the Standard Oil. There may be a time if this Country don't quit dissipating its natural rescources, when gasoline is a rare commodity. During tha last War, England had to use steam trucks. Lorries they called them, they had a steam engine mounted on or near the rear axle and an ordinary steam boiler mounted at the rear, burning wood coke, or anything that would burn but they got around just the same. We may come to the point where the majority of mobile units will have to depend on stove oil for fuel. I could go on like this all day butthere is no need in selling you as you know the situation as well as I do. I will gradually work up a bunch of advantages and comparisons for publicity purposes, because I really intend to throw a rock into the mill pond and see how far the ripples will go - and where.

In my mind I have roughly outlined a projected design for a good steam car. I will have a two cylimder engine horizontally mounted on the rear axle, it will be combined with the differential. Preferably the engine will be of the "uniflow" type and will operate on dry superheated steam under fairly high pressure. This mounting has been successful in both the doble and Stanley Steamers. The boiler will be installed right over the engine in the trunk compartment. This will remove all heat and fumes from the passengers. I will try and design a pure flash boiler smaller and lighter than the Doble which is rather bulky and clumsy. Will use a centrifugal fan to break up the fuel, mix it with air and force it into the burner where it will be ignited by either a spark plug or preferably a glow plug. I do not intend to carry over a quart of water in the boiler at any one time but will feed it in automatically to meet the demands for steam. A lot of engineering and experimental

work will have to be done on this unit as it is the heart of the whole system and no one so far has gone nearly far enough. I would have a small drum at the top of the boiler to heat the feed water and feed it to the coils at just about the boiling point. I do not care too much for the Doble boiler and do not think it is as good as the White. Of course Doble elominated the pilot light and vaporiser, which was a big improvement. Under the hood at the front end of the car, I would locate the fuel and water tanks and also the condenser or heat exchanger. This will have a large area so that the engine can run condensing at least 95% of the time. An electric pump will return the condensate to the water tank and at the same time will maintain a minus atmospheric pressure. A fan, driven from the same scourse as the vacuum pump will draw air at all times through the condenser and greatly aid in the deal. It is my idea to so engineerthis deal so that the car can be capable of running at least 500 miles on one tank of water. Of course there will be a lot of chassis details such as the springing. I favor the torsion bar type, Buick has pretty well worked it out and will use it as soon as they get the green light from the Govt. Let me know what you think of the set-up as far as I have outlined it and offer any suggestions that might come to your mind.

Here is a choice bit of news, just picked it up at the barber shop (I dont buy newspapers at ten cents per). It seems that a couple of former White mechanics bought an old White at the junk yard for $35.00. They rebuilt it and went flying around here, blowing off about how they could beat any such & so and so gas car. Well a young rich guy here took them up and challenged them to a Cross Counrty race. So they left here headed for New York. They had a new Pontiac eight that had been all souped up. Wot happens? The Steam car beat the pants off of the gas car by better than twelve hours - Hi. That is sure one for the book. The answer is plain enough for anyone to read. Put that in your pipe.

It would cost a lot of money to build the first car but after that you could get fifty million to get into production with if you needed it. We would need about two hundred thousand to build the prototype car and after that it would be easy sailing. Now while I am pretty sharp on steam practice and would want to outline the objectives to shoot at, I would not want to accept solely the responsibility of the entire engineering on this car. It would be too much of a job for any one man anyhow. I would want to form a staff of engineers who had all of them obtained their experience in the Engineering staffs of White and Doble and who were absolutely sold on Steam. There should be plenty of such who are now too old to obtain regular employment on acct. of the age limit. Then we would all go into a huddle and soon get the job done.

I have been saving my Ace in the hole against the time when I needed it most, and this <u>is it</u>. When Beltone Ltd. blew up, Dr Burt raised two hundred thousand cold cash in order to build a compressed air Car. He built it and it was a flop, so he was out in the cold. He may be able to repeat, I don't know but I can find out. He has good connections. I will contact him as soon as I get things in a decent form to present. Will write his nibs in Wichita tomorrow. Too much to write about now so will mail this and write again about Wed. Good Luck for the New Year and it looks like it or I am off my rocker.

