

# ENGINEERING AND MINING JOURNAL-PRESS

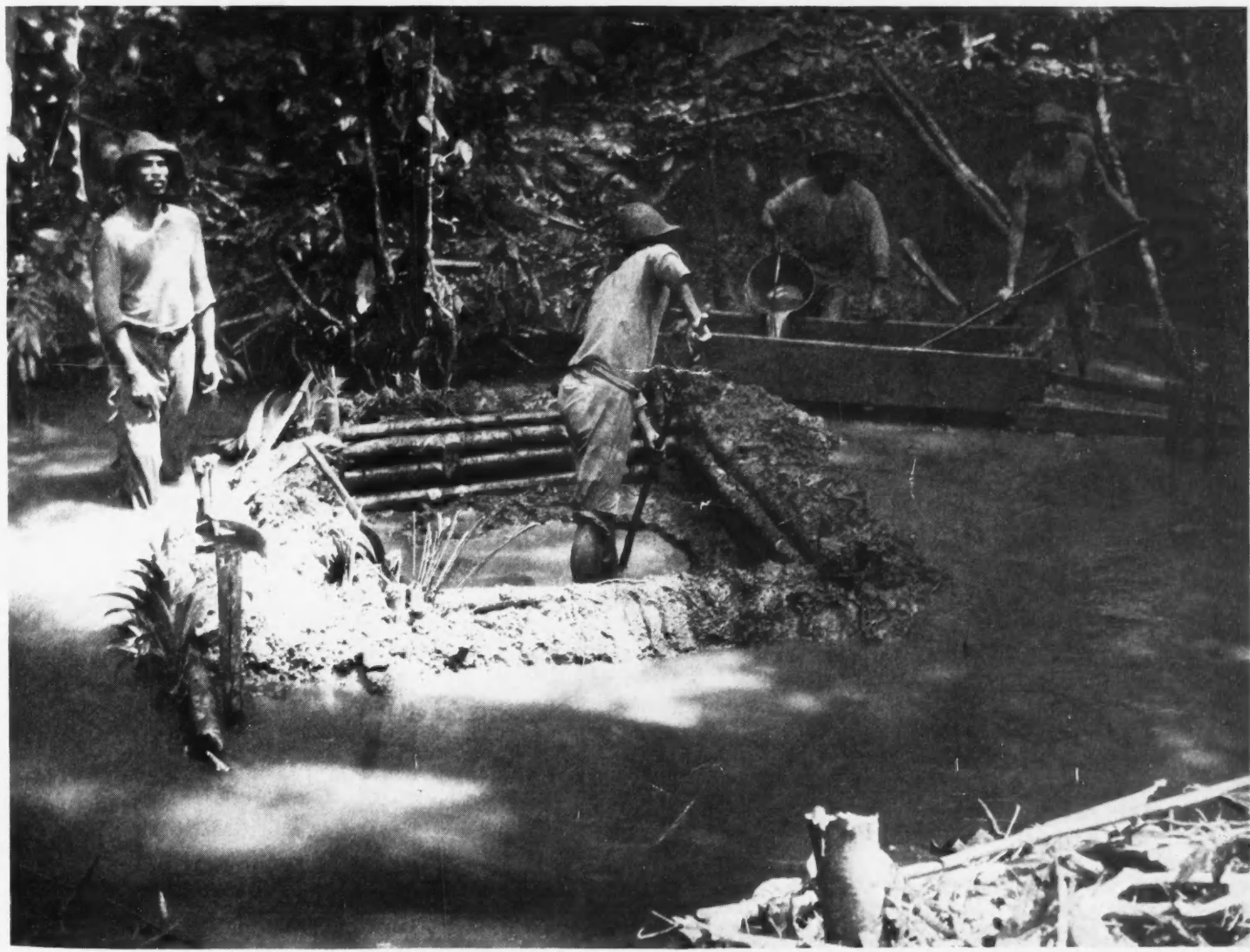
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Also:

A New Addition Reagent for Electrolytic Refining

*Biography of Alfred Granville Burrows*



Testing a creek bed for gold along the Cuyum River  
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# ENGINEERING AND MINING JOURNAL-PRESS

JOSIAH EDWARD SPURR, Editor

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## Immigration Into the United States

**T**HE EFFECTS of restricted immigration into the United States have in many ways been somewhat unexpected; and the mining industry, in common with all other industries which have depended upon fresh supplies of foreign labor, is much interested in the outcome. According to a recent report of the National Industrial Conference Board of New York, several European countries have fallen far short of the quota allowed them by the law for the year 1924-1925. More significant, however, was the large emigration of foreigners back from the United States to their own countries again. In many instances, the net result to the United States was a loss. In the case of Italy, for example, not only was the established allowable quota of immigration unfilled by 10 per cent, but several times as many Italians left the United States. The figures are 6,000 arrived and 27,000 departed, leaving a net loss of native-born Italians of 21,000—an astonishing bit of information. A similar situation for Greeks is revealed; less than 1,000 arrived, while 6,500 departed, making a net loss of nearly 6,000.

It is interesting, indeed, to study the whole long list of countries from which the United States experienced a net loss in the nationals in 1924-1925. Besides Italy and Greece, they include Portugal and Spain; they also include Hungary, Bulgaria, Jugoslavia, and Rumania and even Lithuania, among European countries. This shows an advent of conditions which has checked emigration from the Mediterranean countries, and turned the tide back. In this can be seen a strong argument for the belief that these European countries are recovering their economic prosperity, and that the worst effects of post-war conditions are past.

Northern Europe, according to this test, is in a different category, none of its countries, except Lithuania, having had a net gain from exchange of its nationals with the United States in 1924-1925. Nevertheless, some of these northern countries failed to come up to their allowed quotas of immigration. Czechoslovakia fell short by 17 per cent; Great Britain by 12½ per cent; Germany by 11 per cent; Sweden by 6 per cent; and the Irish Free State by 5 per cent. This indicates the same trend, though modified, as the striking figures for the southern European countries: a symptom of returning prosperity, even for Germany and for England.

Coming now to Asia, it is surprising to find that the Chinamen who returned to their native land nearly doubled the number of new arrivals, the relatively insignificant figure being 1,900 who came in and 3,400 who went out. Of Japanese, also, 700 arrived and 1,200 departed, so that the spectre of Asiatic colonization has not much to give it substance, even for California.

The total net immigration, after deducting emigration from it, was 201,000 for 1924-1925, or less than one-third of that during 1923-1924, when the figure

was 630,000. The chief sources of immigrant labor are now Canada and Mexico; from these two countries came, in 1924-1925, a net figure of 130,000, or nearly two-thirds of the total net for the year! These figures upset many popular impressions which an inhabitant of certain sections, notably New York, is likely to form.

Another surprising calculation of the Conference Board shows that the proportion of foreign-born aliens in the United States has always been fairly constant. It was 12.9 per cent in 1860, 13.1 per cent in 1880, 13.4 per cent in 1900, and 13 per cent in 1920. It is likely that under present conditions this percentage will decrease; but the stability of the percentage, under conditions of little or no restriction during thirty years, points to an automatic control of immigration, due to a definite economic factor of ability of industrial assimilation. Pursuing this thought, it appears likely that with the flattening of the curve of growth due to the ripper development of the country's natural resources, the immigration curve would also automatically flatten. One is thus led to doubt the efficacy or importance of legislation in dealing with these problems, as with many other problems over which our lawmakers are busy.

