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THE MINES MAGAZINE • JULY 1940

Your letters are welcomed for publication in this column every issue. Send along your boisterous, your sympathetic, your urbane, your profane, your critical. The best read and do others. These are a good start, let's hear from you.——

THE LUCKY DRAW

From W. A. C. Hris, of 12

Your letter announcing my lack in the drawing at the Annual Banquet is not likely to be one of your best. You will have another chance next year.

The prize is a very handsome affair, very useful and very ornamental. A wonderful gift sent from the Association and, through you, thank the Association.

Never more importantly for an event away from New Jersey but I have never given up hope that I can be among those present at some anniversaries event or similar if I have to go in a wheel chair.

O. R. REVIEWS EDITOR IN MALAWI

From June A. Beal, 110

I was moved from Tulsa to Covington this week where I expect to be for the next month or so doing manuscript work with the Shell Company. I'm enjoying my job a great deal and believe that I will work that will hold my interest for a long time.

My work for the Ore Digger and Mines Magazine is already proving useful and I'm sorry that I was not able to spend more time on it. If there is any way that I can help out the Magazine in the future please let me know.

General Delivery, Covington, Oklahoma.

COST AFRO EXPLORING AFTER LATER VIETNAM

From R. E. Parker, 1954

On October 23rd, 1939, I left Fresno, California headed for British East Africa via New York and Dar-Es-Salaam, a trip that was longer than anticipated due to weather. On the way I stopped at Golden, Denver, Chicago and New York before leaving Europe. Monday October 29th, our boat, the West Coast, a small freighter of about 6000 tons, of the American South African Line started on its voyage with 26 passengers. Although it was around ten o'clock in the evening, we did get a fleeting glimpse of the Statue of Liberty.

The first two days were plenty rough for a fellow who had never been on a small vessel. I remained where I left off in New York—climbing the rail. After that the weather cleared up and I became a real sailor. As we traveled into southern waters, my legs became numb. On October 13th we had a great thrill by the fact that we heard noise at the loading dock for business and for the first time I heard some South Africans say they were happy about the large American ships which were plying on the seas of the world and the entire world. The large ships were painted white, with a mahogany color, and eight large bombs were painted on the side of the wings. As we went through the water, we could see the green flags which were painted on the side of the wings. We went through Ascension Island and the South Sandwich Islands, two dots in the Atlantic, almost within calling distance. Ascension Island was first and it came as a bit of relief as it was the first land we had seen for seventeen days. Seven days after passing St. Helena we reached Africa and passed the Cape of Good Hope. Here we were visited by a large British cruiser which passed within three hundred yards of us. Up the coast to Natal we saw the southern part of Africa we were (Continued on page 375)
No. 30 DENVER “SUB-A” FLOTATION CELLS

PERSONAL NOTES

Charles E. Galvin, ’34, in Mcurrals for the A. S. & S. R. Company at their Santa Barbara, Mexico plant, and receives mail at the Central Telephone Co., Box 373. F. E. H. Donaldson, ’38, is being addressed at 1101 Main, Denver. Kenneth T. Beausoleil, ’30, is being addressed at Box 20, Municipal, Denver. Cassius W. Colton, ’21, is being addressed at 150 2nd Street, Glendale, Calif.

S. R. Chipps, ’33, has been transferred to Niagara Falls, N. Y. W. W. L. Clark, ’33, has been receiving mail at the Denver Sun Company, has a change of residence to 1535 Crescent Place, Tulare, Calif.

William E. Jeffries, ’31, Sales Engineer for E. L. Aubin to New York, has been transferred to Niagara Falls, N. Y. W. W. L. Clark, ’33, has been receiving mail at the Denver Sun Company, has a change of residence to 1535 Crescent Place, Tulare, Calif.

M. C. M. Stenworth, ’27, has been transferred to Niagara Falls, N. Y. W. M. W. Clark, ’33, has been receiving mail at the Denver Sun Company, has a change of residence to 1535 Crescent Place, Tulare, Calif.

John H. Abbott, ’28, has written his last address to 812 Pacific St., San Francisco, where he was doing the work he is doing.

E. W. Anderson, ’30, who has been prompt to the St. Louis, Ltd., Gallatin County, Mo., has been appointed to the position of Manager. The St. Louis office includes Washington, Oregon, Idaho, and the States in Montana, as well as the Alaska territory.

Joseph L. Barber, ’30, Manager for Cruise Mills, Inc., receives mail in care of the company at Denver, Colorado.

C. R. Blackmore, ’31, is employed by the Phelps Petroleum Company and is at present is being addressed in care of the company, Denver. C. J. Craig, ’30, League City, Texas.

E. W. Bond, ’27, V. F. Foran and W. F. Knott announce the limitation of the firm, Parker, Foran & Bond and have, with V. F. Foran, ’27, have formed a partnership under the firm name of Foran, Knott & Bond. They will continue practice as Petroleum and Natural Gas Consultants.

Charles M. Brouwer, ’21, is employed by the General Electric Company.

C. B. Butler, ’30, is now located in Schenectady, N. Y., where he receives mail in care of the company.

J. E. Brooke, ’30, who is associated with the Bethlehem Steel Company, is spending a few months in Oklahoma. His address there is c/o University Club, Box 144.

James L. Bruce, ’30, General Manager of Cypress Mines Corporation, has a change of residence to 1231 Virginia Road, San Marino, California.

Jesse G. Burrill, ’31, is President Superintendent for The Ohio Copper Company, with address Box 297, Oswego, Kansas.

H. F. Carpenter, ’22, has a change of address from Magruder to 3223 1st Avenue, Septima 207, Vancouver, British, Columbia.

J. L. Cleveland, ’26, who recently opened an office in Detroit under the name of Petroleum Engineer and Consulting Geologist, has a new address, 2707-28th Street, Detroit.

J. J. Corwin, ’21, Manager of the Ohio Copper Company, has a change of address to 3010 Harper, Detroit, Michigan.

John D. Cradock, ’20, last heard of part of May for an accident in the trail in Alaska as he was mining on the Sewar Peninsula, on the Attu islands. Mail sent to his home, 1533 William Boulevard, Arlington, Virginia, will be forwarded.

Eugene D. Davis, Ex-29, Engineer for the Mountain States Power Co., has been transferred from Cheyenne to Laramie, Wyoming.

Santana de Rio, ’20, has returned to his home in Cuba and is being addressed at San Juan, 131 East 45th Street, New York, N. Y.

Donald D. Fogg, ’33, is in the Feather division of the Young Company and has recently moved his residence from Salt Lake City to 70 South 6th Avenue, Glendale, Calif.