Your aff. brother,

Burt.

H. C. C.
South Pasadena.

Feb. 11, '52.

Dear Brother;-

Long time no write, I seem to not be just able to get at things that I should, after I get started, I am all right. Have all your letters and note that you have got that report off to the Govt. good luck and I hope that you are lucky. I suspose that it will take them an endless time to get at it.

Last week I went over to see the Dr. on my regular monthly check up. For the first time he told me what it was - 146 and he was well pleased, said it was 135 a month ago and the first time I came to see him that he could hardly get a reading. I looked at his machine when he went to get my medicine and the lowest graduation was 100, so I sure must have had it low. I asked him what I had and he said anemia and it came very near being pernicious, in fact was getting a good start. I have gained only a few pounds in weight but as the Doc says, I have started up instead of down. I know that I am feeling a lot better and am getting a little more ambish. day by day. Think that in a few months I will be back to normal but it was sure a narrow squeak.

I see no reason for changing my set-up on the projected steam car. However there are two angles to look out for and I know that they can be overcome. One is the matter of oil in the boiler and the other is the matter of liming up the boiler by mineral salts. Neither lime nor oil bothered the White flash boiler but by the same token, it had no reserve and would not sustain high speed for very long. That is why Webb Jay had two boilers on his whistling billy, the balance of the car was strictly stock. The Stanley boiler will not stand any oil at all and so they did not dare to run conde nsing. With soft water they got by all right but in a year or a little over they lime up badly and have to be replaced. I have seen cuts of the Doble but don't remember much about it but know that it was a water tube boiler with a large steam dome. In my proposed design, I am not afraid of oil. I could take out 90% of it right at the engine exhaust by means of an oil seperator but until the engine got good and warmed up, I would take out a lot of water also. So the use of an oil seperator is a very questionable, so let the oil get into the water tank, then when it accumulated, either have a mechanical skimmer or float it off the top of the tank by means of a stream of water flushing it out through a suitable opening in the top of the tank which could be opened for this purpose. In the White we used to spoon the stuff off or else flush it out the top of the tank and let it run all over everything - gad what a mess. This angle can be licked fine and dandy.

Now as to the formation of boiler scale. In the White they feed the water in at the top of the coils and it comes out as steam at the bottom, there is no time for scale to form and burn on. In the Stanley, the water in the boiler is under a continous proscess of distillation. The mineral salts do not pass out with the steam but remain in the bottom of the boiler, getting more highly concentrated as time goes on until they commence burning on and forming scale. However I knew a Stanley owner in Denver who put a blowoff valve in the bottom of his boiler and blew it down a little every few days just before putting the car away. He had no more trouble. In my boiler I propose introducing the water in at the bottom of the coils and as there will be a fairly rapid movement of the water through the coils, the mineral components - as yet in solution will be carried off and through the engine and there will be very little left to form scale. As a precaution

the boiler could be own down periodically and would not anticipate any trouble. Some development work shoule be done on the boiler and road tests made. As this will be the crucial unit in the car, several boilers would probably have to be made and given exaustive road tests. This should overcome the weak points of the three different types of boilers that were in use. I want to maintain a water level in order to give reserve power and to greatly simplify the controls - no thermostats and other automatis trapping which always gave trouble. On the market there are several makes of automatic package boilers. They are self contained and portable. Of course most of them are too large and heavy for Automotive work but the principle is there. They require no attendents whatever and automatically respond to any demands made on them for steam within their capacity. Gen. Motors use them on their Diesel locomotives to furnish steam to heat the train with. They work to perfection. They are the flash tube type and I will try and get some dope on them. There are also two outfits here in L? A. that make this type of boiler and I have no doubt but they would, or could be talked into developing this type of boiler. I will have to contact them by correspondence as I have no car to get around with and they cannot be reached by any of the types of transportation now in use here.