## Oil in Mosul

**T**HE INTERNATIONAL PETROLEUM problem comes every little while into the limelight of publicity, before reverting into the darkness of not-so-public machinations. The territory of Mosul, in Turkey, which has been the center of much scheming, diplomacy, treaties, and the source of many apparently unrelated European policies, is back again to the foreground. At the close of the World War, when everything appeared to be over but the grabbing, first and foremost of the grabbers, as is well known, was Great Britain; and one of the things she grabbed was the valuable oil territory of Mosul in what was then Asiatic Turkey. This was annexed as part of a mandate. The idea of a mandate, as concerned in the pure mind of President Wilson, was a benevolent administration of an unquiet or helpless territory, for the good and for the betterment of the native population. The idea of every other nation to which mandates were given (the United States having declined all mandates) was the acquisition of new territory, to be exploited for the benefit of certain interests, national or capitalistic, of the nation to which the mandate is given.

The prospective adding of the oil fields of Mosul to the British possessions aroused the resentment of France, and a series of negotiations and treaties led to an arrangement between England and France whereby the latter was to have a slice of the petroleum melon. Meanwhile, the corpse of Turkey, which had lain unnoticed in the disposition of the loot, unexpectedly returns to life, just at the time when Greece was giving

it one last melodramatic stab, for good measure. Chasing the Greeks into the sea, the Turks made a desperate stand against the victorious allies, put up a bluff that won a new deal and the rehabilitation of Turkey as a nation; and as an independent one, which, in effect, it was not prior to the World War.

As to foreigners, all of whom have wrought more or less havoc with Turkey, Turkey has always preferred the United States. In her days of prostration, Turkey begged for an American mandate; and in her time of regeneration she feels that she will gain from American participation, but lose by the participation of any of the European nations. She has ratified an old concession, of oil and other privileges of exploitation, to Americans—the Chester Concession, provisionally granted long before the World War. By the provisions of this concession, the sovereignty of the oil fields remains with Turkey, and she receives a liberal share of the profits. Turkey, therefore, would stand by the Chester Concession, whose preliminary operations were stopped by British armed forces. There now comes the charge of Turkish armed pressure in the disputed territory, coupled with the silly charge, always used to damn Turks in the United States and in Europe, that it is the Christians that Turkey is molesting. No more unscrupulous propaganda was ever circulated than this.

The problem has been referred to the League of Nations, and it will be of interest to see whether the feeble counsels of the League will prevail over the strong urgings of commercial warfare. While the prevailing of Turkey will mean an advantage to an American syndicate, the State Department in Washington will not take as aggressive an interest in the fight as does the British Foreign Office.

It seems not at all unlikely that Turkey will, if pressed, fight over the matter: whether England would engage in an armed conflict for mineral territory is problematical, but is not opposed to precedent. The Turks, as above said, prefer American interests: they admire American institutions and Americans: a feeling which is by no means reciprocated, whatever virtues the Turks have being discounted by the fact that they are not "Christians."

### Relative Rank of Gold- and Silver-Producing States

THE RELATIVE RANK of the principal gold-producing states and the Territory of Alaska in 1924 was California, Colorado, Alaska, South Dakota, Arizona, Nevada, and Utah. In 1912, the order was California, Colorado, Alaska, Nevada, South Dakota, Utah, and Montana. In 1900, the order was Colorado, California, Alaska, South Dakota, Montana, Utah, Arizona, Idaho. Total domestic production of gold was 2,258,900 oz. in 1924, 4,520,717 oz. in 1912, and 3,781,310 oz. in 1900. Gold production reached a peak of 4,887,604 oz. in 1915, since which time it has steadily declined.

The relative rank of the silver-producing states was Utah, Montana, Nevada, Idaho, Arizona, California, and Colorado in 1924; Nevada, Utah, Montana, Colorado, Idaho, Arizona, New Mexico, and California in 1912, and Colorado, Montana, Utah, Idaho, Arizona, Nevada, and California in 1900. The total domestic silver production was 65,407,186 oz. in 1924, 63,766,800 oz. in 1912, and 59,561,797 oz. in 1900. The peak of silver

production for the period was 74,961,075 oz. in 1915. Silver production was 73,335,170 oz. in 1923, almost reaching the production of 1915. The intervening years showed less production, the lowest point being 53,052,411 oz. in 1921.

California, Colorado, and Alaska, with South Dakota not far behind, have tenaciously kept in the van of the gold-producing regions and may be expected to continue. It is a remarkable fact that these regions have maintained a fairly steady production, in spite of economic vicissitudes. Nevertheless, gold production is diminishing. This applies more to the mines where gold is the principal metal product and less to the mines where gold is an accessory metal. However, future production will be sustained and possibly increased if dollar inflation diminishes.

Silver production has been consistently maintained, due largely to the accessory silver coming from lead and copper ores. Silver mines, or mines where silver is the principal product, have followed the trend of the gold mines and have steadily diminished in number and importance. Utah, Montana, Idaho, Nevada, and Colorado have maintained their dominant position for a number of years and will undoubtedly continue to do so. As long as lead and copper ores continue to be mined, silver as an important accessory will continue to be produced and the present production will be maintained. If silver prices increase—and this is not improbable—a small increase in silver production can be expected. Undoubtedly Nevada and Colorado silver mining would be considerably stimulated by a strong silver market.

### Are You "Pen-shy"?

SECRECY is gradually but surely giving way to a common-sense exchange of ideas, experiences, and method-detail in the mining and metallurgical industries. Every gathering of technical men affords evidence of a more frank discussion of the research and experimentation upon which the evolution of all industrial art depends. Often the most valuable contributions to contemporary thought and progress are extemporaneous and informal.

The pages of *Mining Journal-Press* have from its first issue been dedicated to recording the history of the industries which it serves and to the presentation of technical papers and articles of scientific, practical, and news interest. No journal, however, no matter how conscientiously and even zealously directed and edited, can function at maximum efficiency unless it command the interested and even enthusiastic co-operation of the men who are doing pioneer work in those industries which it represents. Many engineers and metallurgists of brilliant achievements hesitate to permit a broadcasting of their discoveries and attainments—through modesty, diffidence, or a mistaken conception of professional ethics. Often, also, they are unaccustomed to literary effort. This mental attitude is not four-square with an implied professional obligation to serve—to spend and to be spent, as Roosevelt said.

Nobody expects technicians in the mining fields to be literati. So-called "fine writing" is not essential to the presentation of the results of practical or scientific experiment and research.

*Mining Journal-Press* will gladly give sympathetic consideration to contributions from men engaged in the practical and scientific work of the field which it covers.

The sole requirement for a hearing is that manuscripts be original, authoritative, and of such character as may entitle them to publication in this journal's columns. They should be submitted, preferably, in typewritten form, double spaced. If a manuscript is acceptable the editor will do the rest.

Are you "pen-shy"?