W. W. Ford, ’30, Manager of the Butler Asphalt Corporation, is residing at 700 2nd Avenue, Denver, Colorado, where he receives mail.

Edward T. Gardner, ’21, is now in the Philippines for the past year as Engineer for the North Cariboo Mines, is on his way back to the States. His temporary address is Box 204, Kingfisher, Texas.

FRANCO WYOMING OIL COMPANY PINE STREET

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and grade and the ultimate realization costs. The engineer cannot know the present day value because of the inadequacy of his present day tools. His value, then, is at best an intelligent guess based on factual data integrated in direct proportion to the probable value of its component elements and seasonal variations with reason and experience.

In this discussion I shall arbitrarily divide the whole problem into subproblems, but for facility in consideration only. In practice the engineer is soon aware that each subproblem, although separable per se, is interrelated and interdependent. In the first place, the engineer may divide the problem into parts, carefully considering only the part on which his opinion will be based, and making no allowance for the part absent. The geological problems are improving. In the past few years, the methods of probing mineral possibilities have greatly improved. Geophysical tools, especially in conjunction with geologic control, detailed structural maps, and geophysical models, have been developed. Microscopic studies, especially in reference to paragenesis, can be made on a more diagnostic basis with the aid of the beautiful and clear geological features of the deposit. Before reaching his decision he must organize his information that it definitely indicates to him one course or the other, or let the rejection or drilling be warranted. The resulting assumptions may not be always true, but the resulting decision is based on the available information.

Assuming a degree of precision to the examination, the engineer must re-evaluate the dollar risk, making large investments in evaluative and hence, in the decision to take the risk.

The present day value of the project is the dollar risk, making large investments in evaluative and hence, in the decision to take the risk.

In the case of ore valuation, it is the dollar risk, making large investments in evaluative and hence, in the decision to take the risk.

The geological considerations should be divided into two parts. The first, although difficult, would be comparatively simple, but the second would be required to determine the value of the ore and the ore deposit. The second part would require the future anticipated rate of return.

In the first part, he is assured of the existence of ore. His work is to determine the future anticipated rate of return. In the second part, he must determine the value of the ore. In the first part, he must be satisfied with the data available to him, but in the second part, he must be satisfied with the data available to him.

The problems of location for ore deposits are very similar to the problem of concentration. In the first case, the problem is to determine the value of the ore and the ore deposit. In the second case, it is to determine the value of the ore and the ore deposit.

The examining engineer, having determined his project, may proceed to an estimate of the property. If his work is not completed until the lease or the property is questioned, as it often is, then a minimum rate should be set up. With this phase worked out, it is then advisable for the examining engineer to take the property and underground plant in addition to such equipment as is already on the property.

In the examining engineer, the rate of concentration, gravity flow, sufficient water, tallings disposal, operating costs, replacement costs, and other impositions in and of themselves can but only be mentioned here.

There is no record of individual underestimation of the market. The examining engineer, having determined his project, may proceed to an estimate of the property. If his work is not completed until the lease or the property is questioned, as it often is, then a minimum rate should be set up. With this phase worked out, it is then advisable for the examining engineer to take the property and underground plant in addition to such equipment as is already on the property.

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In the examining engineer, the rate of concentration, gravity flow, sufficient water, tallings disposal, operating costs, replacement costs, and other impositions in and of themselves can but only be mentioned here.
The financial problem. The geological solution answered the question of gross present value. Succeeding solutions or partial solutions answered the problem of capital investment, probable operating cost and probable maintenance cost. The answer to this final problem is the answer to the question of feasibility. The valuator must decide whether or not the mine, if under consideration for purchase or substantial capital outlay, may be reasonably expected to repay the capital investment plus interest thereon. Usually the anticipated rate of interest is in proportion to the apparent risk. Because a mine is a waiting asset, because mining, once undertaken, is not susceptible to intermittent operation, because mining is a capital goods or heavy industry, and because mineral products, except by law or cartel agreement, are subject to price and responsive to the vagaries of supply and demand, imposing problems face the engineer. In effect, he must arrive at some conclusion on the value of today's dollar tomorrow and tomorrow's dollar today. To do this he must consider the past and present history of the dollar in the many functions under review. On this basis, and seasoned with his own good judgment, he must express an opinion in regard to the future cost of exploitation and development, of labor and material costs, of taxes and premiums designed to promote the individual security of labor, and of property and income taxation. He must also express an opinion in regard to the future value of the product or products, the future trends in consumption, the possibilities of replacement by or displacement of other products, the product's competitive position, and of the effect of the mine on taxes. The effect of taxes on the secondary or scrap market is a consideration. These are many other considerations. The result, whether itemized or included in a final figure, should be an expression of the degree of feasibility. This study may be brief or exhaustive, but its quality should bear some relation to the expected investment and the life of the property.

No discussion of valuation is considered competent without mention of the Hoskold annuity formula. Briefly, it is a formula which provides a mathematical solution to the valuation after the participating factors have been determined. These factors are (1) expected net yearly profit; (2) expected life of the product; (3) the anticipated rate of return to attract capital, and in some cases (4) the number of years required to place the property on production. The formula, the solution of which gives the present day value, gives an answer that is practical only in the light of experience and contemporary trends.

In view of the many unknown factors, what is the real value of such an imposing program of investigation? In the first place, the program is best given in such brief and unsatisfactory terms as "broad conclusions". The determination of what to include, exclude, stress or slight, must rest with the examining engineer and his decision will be based upon (1) the nature of the expected asset and present and potential character of the property, (3) the ability of his employer to follow his recommendations, (4) the anticipated value of his report, and (5) experience. The engineer will attempt to competently ascertain (1) the gross value of reasonably assured reserves, (2) the possibilities of future discoveries, (3) the overall cost of realization, and (4) the probable market for the product or products. Thus the valuation program is impos¬sible without the character of the proposed program of subsequent action. In the second place, it does not follow that a dollar value is an intangible resource of value by means of which the holder may in practice be superior to others. Finally, although there are many known exceptions to this general rule, it is true that the determination of what is a resource and the reasonable interpretation of human activity are in the long run so much the same problem.

In closing, I should like to emphasize an opinion that the increasing availability of tools for interpretation of ore possibilities will coincide with demands for their practical application. Early days saw, for example, grass root geologists, and abundant speculation. Ten years later, a driving force of random holes into attractive hillside resulted in the discovery of ore possibilities which coincided with demand and the reasonable interpretation of the human activity. And these findings were, in turn, a step toward progress in the art of exploration.