Have been giving some thought to the engine, I would not use a compound engine like the White did - you know how it used to buck now and then at certain throttle settings. I would use two small cyls. of the same bore and stroke. Would use balanced piston valves instead of the D slide valve, driven by the conventional Stevenson link motion for purposes of reverse motion and variable cut off. It would be ball and roller bearing thruout, even to the cross head. The White Co. fell down on their bearings, they had them all right but they made them themselves, in those days they did not have the steels or the methods that we do now and they were a lousy design anyhow. We used to have to take them apart, surface grind them and put them back in again. I could design a bang up steam engine. I have had enough experience with steam power plants to enable me to supervise the development work leading to the production of a very good, if not the best steam car ever produced.

I did not write that bird in Wichita and am not going to, he is too much of a crackpot. Anybody that would design a steam car without a clutch, don't know much about steam. How is he going to warm the engine up and get up a head of steam? Shows he knows very little about steam practice, especially as applied to automotive work.

The thing to do is to try and get an "angel" who will put up the money to build a prototype car. This might cost one hundred thousand dollars and possibly more. It may be said that The Stan. Oil or Gen. Motors would either stop us or buy us out they cannot prevent us from building one or more cars if we already had the money from a private source. They would know nothing about it until it was out anyhow. Then if we started a stock selling campaign to raise money , they could throw many obsticles in our way. Either that or buy us out, which would not be so bad if they paid us a few million. The angle I would try to work would be to get some large Outfit that had plenty of money and was not connected with the Automotive Industry in any way to take the thing over. I am not on favor of any Stock selling scheme, especially under present conditions. This is probably a lot of wishful thinking but it gives us something to chew on and keep our minds occupied. It will take some time but I know that we can come up eventually with the best Automobile ever built regardlass of type. That is for sure. Well I am running out of paper and patience so will give you another dose right soon. Good luck to you on your mine deal. In the meantime I would settle for a good second hand Ford. Hi. Your aff. brother. Burt.

E. A. Colburn, Jr.
P. O. BOX 153
CONGRESS, ARIZONA

February 19, 1951

Attached hereto ia a copy of a report compiled by Ray W. Arms on the metallurgy of the old tailing dumps of the Congress Mine, Congress, Arizona.

The writer did most of the work and a large part of the planning for these tests, as he wished to know just what was necessary to produce a good commercial recovery on the tailings. Most of the tests were made during the actual operation of the mill.

It must be borne in mind that the material for the tests was roasted concentration mill tailing, and that the problem was much more difficult than if raw Congress ores had been used, the roasting having produced a slag around each pyrite particle which kept the cyanide solution away from the gold until fine grinding released the residual pyrite or broke up the slag. This condition made fine grinding imperative.

In the treatment of raw Congress Mine ores a relatively coarse grind would probably be satisfactory, possibly to 50% to 60% minus 200 mesh, for flotation and perhaps a little finer for cyanidation. Congress Mining Co. which operated their mill just prior to the last war ground to 80 mesh and also conducted all test at that mesh grind. Tests conducted at that time showed good recoveries at the above grind on all dump ores.

The Illinois Mining Co. substanciated the data as given in the attached report on a basis of 150 tons per day, but were not able to make the operation pay at that small tonnage. The grinding to 150 mesh produced so much slime that they were unable to settle the pulp in the existing thickeners. The next company organized by Sherman, Holmes and Lydell either did not have access to the Arms report or ignored it. They did not arrange for further settling capacity which would be necessary for fine grainding 300 tons per day which they wished to mill. Consequently they had to arrange to mill mine dumps in order to help out the settlement of the pulp, and even then they did not get athoruugh wash of the tailing.

A tailing of 0.02 oz. gold is readily possible on Congress Mine ore, this amounts to $0.70 per ton with gold at $35. per ounce. With flotation and concentration it is probable, from actual test made at about 50 tons per day, that the final tailing will run in the neighborhood of $1.00 per ton. Certainly further flotation testing should be done on this ore to determine just what can be done with it in the point of recovery and to determine whether the flotation concentrate could be treated locally.

Very truly,

E. A. Colburn, Jr.

Report on Study of Tailings at Congress Mine

Purpose of Investigation

(1) A study of the physical and metallurgical characteristics of the mill tailings at the Congress Mine was made in order to develop a method of treatment for the tailings which would yield a maximum recovery of the gold and silver with a minimum of treatment costs.