### Another Scandal

**A**NOTHER PLOT has been unearthed. A reader in Oregon, where chrome ore is included among the mineral resources, writes complainingly that nothing has appeared in the *Mining Journal-Press* regarding the discovery, by B. D. Saklatwalla, of a new rust-proof steel containing chromium. The fact that he had sent to the *Mining Journal-Press* newspaper clippings describing the new alloy, which had not been published, seems only to have made the correspondent more suspicious. "Can there be any reason for suppressing this?" he asks. The elements of the plot are: abundant chrome ore on the Pacific Coast, without a market since the war, because of the cheaper imported mineral; "big interests" in the East who will not give the owners of chrome ore on the Coast a chance; a new use for chrome ore, a rust-proof steel that will help combat that foe of man—corrosion—and that will make wealth for chrome men overnight; a muzzled press, however, with the "big interests" at the muzzle, in order that nothing may be said to affect their interest with regard to chrome.

Nothing, however, was suppressed. Suppressing news is indeed the exact opposite of the function of any publication. Anything of interest regarding chrome ore or any other mineral is of interest to the *Mining Journal-Press*, even though at times some bit of news may accidentally be omitted from its columns.

### Directors' Fees and Duties

**O**N AUG. 20, in London, reports for the year ended Sept. 30, 1924, were presented to the shareholders of the Oroville Dredging Co., Ltd., and Pato Mines, Ltd. The first named is a holding company, practically all of its income being derived from 89,600 shares of Pato Mines, of which 100,000 are issued. Oroville Dredging also owns most of the shares of Nechi Mines, Ltd., and all of the 255,000 ordinary shares of the Colombian Corporation. The ownership and directorates of all of these companies are practically identical, and all depend on gold-mining operations in one district in Colombia. The Nechi mine, a dredging property, was exhausted in November, 1923, and the company now is to be dissolved; the Pato dredge returned a profit of about \$330,000 in the year under review. The Colombian Corporation, operating the Constancia lode-gold mine, finished the construction of a milling plant last April, which to date has not been profitably worked, although hope is expressed that the output may soon cover operating costs.

The position of the group is not good, owing to a number of mistakes of administration. The directors point out these blunders, but aver that, in each instance, their action was taken on the advice of others. About \$120,000 was lost during the year on the operation of sundry company-owned transportation systems to the mines. These include a steamer, barges, and a highway, all of which represent large capital outlays,

and from which no better results are expected. The responsibility for this unfortunate project is placed upon the shoulders of the former manager, Mr. Prichard, now deceased, in whose judgment the directors placed so much faith that they decided to provide the necessary capital. The directors assert that they "do not despair of the future of the Colombian Corporation, but the success of the company lies in future development." Here again they are very explicit in disclaiming any direct responsibility for what appears to be a fiasco. The late Mr. Prichard again is blamed, although his proposal "was subjected to the greatest scrutiny before the enterprise was undertaken." A third unfortunate circumstance is the imposition, as a consequence of unexpected decisions, of additional British excess-profit taxes, amounting to \$780,000 on the three companies. Had this been foreseen, says the chairman, "steps could have been taken so to limit our production that no liability would have attached to us." Here, again, the directors blame their "advisors"; they assume no responsibility for bad judgment on their own part.

At the same time the following items, in round numbers, appear in the accounts for the year: for the Oroville company—directors' fees, \$10,600, and directors' extra remuneration, \$2,900; for the Pato company—directors' fees, \$3,000, and directors' extra remuneration, \$7,300. The Colombian Corporation paid \$21,000 for "general expense in London including directors' fees," of which probably half can be allocated as fees; and the Nechi Mines Co., according to the report of August, 1924, the last that is available, paid to directors fees of \$15,000. Disregarding any payment that may have been made on account of the Nechi company, the directors received about \$35,000, or, as only seven men are on the boards, an average of nearly \$5,000 each during the last fiscal year. Two comparatively small mining operations were conducted, and results were almost disastrous, largely as a consequence of policies approved by the directors.

The question arises, What is the proper function and status of a director? Apparently in this particular case the directors played the part of rubber stamps—at least they assume no responsibility for the blunders made. Yet if they could have connected themselves on as advantageous terms with one other similar group they could have had comfortable incomes with nothing to do but attend a few meetings each year. This case is not cited as a horrible example. It seems to be more or less typical of the situation in London mine finance.

In the United States, mining-company directors can be divided roughly into three groups: (a) salaried officials and engineers of the company, or of closely allied companies, who give their entire time and effort to the work and who are responsible for the wise administration of affairs; (b) representatives of outside financial interests who attend the meetings, principally to see what is done, and perhaps to give occasional advice of a general nature and who frequently get a nominal fee of \$10 or \$20 at each meeting that they attend; and (c) minor employees of the company who are named so as to make the obtaining of a quorum less difficult. Ordinarily, no fees are allowed to those in either the first or last group. The payment of large sums to men who have neither regular duties to perform nor any responsibility to shoulder cannot make for economical and efficient administration. Certainly it is not fair to shareholders.

## Geologists of Note

### Alfred Granville Burrows

By G. C. Bateman

THE new Provincial Geologist of Ontario, Alfred Granville Burrows, was appointed April 7 last, to succeed the late Dr. W. G. Miller. His selection was the logical outcome of over twenty years service with the Department of Mines, and it met with the hearty approval of the mining industry, which is very jealous and proud of the excellent reputation the department enjoys and recognizes Mr. Burrows' peculiar fitness for the position. Mr. Burrows was born at Napanee, Ontario, in 1878, where he received his primary education. His father was Frederick Burrows, a county school inspector who was interested in mineralogy. Young Burrows often accompanied his father on trips into the back country, and as a result his first interest in minerals was aroused. The district lying to the north of Napanee is extensively mineralized, and while it has not produced many mines, it has always been a happy hunting ground for mineralogists. It was therefore natural that when he entered Queen's University at Kingston, Ont., in 1896, he should have taken the course in chemistry and mineralogy. He was graduated in 1900 with the degree

of Master of Arts, winning in that year the medal in mineralogy. In the following year he was awarded the medal in geology and was graduated in 1902 with the degree of Bachelor of Science. During these last two years, in addition to carrying on his scholastic work, he acted as instructor in mineralogy. In the fall of 1902 he was appointed Provincial Assayer for Ontario and occupied that position for the next five years. During his university career he studied geology under Dr. Miller, who was professor of geology at Queen's University and who was appointed Provincial Geologist in 1902. Following the discovery of Cobalt in 1903, the work of the department was greatly increased and the number of field men had to be augmented. An appointment to the geological staff was always a matter of serious concern to Dr. Miller, but knowing Burrows from the latter's college days, he had no hesitation in having him transferred. From that time on Burrows' work has been entirely with the Geological Department. During his first years of service his attention was

devoted almost entirely to the outlying silver camps, and his early reports, particularly on the South Lorrain and Gowganda areas, are still standard works. Following the Porcupine gold discoveries in 1910, his energies have been devoted largely to the gold camps of

the province, although he made another report on Gowganda in 1920. He is recognized as the leading authority on Kirkland Lake and Porcupine, his first report on Porcupine being in 1910, and he has been in direct charge of all work in that district ever since. A few years ago work was started on a detailed re-examination and survey, not only of the Porcupine district as a whole, but also of all the underground workings. This work, which was undertaken in conjunction with the geological staffs of the various mines, has not yet been completed, but it preserves essential data for future reports. In 1923 Burrows was appointed Assistant Provincial Geologist, and he has now received a well-merited promotion. While of a retiring disposition, he is very popular with the mining interests, who have entire confidence in him. His chief recreation ap-



ALFRED GRANVILLE BURROWS

pears to be work. He is not only an authority on Pre-Cambrian geology, but he has a unique knowledge of the northern bush, through his many years of indefatigable traveling through it. In 1903 he married Ethel, the daughter of D. F. Armstrong, of Kingston, and has one child living. He is a member of the Canadian Institute of Mining and Metallurgy, a fellow of the Royal Society of Canada, and a member of the American Society of Economic Geologists, as well as of several non-technical organizations.