One of paramount importance under this title is the subject of management. From his own experience the examining engineer must estimate the possibilities of future management for efficiency and the problem of valuation. Labor, as have said, enters into every step from the first exploratory operation. At the end of an entire period the examining engineer faces the final resting place. The problem for the valuator decreases, however, as the valuable ore possibilities will coincide with demands for their practical application. Early days saw, for example, grass root geologists, and abundant speculation. Ten years later, a driving force of random holes into attractive hillside resulted in the discovery of ore possibilities which coincided with demand and the reasonable interpretation of the human activity. And these findings were, in turn, a step toward progress in the art of exploration.
Survey. The Lucky Strike ad of a few years ago pointed out that ‘tis fun to be fooled.” More than one well informed prospector believes that something with a certain amount of the spirit of the romantic doodlebug has been drilled on a doodlebug location.

Shorty Hamilton’s Treasure Finder

Description of actual doodlebug use are rather pure the literature on the subject in general is surprisingly extensive. One publication, for example, contains a bibliography of 572 items. But in spite of the more or less sensationalist literature that kept bothering with the quaint vein readings Jim was getting. The old fellow told us about his claims and it checked just what the machine showed; so we asked him if he wanted to sell. He was agreeable—wants for 40 cents the four claims. We went down to Nogales, raised the cash and took it back. He signed the deeds, and after we counted out the money and everything was settled, he said, "Great, the place is yours." He went over to his bunk, fished around under his coat, and came out with an old suitcase. He opened it up to put the money in the case and a small buried metal bound case. We asked what it was and he said, "It’s a doodlebug." It was an old one, all beraded up like a billy goat—and asked us to come in. We took the machine in the cabin and Jim took some readings. There was gold ahead of us all right and there was something close to the cabin. Jim took some readings. There was something close to the cabin. Jim took some readings.

Shorfy Hamilton’s Treasure Finder

"Shorfy Hamilton was in the office the other day asking for an old car battery electrode and, on our ques­tioning, said that he was helping build a radio antenna finder. Further questioning

"This is the second machine we’ve built. It has an old air compressor, and it cost about $120 worth of parts, but the lightning struck it and burned everything up, so we’re going to use the old electro-light com­ponents in the new machine. It’s not as good, but it’s better.

"The first machine was awful sensitive, especially to gold. We tried it on a gold watch and gold nuggets, and stuff like that and it worked fine. Jim got the idea from a book called The Cane River, a book by Joe Lanter of the Canyon country, north of Phoenix; there was a lot of placer ground and the brocks of the gold were like small, fine grains of a mine. We packed the machine in my old mining wagon and went to the mine where we reached Humber and, then it went crazy. The needle pointed north west and the bell was ringing, and Jim says, "There’s a mine here somewhere!" We went over and it came on the needle and we followed it. We turned the wrong way and followed the wrong line as far as we could follow it, then we turned the machine—it wasn’t very good when we got home. We kept working and the further we walked the better she was acting, and finally we came to an old prospect that we had heard about. We saw a vein of gold in front of a mine and we went on to explore it. We found a new vein and it was full of gold.

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We were finally stopped by a small converted yacht that mounted a business-looking cannon forward. They chivalrously were out of sight of land, hunting for me, and stopped at the sight of the famous "Rock." It was a grand, impressive sight as we were anchored and appraised of the beautiful scenery, the natural harbor, the large ships, and the boats. We were told to keep our distance at such close range.

There was plenty to keep us interested for awhile at least. The bay was full of ships (probably close to a hundred) of all kinds, sorts, destinations, nationalities, and purposes. Many mine sweepers went into action and passed with not trailing, a few feet over our bows, and the British sent a small British frigate started out of the harbor, and had a shot fired across her bows from the Rock, as she showed up and allowed a small government boat to run alongside, then went on several government boats came out to us with various vessels.

This morning we had another view of the city, the last one being on our departure for Alexandria. The Palm Island and the Rock, the latter being the famous "Rock of Gibraltar" are lying at anchor for the duration of the war so thanks to the Royal Navy, they are only open to the eyes of tourists.

The town on "The Rock" is built on a steep hillside so I scaled long stairs and trudged upward along a narrow ramp on which every step became more difficult as the day went on. The old galleries in the rock had been taken from the hands of the tourist statesmen and were set aside for the duration of the war so thanks to Adolph I missed that.

This night we had a dance but alas there were nine or ten women aboard only four show up. It had been very well advertised, and the rest of us had turned out to see what a real dance was like. The ladies were there the other three were rather fat, complained the pleasant herman from Palestine, and it was the best of both worlds that. The old galleries in the rock had been taken from the hands of the tourist statesmen and were set aside for the duration of the war so thanks to Adolph I missed that.

Friday morning we had fire and boat drill. After seeing the drill I realized why so many lives are lost in disasters at sea. As there was no one at anchor in the waters of a bay that was as smooth as glass it took nearly 20 minutes to start the engines. Once we were under way, about seven knots, we had to use the propeller blades. There was a town of a few hundred thousand people. At one point the一艘 ship had to stop and the crew were sea sick — yet we continued on. We were able to continue on.

At eleven a launch with four Spaniards came alongside and tried to sell cheap, gaudy shawls, tapesries, pajamas and shirts to the crew and passengers. They offered one shawl, some coins, and some cash for two dollars but found no takers. The price came down to one-twenty-five cents for a dollar and still made a good profit.

At noon a convoy of oil tankers began to form and moved out into the strait. Unfortunately, we had to wait until the next day before it may have been lying in wait for this convoy. Some sixty-five or seventy ships went out escorted by destroyers and scout planes—such is the war these days.

We had two more movies here—Twelve Crouched Horses and "Five Came Back" but lying ashore for nine and a half days with little to do for amusement after being on board for a couple of weeks is to say the least, monotonous.

Time was slaughtered by every means possible. There were shell games, cards, board, ping-pong, bridge tournaments, bridge, board, card playing, checkers, lots of reading, etc. Sunday, December 10th, finally along and with the the crew's permission we went ashore. The town on "The Rock" is built on a steep hillside so I scaled long stairs and trudged upward along a narrow ramp on which every step became more difficult as the day went on. The old galleries in the rock had been taken from the hands of the tourist statesmen and were set aside for the duration of the war so thanks to Adolph I missed that.
twice two service teams, and finally reached the lighter in time to return to the ship. It might be added here that this was the first time we had seen on our way that the Somalis and wore regular clothes. My hat and Mr. Twitchell showed another reel of his colored mining films. "Yankee Cruise," which showed one of their ships on tour with sights seen in the Near East assured me I was a dead poor, the better off, and the rich. Our stay in port was prolonged. For part of our cargo couldn't be unloaded from setting off a mine; then came the go aheadsignal and away we went.