Conclusions

(2) The proceedure which gives the maximum recovery at a moderate cost is to regrind the tailings till substancially all passes 150 mesh and subject the pulp to all slime cyanide treatment with proper aeration and agitation. Table concentration, as an assistance to this method does not increase the recovery sufficiently to justify the installation of any new equipmentbut, inasmuch as the tables are already installed and can be operated cheaply, this addition to the slime treatment is well worth while.

This method was decided upon after many others were tried and proven inadequate for one reason or another. Corroboration of the results of the test work was obtained during an actual mill run from March 17 to April 1 during which period it was proven that the values could be released by fine grinding and adequateky recovered if sufficient agitation was provided and a sufficient time interval allowed for the pulpto be in contact with the solution.

(3) Assay value of the tailings

It was necessary, due to the low margin of profit expected, to determine the average assay value of the entire tailings pile in a definate and conclusive mannerso that whatever figure was established as the value per ton could be relied upon. Fortunately many data were available to indicate the value of this material and when it was found that the determinations of this investigation closely checked the results from other sources it created confidence in the figures established.

Sampling

(4) Seven samples were taken in locations which not only afforded access to the nearly completed section of the dump from top to bottom, but also were sufficiently distributed to represent all the areas. These locations were made possible by some previous shuicing operations during which most of the depth of the dump was exposed in almost perpendicular walls. At the sample locations the face of these walls were cleaned of and channel samples were cut in the material thus exposed. The assays of the seven samples were as follows:

Number	Oz. Au.
1	.06
2	.04
3	.68
4	.06
5	.10
6	.06
7	.04
Average	.063

Records of Old Company

(5) Through the former officials of the mining company which originally produced these tailings, a record was obtained which discloses the average of the daily assays of these tailings for yearly periods during the entire span of operation from 1894 to 1910. These averages were as follows:

Year	Tons	Value at $20.67 per oz.	Assay oz. per ton
1895	17330	$2.98	.149
96	4913	3.88	.194
97	24134	1.35	.069
98	32253	1.39	.069
99	37620	1.23	.061
1900	50220	1.42	.071
01	63415	1.30	.065
02	48080	1.21	0060
0372040	72040	1.18	.056
04	44747	.92	.045
05	28808	.93	.046
06	23887	.95	.047
07	24876	.95	.047
08	24111	1.20	.060
09	26070	1.29	.064
1910	25500	.93	.046
Totals	551094	1.26	.063

Records of Strange & McGuire

(6) During the summer of 1932, Strange & McGuire sluiced a large tonnage of the tailings to a cyanide plant and kept a daily record of the assay value of their heads. This record, which covered a period of about two months and represented some 20,000 tons of tailing, discloses an average assay value of 0.066 oz. per ton.

Mr. Bowen's Report

(7) In the spring of 1933, Mr. Max W. Bowen, metallurgist of the Golden Cycle Mill, at Colorado Springs, Colo., took samples of the tailings and developed an average value of 0.06.

Sampling by F. A. Beauchamp

(8) After the Strange and McGuire operation has proceeded for some time the firm of Hamilton, Beauchamp and Woodward was retained to make a study of the tailings. They undertook a rather elaborate sampling program with pipes and augers and reported an average gold content of 0.0865. Their general findings also corroborate the reccommendations of this report as they suggested fine grinding and more complete agitation and aeriation than was practiced by Strange & McGuire.

Tonnage

(9) Records of the original company show that 551,094 were treated in their cyanide plant. In addition their concentrating mill treated an excess of 66,448 tons over this amount. These mill tailings which were not cyanided are not included in the tonnage on which the average grade are figured. They are reported to be much higher grade than the cyanide tailings but their effect does not show in any of the sampling averages probably because they lay so low in the tailings arroyo that none of the sampling devices used could reach them. They must be included in the total tonnage, however, hence the original tonnage was 617,542.

Since they were deposited wind and rain have disperced a considerable tonnage and a lesser amount has been removed during the operation of the various reclamation attempts. It is estimated that about one third of the original tonnage has been removed and that there remain about 400,000 tons of tailings in a position to be recovered.