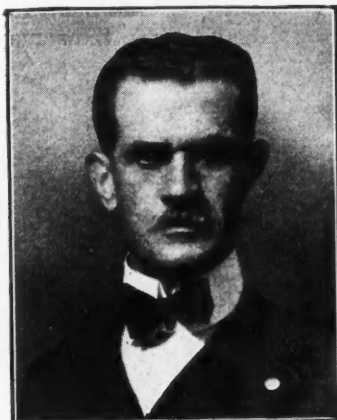
The Geological Department of Ontario has always had an enviable reputation. Its reports and maps are issued with the least possible delay, and instead of holding post mortems on mining camps and districts, it endeavors to keep step with the prospector and, if possible, a step in advance. It is a job for a man who is more than a mere scientific theorist, but with A. G. Burrows as Provincial Geologist, it is believed by those who know him that the high standard of the department will be maintained.

# Gold in Southeastern Venezuela

*Legendary Deposits Verified by Discoveries in Recent Years—Crude Mining Methods—  
Opportunity for Extensive Dredging*

By F. D. Pagliuchi

Consulting Mining Engineer, Ciudad Bolivar, Venezuela



F. D. Pagliuchi

ish West Indies. The mines are reached either by steamers of the Trinidad Line, which has its office in New York, or by the Royal Mail Line, from Halifax to Port of Spain. From there a river steamer of the Compañia Navi-  
era y Constanera de Venezuela is taken for Ciudad Bolivar. From Ciudad Bolivar to El Callao, the center of the quartz mining district, is a two days' journey by automobile, and from El Callao to Tumeremo three hours more; from Tumeremo to Sua-Sua is also three hours by automobile; from Sua-Sua to El Dorado, on the Cuyuni River, six hours on horseback; from El Dorado to Parurubaca, the Coro-Coro mines station, twelve hours via gasoline launch upstream on the Cuyuni River, and to the Alto Cuyuni mines eleven hours more.

Provided the precautions usual in tropical countries are observed, the climate is safe and healthful. The average temperature during the day is from 80 to 85 deg. F., and the nights are refreshingly cool. The country where the mines are situated is densely wooded, interlaced with large varieties of lianas (tropical vines), some of which attain a diameter of one foot or more. Most of these lianas contain water. In some this water is acid and pungent; in others it is deliciously cool and pure. While in the forest this water should be used in preference to river water. The available food consists of salt fish, morocoy (diamond-back terrapin), occasionally fresh fish and game, and local vegetables such as platanos (plantains), yuca, yami, sweet potatoes, pumpkin, green corn, rice, and beans. A small amount of alcohol is beneficial; the abuse of it is suicidal. A few grains of quinine should be taken occasionally as a prophylactic measure; of paramount importance, however, is scrupulous cleanliness of one's camp and person.

## LEGENDS AND RECENT DISCOVERIES

When Venezuela was under the Spanish régime this part of the country was known as Guayana Vieja. It enjoyed the reputation of possessing an "El Dorado" near the Brazilian boundary, which tradition described as a large lake, the bed of which was reputed to be

covered with gold nuggets. The Indians are responsible for the legend that attracted a number of Spanish adventurers and Jesuit priests to the interior. The latter established several missions, usually building them in the vicinity of mineral deposits, as La Pastora, 18 miles from Guasipati and 6 miles from Quebrada de Oro (gold ravine); El Miamo, between Guasipati and San Felipe; and Guasipati, one of the oldest mining towns in the district.

In 1913, a party of Demerara miners, headed by Anthony McKenzie and General Fernandez, went to the



Sketch map of part of Venezuela, showing location of gold fields

Alto Cuyuni, a three-day journey on foot, and in a small creek found some gold. Afterward, several Caribbean Indians informed the general that in a creek which emptied in the Cuyuni some distance upstream, at a point recognizable by a recently felled tree, plenty of gold was to be found. The party went in search of this creek, and almost reached the headwaters of the river without finding gold. On their return trip, while hunting, they accidentally discovered the creek described by

the Indians. Work was immediately started, and they were rewarded by rich gravel yielding as much as one ounce of gold to the pan.

The strike on the Alto Cuyuni was made on government land in May, 1913. After this several claims were staked, and soon the placer mines were producing. At the time of my visit, about four months ago, after twelve years of continuous production, the output was from 200 to 300 oz. per month, which represented the work of about sixty miners.

Sometime in January, 1915, Salvador Bianchi, Anthony McKenzie, and six miners established a camp at the mouth of the Coro-Coro creek, and, using this place as a base, started to prospect the near-by creeks. In June of the same year gold was discovered in a ravine emptying into San Antonio Creek. Soon afterward the Salvacion, Foco, and Aurora creeks were discovered. Work was started in 1916, but was not very actively prosecuted until 1917, when approximately a thousand miners were at work on the property. These mines have produced a considerable amount of gold, but bad management and lack of necessary surveillance resulted in only a small amount of gold reaching the owners.

#### ERODED AREA FROM THE ORINOCO TO THE HEADWATERS OF THE CUYUNI RIVER

The valley of the lower Orinoco was once an immense lagoon, or marsh, which was slowly and gently uplifted, so that the Orinoco and its tributaries, formed first as small and shallow drains, have been developed by time

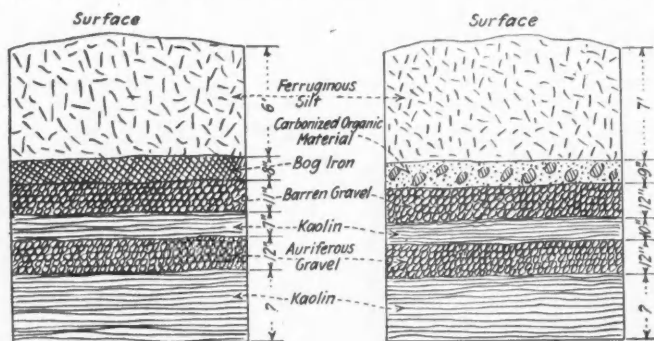


Fig. 2—Shaft 10

Fig. 3—Shaft 7

Stratigraphic section of Foco Shafts Nos. 7 and 10

and erosion into large rivers. The Orinoco flows between low banks in a gently undulating country, the soil of which at times is heavily stained with iron. Examination of the rocks in evidence at San Felix and Ciudad Bolivar shows both acidic and basic rocks such as granite, gabbro, and hornblendite.