Late on the afternoon of the 13th, the Mediterranean the next day (Thursday) was as smooth as glass and we had a fine trip along the rather wide channel between Vigo Rock and the British coast. The California furnished wine, a short film of their operations in Arabia, and announced we were leaving;—at nine P. M. we hoisted anchor and announced we were leaving;—at nine P. M. we hoisted anchor and said "Campo Santo" which is good names. A stairway by the central part, while out from in it long corridors are crypts, over which are thrown the bones are thrown into a pit unless otherwise in cracks in the lava in 1906, during the last bad eruption. Some of the best Italian sculptors have designed some such musician, and the places shown and enjoyed the pictures they are almost prudish. All I could do was hope that my big Stetson could do was hope that my big Stetson could help and forget them. It didn't seem more than a moment before we were on our way down the A. M. and supposedly was going to follow the coast. We headed out the other rather than expected and when we passed the island of Elba, there was certainly a strong flavor of poetic license.

Our guide offered to show us some more of the island but we had to get by Spanish but found a waiter who spoke English. Our lunch was in layers that had what proved to look like chocolate digg in between but which proved to be something filled with brandy, very good, and mixed with wine quite potent.

"I'll have to see one before knowing what is said to be the finest cemetery in Europe. A book could be written about the same as usual. However the Company furnished wine (Capri), and champagne called "Sparkling Tears of Christ" to wash it down, and all the other animals I didn't recognize without our jackets. In fact they are almost prudish. All I could do was hope that my big Stetson could help and forget them. It didn't seem more than a moment before we were on our way down the A. M. and supposedly was going to follow the coast. We headed out the other rather than expected and when we passed the island of Elba, it was pouring hard by this time and we got by Spanish but found a waiter who spoke English. Our lunch was in layers that had what proved to look like chocolate digg in between but which proved to be something filled with brandy, very good, and mixed with wine quite potent.

By asking directions of different po­lently in four languages, we finally reached the American Express office near the main railway station where we hoped to get a guide. It being Saturday afternoon the place was closed which was unfortunate as it had been closed by this time and we craved shelter. We caught a taxi and said "Campo Santo" which is good names. A stairway by the central part, while out from in it long corridors are crypts, over which are thrown the bones are thrown into a pit unless otherwise in cracks in the lava in 1906, during the last bad eruption. Some of the best Italian sculptors have designed some such musician, and the places shown and enjoyed the pictures they are almost prudish. All I could do was hope that my big Stetson could help and forget them. It didn't seem more than a moment before we were on our way down the A. M. and supposedly was going to follow the coast. We headed out the other rather than expected and when we passed the island of Elba, there was certainly a strong flavor of poetic license.

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Statues. One with a hole in the back and numerous small statues. Such unusual persons as the Pompeiians seemed to feature, but we were told there were several connected by a pipe with an underground chamber so that a priest could enter the house Bulbo, etc. Days of Pompeii, and finally one of the most of mythological subjects, who tip the guide,—never to mixed up with a door and locked, but off. By the front door was a painting of Mes­si­na, between the toes of the boot and Sicily, and went to bed. At four A. M. the ship slowed down to pass thru the straits and the change in vibration of the engine woke me up. One look out the port hole and I grabbed a hot bath and dashed on deck—the only pass­enger that got to see the sight. The street was rather narrow, and lined with houses, streets, etc., all lit up like a church on Sunday night. The two long lines of light against a pitch black background made the scene look like "the Great White Way," and a sight not to be forgotten. Hope to see the towns by daylight next time.

While in Italy by the way we got a few Fascist salutes, chiefly from officials but sometimes by individuals. It was more like an official salute and far less ominous than the Nazi salute. I was accompanying "Heil Hitler" so universal in Germany. Giving it was easy and natural to a "Heil Hitler." We had to be very careful that the air was bad and be come out with—on the way to the race track.

The manager's car then took us up town where we got some money changed and bought a newspaper, "The Egypti­an Mail." The monetary unit here is the Egyptian pound which has a silver value of 5/100th of an ounce of fine silver—that is a little over four dol­lars. It is divided into one hundred piasters, so accompanying "Heil Hitler" so universal in Germany. Giving it was easy and natural to a "Heil Hitler." We had to be very careful that the air was bad and be come out with—on the way to the race track.

Back past the voting chamber and thru the Forum we soon regained our car and headed for Naples. We ran out of gas shortly after we entered the forum, fortunately near a service sta­tion or rather pump, and here learned to see the towns by daylight next time. We passed between the University, an old fort, a little farming villages were collections of mud or adobe huts, for the fields. There were many water buffalo, some graz­ing, some plowing, others walking in a circle attached to a pole that turned around a low post. It is an old Society-Vacuum craning factory or something, and the manager and we were sent on a tour of the fields. There were many hares on the run, so usual carry enormous leads, and quite a few camels—domestiries I think is a better term as to what I think" and out we went. I saw one haystack ambulating down the road but the train went by a cameleer's head was seen to stick out from the front end. There were also some regular ugly, goos, chickens, donkeys or cranes, and some other animals.

The little farming villages were called "villace," and usually more or less surrounded by a wall. They reminded me very much of Mexican settlements in parts of New Mexico but nowhere did red chili pepper seem to be grown as here. It was more like a small room, the view of which, by the way, seemed to be made of straw or brush. Almost all the men in the country were a sort of white cup or turban, and a flowing grey nightshirt. On their feet were sandals so that the foot could be flopped along as they walked. They wore foreign hats, and except perhaps the cities but generally the red fedoras predominates there aloft the night­shirt is still popular. I could see a man wearing a piece of sort of vest at the top and front of the nightshirt, and traces of a straw hat but whatever else were underneath finally thru the railroad windows, as all we saw only had one hump. There were many water buffalo, some graz­ing, some plowing, others walking in a circle attached to a pole that turned around a low post. It is an old Society-Vacuum craning factory or something. Back past the voting chamber and thru the Forum we soon regained our car and headed for Naples. We ran out of gas shortly after we entered the Forum, fortunately near a service station or rather pump, and here learned to see the towns by daylight next time. We passed between the University, an old fort, a little farming villages were collections of mud or adobe huts, for the fields. There were many water buffalo, some grazing, some plowing, others walking in a circle attached to a pole that turned around a low post. It is an old Society-Vacuum craning factory or something. Back past the voting chamber and thru the Forum we soon regained our car and headed for Naples. We ran out of gas shortly after we entered the Forum, fortunately near a service station or rather pump, and here learned to see the towns by daylight next time. We passed between the University, an old fort, a little farming villages were collections of mud or adobe huts, for the fields. There were many water buffalo, some grazing, some plowing, others walking in a circle attached to a pole that turned around a low post. It is an old Society-Vacuum craning factory or something.
ELECTROMETALLURGICAL
Nickel and Copper
Electrolytic Production of
In the Hybimette\(^*\) process the con­
verter white metal is first used to re-
move traces of copper from the nickel catholyte by replacement and precipi-
tation of copper, after which it is refined to a very low sulfur con-
tent. The roasted white metal is then treated with sulfuric acid to provide
an electrowinning electrolyte. This elec-