Effect of Milling on Mineral Characteristics

(10) The original mill employed concentrating tables anf Frue vanners following a stamp mill which ground to about 30 mesh. The cyanide plant consisted of leaching tanks only and no attempt was made to seperately treat samd and slime. For a period of five years the ore was partially concentrated, then roasted prior to cyaniding.

Due to this roasting a large part of the tailing pile exhibits the charactistic red color of iron oxides produced from the oxidation of the sulphides. These iron oxides are rather light and porous and do not respond to further gravity concentration by tables or other such means. Tests by panning on the roasted tailings failed to produce a satisfactory concentrate ot tailing, but the unroasted portions of the dump still contain some sulphides which react to gravity concentration, especially when partially ground.

Microscppic examinationshows that the iron minerals remaining in the tailings are in the form of true middlings, i,e. attached to grains of quartz and dyke rock. Some of the attached mineral particles are so minute that they would require grinding to 400 or 500 mesh to be released. This predominance of true middlings is, of course, to be expected as the ore has already been subjected to gravity concentration and has had no regrinding since.

The microscope also reveals the fact that the roasting of the sulphides was incomplete as there is much evidence of slag and oxide coatings over grains of sulphide. The slag coating renders the particle more or less impervious to cyanide solutions and necessitates a further grinding to break up these shells and expose the mineral within.

The cyanide leaching process used by the old company, owing to its tendency to channel and divert solutions around accumulations of slime left certain amounts of values in the fines which an all slime process will recover

Tests

(Below are given the various tests performed and the reasons for undertaking them and whether or not the results of the tests proved indicitive or the porpose sound.

Water Soluble Values

(11) One of the most astonishing results of the study was the discovery that an appreciable part of the gold value is in the form which is soluble in water. The exact form in which the gold exists was not determined and no reaction was obtained for free or combined cyanogen in the ore. However, a long series of trials revealed a water soluble gold content varying from a few cents to as high as 90¢ per ton. The significance of this is that some of the gold is in a form which will migrate from one part of the pile to another with each rain and will appear on the surface in the form of blossom or will seek lower strata and other protected parts of the pile where the moisture content is retained

1951

ASSIGNMENT AGREEMENT

THIS AGREEMENT, made and entered into this 22nd day of January, 1951 by and between IKE W. KUSISTO of Yavapai County, Party of the First Part, and ALLISON STEEL MANUFACTURING COMPANY, an Arizona Corporation, of Phoenix, Arizona, Party of the Second Part,

WITNESSETH:

Party of the First Part has a lease with option to purchase the various mining claims constituting the Congress Group, from E. A. Colburn, Jr. and Etta M. Colburn, his wife, copy of which option is hereby attached and shall be a part of this agreement.

Party of the First Part is desirous of assigning this option agreement to Allison Steel Manufacturing Company and Allison Steel Manufacturing Company is willing to acquire this option on the following basis:

(1) The purchase price of the Assignment shall be the sum of $25,000.00

(2) The Allison Steel Manufacturing Company shall operate the property and make such investments in the property as it deems necessary in mining machinery and milling machinery and equipment. It shall keep proper books of account which shall show the operating costs of the property and the amount of the hereinbefore described investments. It shall be reimbursed out of profits for the amounts of these investments and after these amounts have been returned to Allison Steel Manufacturing Company, then 10% of the net profits after income taxes shall be paid over to Ike Kusisto, until such time that he has received the sum of $25,000.00 as described in paragraph 1 above. At this time he shall execute a complete release to the Allison Steel Manufacturing Company.

(3) In the event that Allison Steel Manufacturing Company decides to sell the properties described in this agreement, then it shall have the privilege of so doing and will protect Ike W. Kusisto to the extent of the unpaid balance of the purchase price of $25,000.00

(4) Allison Steel Manufacturing Company shall have the privilege of relinquishing their rights under this agreement at any time that they desire upon written notice to Ike W. Kusisto, and in such event shall have a period of sixty (60) days in which to remove any equipment, machinery, etc., which they may have installed upon these premises.