From Ciudad Bolivar to Guasipati, a distance of 146 miles, the country is a rolling savannah, the soil of which is extremely siliceous, being derived from the disintegration of granodiorite and granite. Guasipati lies at the edge of the savannah in a belt of schist which has been intruded by gabbro and diabase, the latter being both intrusive and extrusive. It is in this belt that most of the known quartz mines, such as El Callao, Lo Increible, El Peru, La Paz, and others are situated.

The auriferous quartz veins are generally from 2 to 3 ft. wide, strike east and west, and dip at a varying angle of from 45 to 70 deg. There is also another system of veins extending from north to south, which as a rule intersect the former. This condition is specially in evidence at the Botanamo mine. Up to the present

the workings have been comparatively shallow; the greatest depth was attained at the Callao mine, where a vein has been followed down, and profitably worked, for 1,000 ft. At La Paz in 1915 an ore chimney was struck which in one year produced more than a million dollars. Some time ago rich ore was encountered at the Sonora and Quebrada de Oro mines near Guasipati.

From El Callao to Tucupan, 3 miles east of Callao, the country is thickly wooded, and is in the above-noted auriferous belt. Thence to Tumeremo, a distance of about 27 miles, and from Tumeremo to Sua-Sua, 18 miles, the country is rolling grass-land having the same characteristics as the savannah from Ciudad Bolivar to Guasipati. From Sua-Sua to El Dorado, a distance of about 18 miles, the country is chiefly gabbro and diabase. In this area several quartz veins were observed. At the Coro-Coro mines the country is also densely wooded. The surface is covered with fine sandy detritus; the country rock is seldom seen, but when in evidence it is either gabbro or diabase.

#### GENESIS OF THE ALLUVIAL GOLD

The geological features at the alluvial mines of the Alto Cuyuni are as follows: Orogenic movements uplifted the country and possibly also formed the fissures which, filled with auriferous quartz, were afterward, through their weathering, the source of the alluvial gold. The angular gravel varies from  $\frac{1}{2}$  to  $1\frac{1}{2}$  in. in diameter and the bed is from 6 to 18 in. thick. The gold is flat and rough, proving that it has not traveled far, and that the ancient rivers, like the modern ones, have such gentle grades that their carrying capacity was limited; hence the angular aspect of both the gold and the gravel.

The auriferous gravel lies from 5 to 20 ft. below the surface, and rests on a thick stratum of clay. This clay bed indicates that the country had been submerged for a long time; also that the period of submergence has a direct relation to the thickness of the clay. Above the auriferous gravel another false bedrock of clay from 6 to 12 in. thick occurs. This represents another submergence of the country. The clay, having been formed from similar detrital matter, is of the same composition as the lower clay bed.

Above the upper clay bed is another stratum of gravel similar to the lower and from 8 to 12 in. thick, but containing a very small amount of gold. This gravel represents another uplift of the country. Resting on this gravel occasionally a stratum of carbonized leaves and stumps of the present flora is found, and at other times a stratum of bog iron or iron conglomerate occurs, as shown in sections of Foco shafts No. 7 and No. 10, Figs. 2 and 3.

The presence of organic material and bog iron resting directly over the second gravel shows another submergence. This time the country was not wholly submerged, and large swamps were formed, and these soon became covered with vegetation. The iron carbonate of the country rock was dissolved by meteoric waters, and afterward changed and precipitated as sesquioxide, forming the bog iron. Where the country rock did not contain any iron a thick stratum of organic matter accumulated on top of the gravel.

Again the country was uplifted, and this movement, like the last submergence, was so limited that some of the deeper places of the swamp are still in evidence and are locally called "Bajumbales." Since then a gentle





*Testing placer ground by crude hand washing*



*Mining camp in Alto Cuyuni, Venezuela*

erosion has taken place, forming exceedingly fine silt and dissecting the country into a chain of low, undulating hills.

#### EVIDENCES OF A THIRD GRAVEL DEPOSIT

In the Alto Cuyuni alluvial mines there are strong evidences of the existence of a third auriferous gravel deposit. This assertion is based upon the following grounds:

1. The large number of veins still visible at the Alto Cuyuni mines have been eroded to such a depth that their gold content is almost negligible and of no commercial value. The deep erosion of such a large number of veins necessarily must have produced a great deal of material, only a small portion of which is accounted for by the two thin beds of gravel. Therefore, this large amount of material has either been scattered over a much larger area than the one at present known, or else another untouched deposit exists below the clay bedrock, which, like the one above, is merely a false bedrock concealing a third deposit.

2. The upper or first layer of gravel contains little gold, and the transition from an upper thin bed of very poor gravel, to a thin and very rich one below, is too abrupt. If the lower or second gravel bed had



*A primitive stamp at the Botanamo Mine*

attained a depth of several feet, all of the material disintegrated from the veins above referred to would be accounted for, and the pooriness of the upper gravel explained. But the conditions which I have described as existing in this section require other explanation to account for them. Such an explanation will be found in the hypothesis of a third auriferous gravel deposit underlying the second, and the formation would be as follows:

(a) First, and unknown, deposit. This would represent the erosion of the portion of the veins from their outcrop to a considerable depth, and almost certainly should be auriferous.

(b) Second, known deposit. This would represent the erosion of the portion of the veins still containing auriferous quartz.

(c) Third, and also known, deposit. This was formed from material derived from veins at such a depth that they ceased to contain gold. This is in accordance with the eroded and almost barren veins in evidence at the mines, and the layer of poor gravel which is found above the pay gravel.

I do not consider it probable that a large portion of the matter eroded from the veins can be accounted for

by a wider scattering of the material. Thus, in my opinion, there are strong indications of the existence of auriferous gravel below the clay bedrock. This third gravel deposit should be at least as rich as the second deposit, which is now being worked.

#### QUARTZ MINES AND PROSPECTS

The El Callao has been the largest and richest mine in the district; it is said to have produced for many years at the rate of one thousand ounces of gold per stamp per month. The El Peru, about 10 miles from El Callao, has been a steady producer for more than twenty years. The La Paz mine has been a large producer and it is now said to possess a large tonnage of \$10 to \$15 ore. The Lo Increible, about 7 miles from El Callao, is owned by a Venezuelan company and has produced a great deal of ore yielding from an ounce to several ounces in gold to the ton. This mine is also credited with a large tonnage of \$13 ore. Some time ago the company erected a small cyanide plant to treat the tailings from the mill. Around Lo Increible are several prospects showing well-defined veins.

Six years ago and about 45 miles from Tumeremo I examined what I then considered the most interesting and promising quartz prospect in the district. The property is called La Inflexible, but is better known as the Botanamo, really composed of two prospects, the India and the Vencedora, about one mile apart. The India is better developed and shows a well-defined vein with an east-west strike, and also a north-south vein which intersects the former.