trowinning cells were conventional
nickel-copper sulfide anodes were used
the copper concentration in the electrolyte was built up
to 30 grams per liter and the copper concentration reduced to be-
lar electrolysis of the copper-electrowinning cells. In practice, the copper
was electrowon with lead anodes in a separate series of cells to free the solution of copper.
Cathodes were the regular
mental copper-refining cells were made of maple. All joints at corners were
taped with raw converter white metal or anode material to maintain tightness. Electro-
lytic nickel and precious-metal slimes are the end products of this electrolysis.

R. G. Knickerbocker\(^*\) has reported the use of coke, blast-furnace, matte and copper cathode electrolyte for copper electrowinning at the plant of the Missouri Cobalt Co. in
Fredericktown, Mo. These anodes were far more complex than those used in the present work but were in a manner similar to that reported
in this paper. However, the Missouri Cathode Co. did not recover the nickel in the spent copper electrolyte by elec-

trowinning because of the high cobalt content, but separated it from the cobalt
by a complex series of precipi-
tations and purifications. Nickel

Figure 3—Copper refining cell.

The copper cell was placed in a slotted diaphragm frame covered with light
canvas, the anodes of soft lead were separated from the cathode by these diaphragms. The purified nickel electrolyte was then made to pass through the top of the cathode compartment through flow tubes drilled in the frame, passed down the face of the cathode, out into a system of flow tubes through the bottom of the frame, and into the anode compartment. The anode flow entered the face of the anodes and out into the anode sump. The acid anode

was then treated to neutrality with the precipitated nickel carbonate, filtered, and returned to the purified nickel carbonate tank. Figure 3 is a diagrammatic flow sheet showing the sequence of the process.

**DISCUSSION OF RESULTS ON ELE­
THERMAL AND ELECTROLYTIC METHODS**

The different anode compositions were used in the copper-refining cells.

**Table I**—Anode compositions, percent

<table>
<thead>
<tr>
<th>Acid</th>
<th>Cu</th>
<th>Ni</th>
<th>Co</th>
<th>Pt</th>
<th>Au</th>
<th>Ag</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fe</td>
<td>44.42</td>
<td>39.46</td>
<td>.30</td>
<td>25.82</td>
<td>1.58</td>
<td>1.12</td>
</tr>
<tr>
<td>Cu</td>
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</table>

The precious-metals content of the anodes was:
lower copper concentration. Starting shots of 48 hours' development time could be stripped easily from the blanks. The starting-shot blanks were conductivity-copper plates 54 inch thick, the surfaces being polished so that the electrolyte could flow through them. Before the use, the blanks were painted with a coat of graphite, compounded equal parts of soot and paid for this service. The paint was composed of an officer made graphite paste of 3.5-grain-bodied luted oil. The paint was applied at a temperature of 50° C. and, after hardened to the paint on the blank was then allowed to air dry a few minutes so that the paint would flow out well and show no brush marks. The sur- face of the painted blank was then dusted with graphite powder so that all oil was apparent on the surface. The blanks were used immediately after being dusted with graphite. Electrolyte in the catholyte would not wash the paint from the surface of the blank. After running for approximately 2 hours, the paint was covered with a film of copper, and at that time the circuit of electrolysis was increased to normal value. Typical operating data for the starting-shot cells are as shown in table 20.

Nickel Electrolysis

The extraction of nickel from the nickel solution by means of insoluble anodes depends mainly on chemical control of the pH of the catholyte. If the catholyte became basic enough, nickel hydroxide or basic nickel sulfates will form in the catholyte at pH 7 to 8. On the other hand, if the catholyte becomes acid enough, hydrogen is evolved at the cathode, especially in the presence of nickel. The evolution of hydrogen becomes a major factor at pH 4 or under. Thompson[20] has established the pH of nickel electropolishing baths is such that nickel is deposited from the catholyte. The nickel suspension nickel carbonate; (2) the insoluble anodes depend mainly on chemical control of the pH of the catholyte. If the catholyte becomes basic enough, nickel hydroxide or basic nickel sulfates will form in the catholyte at pH 7 to 8. On the other hand, if the catholyte becomes acid enough, hydrogen is evolved at the cathode, especially in the presence of nickel. 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in equilibrium for indefinite periods, thus making possible the determination of the thickness of nickel deposits derived from electrorefining or electrowinning of metals. The nickel deposits formed from nickel sulfide-fluoride electrolytes had less tendency to split, pit, and three than did those deposits formed in other electrolytes.

It is necessary to control the pH of the solution from which the nickel was deposited, a compartment was used for all experimental work. The construction of the cathode framework utilized in these experiments was described by S. M. Shelton and coworkers.

The purified electrolyte was introduced into the top of the cathode compartment, flowed down through the cathode, and out of the cathode compartment into the anolyte compartment of the solution from which the nickel was peeled, pit, and three than did those deposits formed in other electrolytes.

The composition utilized in these experiments has been used for all experimental work. The borate electrolyte of the following analysis:

<table>
<thead>
<tr>
<th>Component</th>
<th>Concentration</th>
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<tbody>
<tr>
<td>Ni</td>
<td>30 grams/liter</td>
</tr>
<tr>
<td>NaBO₂</td>
<td>20 grams/liter</td>
</tr>
<tr>
<td>pH characteristics:</td>
<td></td>
</tr>
<tr>
<td>pH</td>
<td>5.3</td>
</tr>
</tbody>
</table>

The pH of the solution from which the nickel was deposited was maintained at such a point as to prevent the evolution of hydrogen. The deposits formed at higher current densities were fine-grained than those formed at low cathode current densities.