The option dated January 20, 1951 between E. A. Colburn, Jr., and Etta M. Colburn, his wife, and Ike W. Kusisto shall determine the terms and conditions of this particular agreement.

This Agreement of Assignment shall be assignable by the Allison Steel Manufacturing Company and the terms hereof shall be binding upon the heirs, executors, and assigns of the respective parties.

IN WITNESS WHEREOF the parties have hereunto set their hands as of the day and year first above written.

Ike W. Kusisto
Ike W. Kusisto, Party of the First Part

ALLISON STEEL MANUFACTURING COMPANY

By W. L. Allison
W. L. Allison, President, Party of the Second Part

STATE OF ARIZONA)
) ss
County of Maricopa)

On this the 22 day of January, 1951, before me, the undersigned officer, personally appeared Ike W. Kusisto, known to me to be the person whose name is subscribed to the within instrument and acknowledged that he executed the same for the purposes therein contained.

In witness whereof I hereunto set my hand and official seal.

Notary Public

My Commission Expires Jan. 6, 1952

STATE OF ARIZONA)
COUNTY OF MARICOPA) ss

On this 22nd day of January, 1951, before me, the undersigned officer, personally appeared W. L. Allison, known to me to be the President of Allison Steel Manufacturing Company, and that he signed this agreement on behalf of the said Allison Steel Manufacturing Company.

In witness whereof I hereunto set my hand and official seal.

Steven Greaves
Notary Public

My commission expires:

My Commission Expires Jan. 6, 1952

1951

W. BEN WILLIAMS
BOX 131
CLARKDALE, ARIZONA
PHONE 634-8841

LEASE WITH OPTION TO PURCHASE

THIS LEASE, made and entered into this 20th day of January, 1951, by and between E. A. COLBURN, JR. and ETTA M. COLBURN, his wife, of Wickenburg, Maricopa ~~Yavapai County~~, Arizona, hereinafter called lessors, and W. A. MURRAY ~~IKE W. KUSISTO~~, of Wickenburg, Maricopa ~~Yavapai~~ County, Arizona, hereinafter called lessee;

WITNESSETH:

Lessors do hereby lease to lessee for a term commencing the 20 ~~20th~~ day of August 1955 ~~January, 1951~~, the following described patented and unpatented lode mining claims:

PARCEL ONE: "Fractional" Lode Mining Claim, located in Martinez Mining District, designated by the Surveyor General as Lot No. 43, known as Mineral Certificate No. 194, and described in Patent No. 18637, dated October 6, 1891, recorded December 19, 1891, in the office of the County Recorder of Yavapai County, Arizona, in Book 30 of Deeds at page 497, records of Yavapai County.

PARCEL TWO: "Why Not" Lode Mining Claim, located in Martinez Mining District, designated by the Surveyor General as Lot No. 42, known as Mineral Certificate No. 193, and described in Patent No. 18636, dated October 6, 1891, recorded December 19, 1891, in the office of the County Recorder of Yavapai County, Arizona, in Book 30 of Deeds at page 493, records of Yavapai County.

PARCEL THREE: "Mosouri" Lode Mining Claim, located in Martinez Mining District, designated by the Surveyor General as Lot No. 41, known as Mineral Certificate No. 192, and designated in Patent No. 18635, dated October 6, 1891, recorded December 19, 1891, in the office of the County Recorder of Yavapai County, Arizona, in Book 30 of Deeds at page 488, records of Yavapai County.

PARCEL FOUR: "Niagara" Lode Mining Claim, located in Martinez Mining District, designated by the Surveyor General as Lot No. 40 A, known as Mineral Certificate No. 191, and described in Patent No. 18634, dated Octo- [illegible]

the office of the County Recorder of Yavapai County, Arizona, in Book 30 of Deeds at page 484, records of Yavapai County.

PARCEL FIVE: "Congress" Lode Mining Claim, located in Martinez Mining District, designated by the Surveyor General as Lot No. 38, known as Mineral Certificate No. 189, and described in Patent No. 18632, dated October 6, 1891, recorded December 19, 1891, in the office of the County Recorder of Yavapai County, Arizona, in Book 30 of Deeds at page 476, records of Yavapai County.