#### MINING AND STAMP MILLING PRACTICE

The prospect is worked by leasers on a 25 per cent royalty. The leasers are allowed to sink, but not to drift, on the vein, with the result that within 200 ft. they have sunk eighteen shafts, the deepest being about 90 ft. Unlike the Mexican, the Venezuelan is better versed in agriculture than mining; hence usually little interest is manifested in the latter industry. Three men, two miners and a surface man, work in each shaft. After the ore is brought to the surface it is sorted. The quartz showing gold is put aside and the other thrown on the dump. A grab sample of the dump gave me \$28.50; and two samples from the vein gave \$49.60 and \$118 per ton. After the ore is sorted it is placed in empty kerosene boxes (a kerosene box being the standard measure at the mine) and turned over to Demerara negroes, who crush the ore by means of stamps somewhat similar to those used by their predecessors in Ethiopia, as shown in the illustration. A flexible pole about 15 ft. long and inclined about 30 deg. from the horizontal has one end anchored in the ground. Attached to the free end is a piece of round, hard wood 8 in. in diameter and 3 ft. long, with a cross-piece as a handle, and the shoe, which is a piece of round iron, is fastened to the bottom. The mortar consists of a large slab of quartz. The millman stands in a pit, grabs the handle attached to the round wooden block above the shoe, and brings it down on top of the ore to be crushed. This crude stamp is lifted by the flexible pole, which saves the millman energy for the downward stroke. While at work it is customary for the operator to sing a monotonous though rather pleasing chant, which is taken up and repeated by others, so that the noise of



*Part of the "crew" of an American prospector starting into the jungle*



*Sluicing for gold in the midst of the tropical jungle*

the crushing is accompanied by singing as primitive as the stamps.

The charge for crushing the ore is \$2 per kerosene box. When crushed it is turned over to panners, who, using a large conical wooden batea charged with mercury, pan the ore in a near-by creek. They also charge \$2 to pan a kerosene box of crushed ore. I panned some of the tailings and recovered a good deal of gold, amalgam, and mercury. The tailings are not impounded, and are carried away to the Botanamo River at every freshet of the creek.

The Vencedora prospect, better known as the Calabria, shows several quartz veins, some extending east and west and others north and south. Very little work has been done. A panned sample of ore taken from a vein outcropping near the creek yielded from \$40 to \$50 per ton.

The owners of this property have a store at the mine where provisions, tools, and explosives are sold at exorbitant prices. The gold is purchased from the miners at \$15 an ounce, though it is worth over \$18. Notwithstanding the fact that a great deal of the gold was being lost in the treatment of the ore, and some was being stolen, at the time of my visit the mine was producing about 400 oz. of gold per month. This mine has been thoroughly prospected by an American company to a depth of about 200 ft., and a large tonnage of good ore exposed. There is about 8,000 tons of \$30 ore on the dump.

#### A FEATHER GUIDE TO GOLD

While engaged in the examination of the above-described mines and prospects, I constantly heard the sharp cry of a bird which is seldom seen, as its habitat is in the dense foliage of tall trees. The bird is gray in color and about the size of a robin. It is called "El Minero" (the Miner). The natives informed me that this bird is always found in the vicinity of gold mines or wherever quartz is abundant. Thereafter, as I rode through the country, whenever I heard the cry of El Minero either I saw a quartz ledge extending across the trail or was able to find one by looking about a little. Apparently the natives were correct. Why the affinity which seemed to exist between bird and quartz ledges? My investigations and attempts to solve the mystery left me still puzzled. Finally a miner told me that if I wanted gold I must always look for the Mora tree. He pointed out to me some trees which grew next to the quartz ledge that I was examining at that moment. Then the solution of the puzzle dawned upon me. The Mora tree grows and thrives only in siliceous ground, and El Minero feeds on the berries of this tree; hence whenever his cry is heard, one is assured of finding a quartz vein in the vicinity. Of course the quartz may or may not be auriferous, but when prospecting in a country known to be auriferous, it must be admitted that the bird is a helpful guide to the prospector.

#### THREE GROUPS OF PLACER MINES

The placers are on both sides of the Cuyuni River, beginning at the Parurubaca Falls and extending to a point near the headwaters of the river, a distance of about 30 miles. They are divided in three groups: The Coro-Coro, the Marruecos, the Alto Cuyuni and a few other claims. Only a small part of these concessions have been explored and worked.

Mining claims in Venezuela, up to July 8 of this

year, were granted by Congress and approved by the president of the republic. A placer claim is a square, with sides 5 kilometers in length. Each claim, therefore, covers an area of 25 square kilometers, equal to 9 square miles. A quartz claim is a square or rectangle containing 500 hectares or about 1,250 acres. The title to a placer claim is granted for fifty years, and for a quartz claim for ninety years.

On my earnest solicitation and persistence, the Venezuelan Congress, in order to expedite the issuing of mining titles, on July 8, 1925, amended the law so that in the future the application for a mining title is now made and approved by the Minister of Fomento and signed by the president. Another valuable and very important amendment was the addition of Article 87, as follows: "Alluvial mines that are worked by mechanical means, such as steam shovel, drag-line excavator, dredge, or similar appliances, producing not less than 500 cubic meters per day, will be exempt from the taxation referred to in articles 83 and 86; and in its place they will pay, as total taxation, 3 per cent gross of the mine production."

Article 83 says: "Alluvial mines will pay a surface tax of 0.50 of a bolivar (about 10c.) per hectare, for the first three years, and one bolivar for the remaining time of the concession."

Article 86 says: "The exploitation tax is obligatory from the time that mineral is being extracted from a mine, and is: For each gram of gold produced 0.10 of a bolivar, (about 62c. per ounce) and 0.60 of a bolivar (or 12c.) for every ton of copper ore extracted."

Article 87 also includes quartz mines whenever they mine and mill more than fifty tons per day. They will then be exempt from the taxes referred to in articles 84 and 86, and in its place they will pay a total tax of 3 per cent of the gross mine production.

Article 86 has already been described. Article 84 says: "Quartz mines will pay a surface tax of one bolivar (about 20c.) per hectare for the first three years, and two bolivars for the remaining time of the concession." As the Venezuelan gold varies from \$17 to \$19 per oz., the total tax on a gold mine would be from \$0.51 to \$0.57 per ounce produced.

The placer mines of the Alto Cuyuni are worked by leasers, who are allowed to select their own ground. Usually they are Demerara negroes and poor miners. At Parurubaca, on the Cuyuni, the owners of the Coro-Coro mines have a store which supplies the miners with tools and provisions at high prices. The leasers are supposed to pay as royalty 25 per cent of the gold extracted, and are required to sell the remainder to the owners at \$14 per ounce. Owing to lack of supervision and poor management, very little gold is turned over by the leasers, with the result that the chief profit of the owners is derived from the sale of tools and provisions. The known amount of gold so far produced by these placers and the Alto Cuyuni mines amounts to more than 100,000 oz.

No gravel from a depth of over 20 ft. has been mined. The prevailing method of working the placer ground is by open cuts, which usually have 15-ft. sides. The gravel is shoveled into a 6-ft. tom or an inadequate 30-ft. sluice box, quicksilver being used in both. The recovery is so poor that the Foco and Aurora creeks of the Coro-Coro group, which have been worked two and three times, for a distance of about a mile and a half, yield \$1.20 per cubic yard of material from surface to bedrock.