As much as the speed of circulation of the electrolyte solution was found to be very important variable in relation to the cathode current density and to the nickel concentration of the electrolyte feed, a method expressing rate of flow, the "flow number," was evolved. By definition, the "flow number" is equal to the ratio between the amount of nickel that could theoretically be deposited in a unit time. This may be expressed mathematically by the equation:

\[ \text{Flow number} = \frac{\text{Number of grams of nickel introduced per hour}}{\text{Electrochemical equivalent of nickel}} \]

Using nickel sulfide-fluoride electrolyte of the following composition:

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at a temperature of 30 °C, the catholyte was studied. It was made of the effect of variations in current density, Representative data are given in Table 3.

<table>
<thead>
<tr>
<th>Current Density</th>
<th>Voltage across cell</th>
<th>Amperage efficiency</th>
<th>Nickel deposited</th>
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<tbody>
<tr>
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<td>96</td>
<td>19.5</td>
<td>62</td>
</tr>
<tr>
<td>24.9</td>
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<td>96</td>
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Table 2 presents typical operating data on electroplating nickel cells. Table 3 compares industrial copper and nickel electrolysis operating data with the Boulder City laboratory data.

Conclusions

1. A process has been developed for the production of electrolytic nickel and copper from nickel-copper converter white metal. While the energy required for the two electroplating processes is somewhat higher than the normal energy requirements for the present commercial processes, this is more nearly offset by a saving in thermal energy.

2. Copper of satisfactory chemical composition and physical characteristics has been deposited electrolytically from solutions containing as little as 5 grams of copper per liter and as much as 30 grams of nickel per liter.

3. Nickel of satisfactory physical and chemical characteristics has been deposited from nickel sulfide solutions of copper-nickel electrolytes by means of insoluble anodes.

4. The precious metal values from the ore are entirely recovered in the converter.

5. Indications are present that the precipitation of nickel carbonate before the nickel electrolysis may be eliminated. Further work in this direction is anticipated.

TABLE 21—PRELIMINARY OPERATING DATA ON ELECTROLYTIC NICKEL AND COPPER CATHODES

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EDUCATIONAL TRAINING FOR TEACHERS IN ENGINEERING COLLEGES

By
C. G. REISER
Elleghia, N. J.

In order to provide instructors who are not equipped in the subjects which they offer, engineering colleges often make special efforts to bring to their faculties qualified men who are recognized as experts in the fields in which they are teaching. A carefully arranged system (if a logical method of selection but other factors also warrant consideration. Should not the one who is to teach the profession of teaching have training which would fit him for this special phase of his work?

The graduate seeking a chemical job needs a knowledge of chemistry. Likewise, the teaching applicant should be selected on the basis of his knowledge of his subject, as well as his understanding of the subject he is to teach.

In the view that facts of that colleges and universities make every effort to keep abreast of the time and informed of recent developments, it seems rather surprising that they have allowed themselves to drift as far as elementary and secondary schools in their requirements for educational training of their faculty members. Opposite of this proposition may argue that the college student must shift for himself and will not have things presented to him on a silver platter; however, this reason is not sufficient. The classification of an examinee, which is much below the passing mark, then it is time for the instructor to ask himself if he is as capable as his students are as learners.

In addition to making a subject more learnable by proper presentation, the interest which is aroused by so doing, will better help those who do not decide what field is best suited. Men do not choose as a profession, this must shift for himself and will not have things presented to him on a silver platter; however, this reason is not sufficient. The classification of an examinee, which is much below the passing mark, then it is time for the instructor to ask himself if he is as capable as his students are as learners.

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ECONOMICAL SAND PUMP

A complete new standard of sand pump efficiency is created by this new addition to the Wilfley line.

By
KENNETH E. HICKOK, '26
Instructor, Department of Metallurgy
Colorado School of Mines

Part IV—Dimension and Crushed Stone

Dimension Stone

Dimension Stone is a convenient term applied to stone sold in blocks, slabs, or shapes of specified sizes. Dimension stone includes cut stone, rough building stone, paving blocks, curbing, and crushed stone. Building stone must be not only hard and durable material but must be pleasing in appearance. For these reasons granite, limestone, sandstone, and marble are the most important in the industry. The only dimension stone politically controlled is marble from Tarenta and Carrera, Italy. This marble is of slight importance compared to the industry as a whole. Crushed Stone is that stone that has been crushed and sized. It may be igneous, metamorphic, or sedimentary and may be of any geologic age.

Size, texture, color, hardness and toughness are of major importance for some uses while chemical composition is the deciding factor for other uses.

The principal uses of crushed stone, without regard to chemical composition are: mineralogical, economic and engineering. Crushed stone is used in roads, houses, bridges, buildings and other construction. It is used in the building trades.

The geographical distribution of dimension stone is world wide and while some stone crosses international boundaries it is a local condition and does not enter into international trade to any extent. Every country has some suitable for dimension work and competition with other types of building stone.

Because of the widespread occurrence of dimension stone deposits, no country exercises any political control over the industry. The only dimension stone politically controlled is marble from Tarenta and Carrera, Italy. This marble is of slight importance compared to the industry as a whole. Crushed Stone is that stone that has been crushed and sized. It may be igneous, metamorphic, or sedimentary and may be of any geologic age.

Marketing crushed stone is not only a problem but is seasonal as well. The winter months are not good months and the industry suffers many important jobs in the southern and southwestern states. Crushed stone is also a strong competitor of sand and gravel used for concrete aggregate where conditions permit the two to be produced.

In spite of the fact that there is no one to "Hitler" the difficult dimension stone industrial problem to many men. The employment is not cut out for but equipment manufactured by the employers, makers of explosives and many others indirectly benefit from these efforts.

During the year 1938 which was a fairly poor year for the stone industry, the value of dimension and crushed stone produced in the United States was almost equal to the value of gold produced during the same year. Total tonnage was approximately 158,000,000 tons and had a value of 142,000,000 dollars.*
They are four-cycle, direct-injection gasoline engines, and as a result of a continuous test of those that are in operation, have been shown to be of great advantage. The fuel consumption of the small, low-speed Diesel engine is about 15% less than that of the medium-speed Diesel engine. They are very little affected by dirt and dust. Lubrication is 100% automatic and automatic. No parts require hand oiling or greasing—preservation lubrication is used. A provision is made in all parts for the maximum safety and protection of the machine. Also, the maximum effort is made to give the maximum service that can be obtained from each inch of iron used.

Quick easy starting is a feature not to be overlooked. Complete details of this Diesel may be obtained from the Chicago Pneumatic Tool Company, 6 East 44th Street, New York.

New 1 1/2 Yard Shovel

A new, powerful 1 1/2 yard's overthrowable slewing-frame-craner, Model LS-150, is proposed by Link-Belt Speeder Corp., 501 West Pershing Road, Chicago, III. Claimed for this new model are several advancements, including a combination of outstanding features of other Link-Belt Speeder models.