PARCEL SIX: "Queen of the Hills" Lode Mining Claim, located in Martinez Mining District, designated by the Surveyor General as Lot No. 39, known as Mineral Certificate No. 190, and described in Patent No. 18633, dated October 6, 1891, recorded December 19, 1891, in the office of the County Recorder of Yavapai County, Arizona, in Book 30 of Deeds at page 480, records of Yavapai County.

PARCEL SEVEN: "Excelsior" Lode Mining Claim, located in Martinez Mining District, designated by the Surveyor General as Lot No. 44, known as Mineral Certificate No. 218, and described in Patent No. 21242, dated May 11, 1892, recorded February 14, 1894, in the office of the County Recorder of Yavapai County, Arizona, in Book 33 of Deeds at page 620, records of Yavapai County.

PARCEL EIGHT: "Ohio" Lode Mining Claim, located in Martinez Mining District, designated by the Surveyor General as Lot No. 1190, known as Mineral Certificate No. 288, and described in Patent No. 27181, dated June 23, 1896, recorded March 18, 1897, in the office of the County Recorder of Yavapai County, Arizona, in Book 41 of Deeds at page 107, records of Yavapai County.

PARCEL NINE: "Rich Quartz" Lode Mining Claim, located in Martinez Mining District, designated by the Surveyor General as Lot No. 1192, known as Mineral Certificate No. 291, and described in Patent No. 27182, dated June 23, 1896, recorded March 18, 1897, in the office of the County Recorder of Yavapai County, Arizona, in Book 41 of Deeds at page 97, records of Yavapai County.

PARCEL TEN: "Golden Eagle" Lode Mining Claim, located in Martinez Mining District, designated by the Surveyor General as Lot No. 1191, known as Mineral Certificate No. 289, and described in Patent No. 27227, dated July 3, 1896, recorded March 18, 1897, in the office of the County Recorder of Yavapai County, Arizona, in Book 41 of Deeds at page 98, records of Yavapai County.

PARCEL ELEVEN: "Incline" Lode Mining Claim, located in Martinez Mining District, designated by the Surveyor General as Lot No. 1193, known as Mineral Certificate No. 290, and described in Patent No. 27228, dated July 3, 1896, recorded March 18, 1897, in the office of the County Recorder of Yavapai County, Arizona in Book 41 of Deeds at page 94, records of Yavapai County.

PARCEL TWELVE: "Old State" Lode Mining Claim, located in Martinez Mining District, designated by the Surveyor General as Lot No. 1189, known as Mineral Certificate No. 287, and described in Patent No. 27141, dated October 6, 1896, recorded March 18, 1897, in the office of the County Recorder of Yavapai County, Arizona, in Book 41 of Deeds at page 110, records of Yavapai County.

PARCEL THIRTEEN: "Snow Storm" Lode Mining Claim, located in Martinez Mining District, designated by the Surveyor General as Lot No. 1188, known as Mineral Certificate No. 285, and described in Patent No. 27870, dated February 26, 1897, recorded March 18, 1897, in the office of the County Recorder of Yavapai County, Arizona, in Book 41 of Deeds at page 104, records of Yavapai County.

PARCEL FOURTEEN: "Golden Thread" Lode Mining Claim, located in Martinez Mining District, designated by the Surveyor General as Lot No. 1352, known as Mineral Certificate No. 369, and described in Patent No. 31956, dated January 17, 1900, recorded March 26, 1901, in the office of the County Recorder of Yavapai County, Arizona, in Book 54 of Deeds at page 104, records of Yavapai County.

PARCEL FIFTEEN: "Bellick" Lode Mining Claim, the certificate of location of which appears of record in the office of the County Recorder of Yavapai County, Arizona, in Book 24 of Mines at page 291, records of Yavapai County.

PARCEL SIXTEEN: "Remnant" Lode Mining Claim, the certificate of location of which appears of record in the office of the County Recorder of Yavapai County, Arizona, in Book 25 of Mines at page 314, records of Yavapai County.