Only the creeks where the water is shallow and could easily be diverted have been worked. Large creeks in which there is a continuous flow of from 2 to 5 ft. of water have not been touched. To ascertain whether or not these contained any workable gravel, in the absence of pumps or machinery of any kind, the following method was adopted: A breakwater composed of poles and palm leaves was built. A little below the breakwater four stout poles were driven to bedrock; to these, more poles and palm leaves were fastened lengthwise with vines, which so plentifully grow in the forest; then the material extracted from the pit was piled up on the sides. Very soon the hole was water-tight, and the work of digging the pit proceeded without trouble. Once the gravel was reached this was washed on a tom located at the side of the creek, as shown in the illustration on p. 487.

The testing of the shallow creeks was accomplished by sampling the leasers' cuts, and by sinking 4x6-ft. shafts to bedrock, which as a rule lies from 5 to 10 ft. below the surface. See Figs. 5 and 6. The gravel is washed in a 6-ft. tom.

**DREDGES RECOMMENDED FOR WORKING THE GRAVEL**

Owing to the small size of the gravel, the absence of boulders, and hard bedrock, the best method to use in working these deposits would be dredging with a 2-ft. flume dredge as used in Alaska, with a capacity of about 1,200 cu.yd. per day. The cost of such a dredge f.o.b. San Francisco would be about \$45,000. A 3½-ft. dredge with a capacity of from 1,800 to 2,000 cu.yd. per day, with flat shallow bucket specially adapted for digging clay, will cost about \$75,000 and will need 150 hp.

The above-mentioned types of dredges are being operated successfully in the neighboring British Guiana, where conditions are almost identical with those at Coro-Coro mines. Since these dredges were put in operation up to 1922 they produced 2,621,531 oz. of gold, worth \$46,285,035. At the Coro-Coro mines an American company, the Venezuela Gold Incorporated, of San Francisco, is erecting a 2-ft. flume dredge which the company expects to have in operation by December.

Not long ago a new placer district was found near El Dorado at a place called Isquiel, where coarse gold (pieces weighing from one ounce to several ounces being common) was found. Strange to say, at this place, even during the rainy season, there is a scarcity of water, so that most of the gold has been recovered by dry washing. Water could be had about 5 miles away, but these people do not know how to dig ditches to bring water to these rich diggings, nor care to do so.

A few months ago an American company at Paviche, about 150 miles southwest of Ciudad Bolivar, erected a ¾-yd. Sauerman drag-line excavator alongside the Caroni River with the object of dredging the bed of the river for gold and diamonds. Unfortunately, the bed of the river was so rocky that the excavator gave negative results. I doubt that success can be gained with this method of dredging when the river is from 5 to 6 ft. deep and has a hard and rocky bed, though I am sure it would give splendid results in shallow streams with soft bedrock.

Other engineers have visited and reported on this region, and their views are expressed thus:

Lucien Morisse<sup>2</sup> was sent by the French Minister of Public Instruction to the Venezuelan Guiana, where he



*Typical thatched dwellings of the native Venezuelans*

made three trips for scientific researches. The first was of two and a half years' duration, when he explored the upper Orinoco and Rio Negro as far as Brazil. On the second trip he explored the lower Orinoco and the lower Caroni River; and during the third, in 1894, he explored and made a geological reconnaissance of the Yuruari region. The result of these investigations are found in the "Archives de Mission du Ministère de l'Instruction Public." In his report he gives valuable data on the geography, geology, and customs of the region examined, and describes in detail the Callao mine (then working), which, as he says, for years produced a veritable gold fever in the mining world. Morisse then proves with figures that no other mine has produced, in the same time, such a large amount of gold. He also states that there is no other comparable example of waste and maladministration, except by the French company on the Panama Canal; and finally the author, basing his conclusions on geological evidences, ends his report by saying that the Venezuelan Guiana is the richest auriferous country in the world.

Paquet Norbert, a Belgian engineer whose investigation and study of the Venezuelan Guiana made in 1900 and 1902 furnished the material for his book, gives geographic, geologic, and industrial data on the Yuruari region. He prophesies a wonderful future for it. In different parts of his book, with full conviction, he affirms that the field has only been skimmed over, and that there are still immense and valuable reserves.

I am in accord with the views expressed by these engineers, and will add that the district where gold is found in Venezuela is large and for the most part unexplored. While not a country for the lone prospector, properly organized parties, representing large mining or dredging companies, would be well rewarded by careful and judicious exploration.

**India's Gold Ore Output Small**

The following table shows the production of gold ore in India during the second quarter of 1925, according to the assistant trade commissioner at Bombay:

District	April, Tons	May, Tons	June, Tons
Mysore	10,241	10,944	10,217
Ooregam	8,625	8,596	9,856
Nandydroog	5,434	5,211	5,146
Balaghat	2,833	3,142	2,837
Champion Reef	2,198	5,126	5,113

<sup>2</sup>Morisse, Lucien: "Excursions dans L'Eldorado (Callao)." Paris Association d'Impreneurs, 1904.

<sup>3</sup>Paquet Norbert: "Loren Guyene Venezuelenne, extrait des Publications de la Société des Ingenieurs du Hainaut années 1902 et 1903. Liège, Imprimerie Desoc."

<sup>1</sup>"British Guiana Handbook for the Year 1922," page 111.

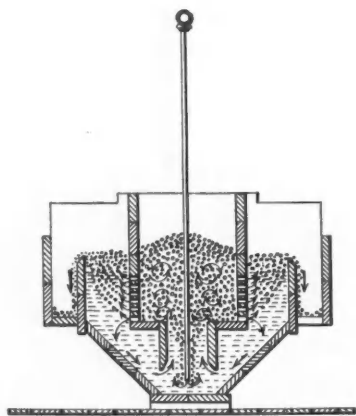
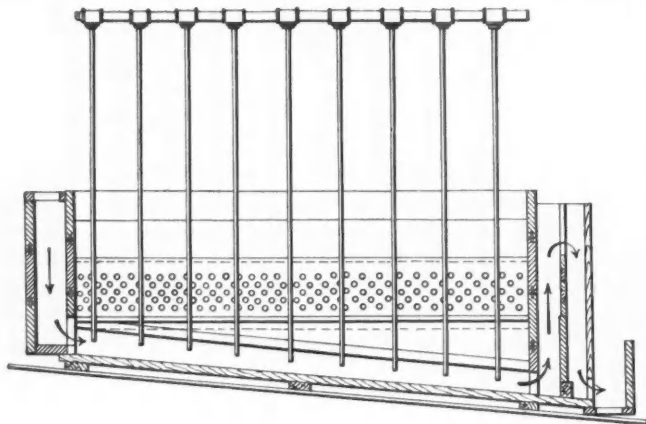
## A New Type of Flotation Machine

*Fool-Proof and Requires Minimum of Repairs.  
It Is Claimed—Power Need Per Ton  
of Ore About Normal*

By D. L. Forrester

Superintendent of Reduction, Old Dominion Co., Globe, Ariz.