**New Classifier**

Mote "Treadle" Rake Classifiers introduce an entirely new, efficient, and compact mechanism for rake type classifiers. The classifier of this type is a horizontal cylindrical screen, consisting of heavy welded carbon steel frames. It is specially adapted for use in the treating of heavy, coarse, and badly diluted pulp. The horizontal plane is a downward and upper plunger which is driven by the drive to the classifier. The classifier acts as a classifier to maintain the maximum content of each stroke of the rake, thus creating a faster speed of the rake. No part requires any type of alignment. No part of the classifier is ever loose to be replaced. The machine may be quickly converted from one conveyor or handling attachment to another, without mechanized alteration.

Complete details of the new LS-150 may be obtained by addressing Link-Belt Speeder Corp., direct. Ask for Bulletin LS-150 Speeder Specifications.

### EQUIPMENT NEWS

**Type "G" Motor Blower**

A new "Motorblower" featuring revolving air centrifugal, quiet operation and low noise, has just been announced by the Ingersoll-Sprague Company, 11 Broadway, New York City.

### Colorado Dynamograph Pump

The Colorado Dynamograph Pump is used for handling pulp, solids, and ash solutions or water with gritty solids, the Colorado Iron Works Company, Denver, have had in mind the production of a pump, simple and rugged in construction, light in weight, and with renewable wearing parts easily replaced. It is made in various sizes and types, the standard sizes being 2" simples and double, 2 1/2" simples, doubles, triples and quartets, and 3" simples and doubles. All these sizes are made with bell and gasket ends. Gaskets are used to keep the ends tight. Gaskets used vary from 3/8 to 1 1/2 horsepower.

**Valves are of the flat type with removable rubber rings which, when seated, rest on the valve seat of the unit.**

### Equipment News

**New Link-Belt Speeder LS-150**

The machine is controlled by a close-controlled lever and equipped with a new type of cut-off, which is so arranged that it is only necessary to close the lever slightly to set the machine in operation. Further features are: fully enclosed travel controls connected by oil; fully enclosed treadle gears running in oil; and 278 drive, machine-driven, roller-bearing, cable with patented, self-aligning rollers—specialized fittings throughout the complete speed-variator equipment for connecting either intake or discharge pipe. The mechanism actuating the rakes is located in the biower discharge plane in unison at the starting and completion of each stroke of the rakes, thus creating a faster speed of the rake. No part requires any type of alignment. No part of the classifier is ever loose to be replaced. The machine may be quickly converted from one conveyor or handling attachment to another, without mechanized alteration.

### New Link-Belt Speeder LS-150

Valves are of the flat type with removable rubber rings which, when seated, rest on the valve seat of the unit. They are water-cooled, efficient, and efficient. The unit is made of the highest quality materials, and the machine is capable of handling the largest loads. The motor is a heavy-duty electric motor, an adjustable voltage equipment. Machine tools, pumps, fans and printing machines are other applications. High-quality steel shafts are used and the control of the system is very smooth.
E. J. BROOK

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C. W. Mc-
PHOENIX
Two meetings in year, second Saturday in April and October. T. E. Grippe, '34, President; A. F. Hall, '27, Secretary-Treasurer. Box 2751, Phoenix, Ariz.

Alumni Business—
(Continued from page 365)
Committee Chairman Bruce Rea, LaFollette, reported that the President and Business Committee had arranged the program for the meetings. The business to be transacted will be noticed in the bulletin.

TULSA
John E. Green, '22; President; O. F. Parker, '27, Secretary-Treasurer. 512 Center Oil Co., Tulsa, Okla. Meetings upon call of secretary.

MINING VALUATION—
(Continued from page 364)
The past inquiries of the scientist regarding structural control, magnetic differentiation, metamorphic alteration, weathering, electrical conductivity, mineral associations, parasitic and others are now developing practical aspects and in the hands of competent men possibilities, although not measurable, are becoming probable. In my opinion the day of measurable quantities of ore and the possibility of finding success—so give us a hand in supplying advertising and material.

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THE MINES MAGAZINE + JULY 1940

367
The Mine & Smelter Supply Co.

Alfred E. Perkins, '10

Credible Steel Co. of America

2065 Walnut Street
Denver, Colo.

WILLIAM CROW
Dover, Colo.

1904 Broadway
Phila. PA 19105

Denver, Colo.

251 Marion St.
Denver, Colo.

C. Lormer Colburn, '07

Mining Engineer

Consulting Engineer

368
New Books, New News, New Review

Compiled by the Geophysics Department, Colorado School of Mines


This new book, the sullies growing of plants, is the result of a very thorough and careful study by the author. It is a very useful and informative book for anyone interested in plant growth and development. The author has included many illustrations and diagrams to help the reader understand the processes involved in plant growth.

Mines Magazine. July 1940

Gravimeters are classified as level, pneumatic, and mechanical. The level gravimeter, which is the most accurate, is used for precise measurements. The pneumatic gravimeter uses air pressure to generate the necessary force, and the mechanical gravimeter uses a physical lever or spring to measure the force.

The paper concludes by stating that the author's experience as a student of geophysics and their ability to visualize the processes involved in the generation of force are a valuable asset to the reader. The book is recommended for anyone interested in the study of plant growth and development.

The author develops the mathematics and physics of the geomagnetic field, and the reader will find the book to be a valuable resource for those interested in the study of geomagnetism.

The paper then goes on to discuss the various types of gravimeters and their applications. The author provides a detailed analysis of each type and their advantages and disadvantages.

The paper concludes by emphasizing the importance of applying the principles learned in the study of gravimeters to real-world problems. The author argues that this application is crucial for the development of a comprehensive understanding of the Earth's gravitational field.
very sensitive to faulting or fracturing. Such areas in Oklahoma illustrate the points.

The process of calibration and weighting will determine: 1. the proper layout and design of the well field; 2. Surface geology for beds just beneath the earth surface; 3. Possible contamination.

The author investigates three types of velocity laws: exponential, linear, and angular. The first two groups; viz.: (1) Measurements of wave velocities; and (2) measurements of forced vibrations produced by individual wave types, are considered largely because of the mathematical difficulties and complications of wave velocity with depth is allowed for in the fitting process.

The paper gives an analysis of prevailing frequencies of a great many gas wells. The following assumptions are made: (1) the reservoir, (2) the matrix, (3) the pressure, and (4) the flow rate. The paper is valuable in giving evidence of the importance of gas wells and the necessity of bringing the raw gas into the refinery.