PARCEL SEVENTEEN: "Boundary" Lode Mining Claim, the certificate of location of which appears of record in the office of the County Recorder of Yavapai County, Arizona, in Book 35 Mines at page 161, records of Yavapai County.

PARCEL TWENTY-FIVE: Beginning at the Portal of the No. 3 Shaft on the Congress Vein, which is S. 70°50'56" E. 1217.64 feet from U. S. Mineral Monument No. 1, thence:

Portal No. 3 Shaft to Corner 1: S 13° 16' W 116';
Corner 1 to Corner 2: N.76°44' W 40';
Corner 2 to Corner 3: N.13°16' E 216';
Corner 3 to Corner 4: S. 76°44'E 100';
Corner 4 to Corner 5: S.13°16' W 200';
Corner 5 to Corner 6: S.28°00' E 132';
Corner 6 to Corner 7: Due West 36';
Corner 7 to Corner 1: N.37°00' W.145';

containing 0.63 acres and situate in Section 14, Township 10 North of Range 6 West, G. & S. R. B. & M., Yavapai County, Arizona.

PARCEL TWENTY-SIX: Beginning at a point on the South Edge of an old Stamp Mill Site, designated as stake S21, which is S. 55°21'52"E. 2540.02 feet from U. S. Mineral Monument No. 1; and which is S: 15°05'18" E 345.23 feet from the portal of No. 2 Congress Shaft; thence:

S. 21 to Corner 1: N.75°W 50';
Corner 1 to Corner 2: N.15°E 50';
Corner 2 to Corner 3: S.75°E 100';
Corner 3 to Corner 4: S.15°W 50';
Corner 4 to S 21 : N.75°W 50';

containing 0.115 acres and situate in Section 23, Township 10 North of Range 6 West, G. & S. R. B. & M., Yavapai County, Arizona

PARCEL TWENTY-SEVEN: Beginning at a point on the footwall of the No. 5 Niagara Shaft, designated as Stake S22, which is S. 56°06'40" E. 3411.28 feet from U. S. Mineral Monument No. 1, thence:

S 22 to Corner 1: Due South 50';
Corner 1 to Corner 2: due West 50';
Corner 2 to Corner 3: Due North 130';
Corner 3 to Corner 4: Due East 100';
Corner 4 to Corner 5: Due South 130';
Corner 5 to Corner 1: Due West 50';

containing 0.298 acres and situate in Sec. 23, Township 10 North of Range 6 West, G. & S. R. B. & M., Yavapai County, Arizona.

SUBJECT to the reservations contained in that certain deed dated October 15, 1947, from Hal Bogle and Dorothy T. Bogle, his wife, and Congress Metals, Inc., a corporation, first parties, to E. A. Colburn, Jr., second party, recorded in Book 189 of Deeds at pages 364-365, records of the County Recorder of Yavapai County, Arizona.

November 5, 1951.

Mr. Harold D. Maryott,
P. O. Box 418,
Claypool,
Arizona.

Dear Sir:

Thank you for the opportunity of looking over the report on the lead-zinc property which you submitted to me.

We would not be interested in the property at this time principally for the reason that it requires too much development before being in a position to produce in any amount, and therefore the expenditure of too much capital.

I am returning the report to you herewith, and wish you the best of success in promoting this property.

Very truly,

E. A. Colburn, Jr.

February 15, 1951.

Mr. L. T. Neilson,
Yava, Arizona.

Dear Mr. Neilson:

I received your letter of January 16th and have waited patiently for you to come down to see me or to send in the rental for January and February which is past due. I don't to be hard on you or ask for anything which you did not agree to do, but time is running out and I should have this rental in hand at the earliest possible moment.

You will realize that in order to get a reasonable rental for the place it is necessary to lease it early in the spring, which is fast approaching, and if you are not able to pay the rental I wish that you would so inform me and vacate the place, as it is only justice to me to have the ranch back in my hands before the first of March. I have other people who want to lease it and I can't let it ride any longer without payments being made on the rent.

I wish that you would get in touch with me as soon as you receive this letter in order that we may know where we stand.

Very truly,

E. A. Colburn, Jr.