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The factor, K, will vary and it is affected by pipe length and diameter, wetting, and temperature. In general, each factor can best be evaluated by a separate test, but in practice this is often impossible. The rate of flow, density, temperature, and viscosity of the fluid all affect the flow. A fluid with a low viscosity, for example, will flow more easily than one with a high viscosity. The condition of the fluid also affects the flow. A fluid that is not adequately wetted may cause the flow to be erratic. "If Germany will not get all Romania's surplus in 1914, it will not get any oil whatever from Russia as it is to assume that she will be able to import all she needs or desires." Germany saved this war much better off with respect to petroleum and motor fuel than she was in 1914. "Since the World War, Germany, Russia has built up a certain production of synthetic motor fuel by synthesis from coal, under the Fischer and Hergout processes, and during the last five years has increased its surplus petroleum which has been accumulated as a war reserve. Also a large but uncertain proportion of Russia's oils which were closed to her in 1914 are now available. Supplies from Russia are also possible and no one can say how much petroleum will be imported into Germany from Russia." F. J. B. On Short Oil Supply Germany War Need? World Petroleum, October, 1940, p. 12. News of a trade agreement between the Soviet Union and Germany, followed by a treaty of non-aggression, has produced much speculation as to the results on the war. The most widely adopted conclusion seems to be that Germany can get foodstuffs, raw materials, and petroleum products. Russia has oil undeniably. She is second in production and has large reserves still to be developed. But supplying it to Germany is another matter. The origin of petroleum under contract concerns the condition of the manufacturer. The refining of oil and gas is a question which is often considered. The condition of the refinery, the availability of skilled labor, the presence of adequate raw materials, and the length of the pipeline all affect the cost of production. "Germany's ability on account of lack of adequate pipeline construction, is just as unwarranted to assume that Germany will get Rumania's surplus as it is to assume that she will be able to import all she needs or desires." Germany saved this war much better off with respect to petroleum and motor fuel than she was in 1914. "Since the World War, Germany, Russia has built up a certain production of synthetic motor fuel by synthesis from coal, under the Fischer and Hergout processes, and during the last five years has increased its surplus petroleum which has been accumulated as a war reserve. Also a large but uncertain proportion of Russia's oils which were closed to her in 1914 are now available. Supplies from Russia are also possible and no one can say how much petroleum will be imported into Germany from Russia." F. J. B. On Short Oil Supply Germany War Need? World Petroleum, October, 1940, p. 12. News of a trade agreement between the Soviet Union and Germany, followed by a treaty of non-aggression, has produced much speculation as to the results on the war. The most widely adopted conclusion seems to be that Germany can get foodstuffs, raw materials, and petroleum products. Russia has oil undeniably. She is second in production and has large reserves still to be developed. But supplying it to Germany is another matter. The origin of petroleum under contract concerns the condition of the manufacturer. The refining of oil and gas is a question which is often considered. The condition of the refinery, the availability of skilled labor, the presence of adequate raw materials, and the length of the pipeline all affect the cost of production. German technologists were going to Russia. It remains to be seen if they can be more successful there than in their own country.—J. W. B. Operations are frequently recorded in the economic sense of the term. The Wooten-Mellon argument, however, still remains. In the short run, Germany's policies seem to be more successful than those of Russia. Germany, however, will not be able to escape the consequences of its policy. In the long run, Germany's policies seem to be more successful than those of Russia. Germany, however, will not be able to escape the consequences of its policy. In the long run, Germany's policies seem to be more successful than those of Russia. Germany, however, will not be able to escape the consequences of its policy. In the long run, Germany's policies seem to be more successful than those of Russia. Germany, however, will not be able to escape the consequences of its policy.

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**Patent Service**

Recent Patents Relating to the Mineral Industries, edited by James Atkins, registered patent attorney. May 31, 1940. This issue contains a wealth of new patent information and ideas that could be useful for innovation and development in the mining and mineral industries.

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**Metal Production Calls for Speed**

By G. A. ROUSH, General Manager of the Mine and Smelter Supply Co. July 1940.

Copper, Iron, Aluminum, Zinc, Lead, Tin, Vanadium, Molybdenum—Mining in the years to come will be the key to our national defense. The strategic minerals are most wanted in connection with possible military programs. It is only in connection with possible military programs. By using appropriately engineered machinery, the mining industry may be greater than ever before in the nation’s industry. The source must be the western hemisphere. To supply these needs the mining industry must shift into high gear.

---

**Strategic Minerals Policy**

By O. A. ROUSH, Denver, Colo.

This looks around a general review of the entire strategy—cover a wide field with a general strategy, with the possibility of covering a large period of time. It is important to foster a great expression that the metals we need and the other elements needed in the event of a future war, and it is up to manufacturers who can supply those metals to work in concert with those who cannot.

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**Mines Magazine Advertisement**

For sale by THE MINES MAGAZINE, Denver, Colo.

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**This Portable Vending Screen**

An excellent portable vending machine for the attack of the huge market. For sale by THE MINES MAGAZINE, Denver, Colo.

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**Recents Patents Relating to the Mineral Industries**

The Mines Magazine, July 1940. A compilation of recent patents related to the mineral industries, including methods and apparatus for detecting minerals, determining horizons, and controlling fluid pressures, among other topics. This issue is a valuable resource for anyone interested in the mining and mineral industries.
YOU GET STARTED QUICKER AFTER SHUTDOWNS

Can you start again immediately, when you want to start? You can if you are using AKINS Classifiers—because the AKINS will always start without unloading. It is never necessary to grind out the circuit before a shutdown. Furthermore, normal circulating sandload and normal density overflow are established immediately. With demand for all metals rapidly increasing, this big gain in operating time means money to you.

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Copper Range Co., Michigan
Cuban Mining Co., Cuba
Empire Zinc Co., N. Mex. and Colorado
The Fresnillo Co., Zac., Mex.
Golden Cycle Corp., Colo.
Hollinger Cons. Gold Mines, Ltd., Ontario
Lake George Mines, Ltd., N.S.W. Aus.
Little Port Loo Gold Mines, Ontario
Marievale Consol. Mines, Ltd., So. Africa
Nevada Consol. Copper Corp., (Chino) N. M.
Potash Co. of America, New Mexico
San Mauricio Mining Co., Philippine Islands
Sunshine Mining Company, Idaho
U. S. Smelting, Ref. & Mining Co., Utah
Van Dyk Consol. Mines, Ltd., So. Africa

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The Clyde Engineering Co., Ltd., Granville, N. S. W.

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