IN THE *Mining Journal-Press* of July 25, 1925, under "Simplification of Copper Ore Concentration," it was stated that flotation cells admit of improvement, and the belief was expressed that either more efficient



*Cross-section of Forrester flotation machine*

fabrics will come into use or that a different type of flotation cell will be adopted.

At the Old Dominion Co.'s concentrator, at Globe, Ariz., a new type of flotation cell has been perfected, and several are in use under actual operating conditions. This is known as the Forrester flotation machine. A description of it follows.

With the adoption of chemicals such as orthotoluidine, thiocarbonyl, and potassium xanthate as flotation reagents, it became necessary at the Old Dominion concentrator to use from 6 to 7 lb. of lime per ton of ore. This large amount of lime, combined with the high iron and sulphur ore, caused a great deal of trouble in the company's flotation department, especially in the porous-bottom pneumatic cells. The blankets soon became clogged, requiring 6 to 7 lb. of air to obtain satisfactory results. Also, three extra men were required to punch the blankets, one man in each shift. The life of the blankets was shortened to an actual operating time of fifteen days per blanket. In addition to this, whenever a shot of oversize came along the operating troubles were increased and, consequently, the metallurgical losses were greater.

Such conditions were intolerable, and something had to be done. The outcome of a great deal of experimenting with different types of flotation cells without porous media resulted in the development of the Forrester flotation cell, for which a patent application is pending. This cell is practically fool-proof, and the repairs and renewals are so far a minus quantity after six months of operation.

The cell consists of a box of any length and of the cross-section shown in the accompanying sketch. Longitudinal and equidistant from the center line of the cell are partitions forming an aërating chamber. This chamber is open at the top and bottom, and the walls extend above the pulp, so that nothing goes over the top of the chamber. In the walls of the aërating compartment are rows of holes and slots below the pulp level in both the aërating compartment and separating compartments. Air is introduced through half-inch or larger pipes directly into the pulp near the bottom of the cell. Violent agitation takes place in the central or aërating compartment. The aërated pulp passes out of the holes in the walls of the aërating compartment into the separating compartments below the pulp level, where a good substantial froth is formed and discharged into froth launders. The pulp in the separating compartment passes downward and in at the bottom of the aërating chamber, where it is again aërated and agitated. The air pipes are high enough above the bottom of the cell so that sand settles out and forms a protecting bottom.

When the power goes off, it is not necessary to empty the cell; the pipes do not stop up. When the plant shut down for repairs or for any length of time, all that is necessary is to pull a plug and drain the cell or leave it full if preferred. No washing of blankets nor pounding of mats is necessary.

The air consumption is more than for ordinary porous mediums but at lower pressure, so that the power per ton of ore is about the same or less. Metallurgically, the new type Forrester cell is equal to the other flotation equipment used by the company.

The cell does not necessarily have to have a sloping bottom; a flat bottom will do just as well. In fact, the company is making cells with flat bottoms now.

### Montana's Metal Output Less in 1924

The total value of the gold, silver, copper, lead, and zinc in Montana ores treated or shipped, and of the gold and silver obtained from placer mining operations in that state in 1924, amounted to \$55,074,548, a decrease of \$2,738,422 from the 1923 output, according to statistics compiled by C. N. Gerry, of the U. S. Bureau of Mines. A total of 4,652,482 short tons of these ores was treated or shipped in 1924.

The recoverable copper in Montana ores treated in 1924 amounted to 249,152,062 lb., an increase of 25,026,798 lb. over the 1923 output. The production of gold in the state in 1924 was 97,854.16 oz., which is an increase of 12,774.73 oz. compared with the 1923 production. The 1924 silver output was 13,289,303 oz., a decrease of 91,559 oz. from the 1923 figures. Recoverable lead in ores treated in 1924 amounted to 39,476,008 lb., an increase of 3,530,385 lb. compared with the output for 1923. Recoverable zinc in ores treated in 1924 reached a total of 128,475,218 lb., which is a decrease of 12,985,174 lb. from the 1923 production.

# Winning Limestone

*Need for Systematic Quarry and Underground Methods—Tunnel Loading—Glory-Hole Quarrying—Shrinkage Stopping—Caving Impracticable Except Under Unusual Conditions*

By George J. Young

Associate Editor

**T**HE VALUE OF LIMESTONE for crushed stone purposes is given by the U. S. Geological Survey statistics as \$1.027 per ton on the basis of 41,386,550 tons mined in 1922 in the United States. On the basis of 76,701,360 tons produced in 1923, for miscellaneous purposes not including that used for cement, lime, or dimension stone, the average Survey valuation is \$1.16. The total quantities of limestone, including that consumed in cements and lime, for the years 1921, 1922, and 1923, are respectively 75,171,000, 96,426,660, and 119,775,360 tons. Of the last amount miscellaneous purposes comprised 64; cement manufacture, 28.9, and lime manufacture, 6.7 per cent. The quantities are large, the outlets comparatively restricted, and the quarry values relatively low. These values vary in different localities and for different

inary study—its hardness, the presence of bedding and sheeting planes, and the presence of foreign rocks such as intrusives and intercalated sedimentaries. The composition of the limestone and the consistency with which this composition is maintained in various parts of the deposit are important factors that have a bearing upon the marketability of the product. Likewise, the size requirements of the market will influence the breaking practice. The amount and nature of the overburden is of importance, as this must necessarily be removed in advance of quarrying. If it is soil, it may be hydraulicked or ground-sluced off where there is a place for the convenient disposal of the debris, but if it is rock it must be drilled, blasted, loaded, and waste-piled. Ploughs, scrapers, and mechanical loaders are of service in soils and sand where hydraulic stripping is impracticable. The amount of overburden to be removed may be prohibitive in some instances, and, on the other hand, areas for waste dumping may not be conveniently available.

Flat-lying deposits of considerable areal extent admit of three general methods, all modifications of bench quarrying. The height of bench will vary from 15 to 50 ft., the former for small outputs and the latter for large production. The initial bench is opened out from the most convenient point accessible by tracks to the crusher plant or to the loading bins or, where railroad cars are to be directly loaded at the faces, from some point that admits of easy track construction. If the limestone is exposed on one side, the initial bench can be carried parallel to the exposed face. A through cut exposing two faces is also practicable in some instances. In the smaller quarry operations an initial cut can be made and from this a more or less circular quarry opened out, but for the larger bench operations it is desirable to establish long benches where practicable. Where the deposit is below the general surface and impracticable of approach by a through cut, it must of necessity be opened out by an incline up which the loaded cars are hauled.

In the smaller operations hand loading and horse haulage are generally used, as this involves the minimum investment and small tonnages are not economically handled by power equipment. Where the tonnage exceeds 100 tons per day, loading by means of a small power shovel is more economical. A caterpillar-mounted shovel,  $\frac{3}{4}$ -cu.yd. bucket, operated by internal-combustion engine or electricity, is the most suitable rig for the small quarry of 100 to 300 tons per day output. Horse haulage or gasoline-locomotive haulage is indicated. For larger operations producing 1,000 or more tons per day, steam shovels, mounted on caterpillar tractors, and locomotive haulage are suitable. Electrically operated shovels are best where there is a power source. Trolley-type locomotives suggest themselves for haulage, but their use requires additional equipment in



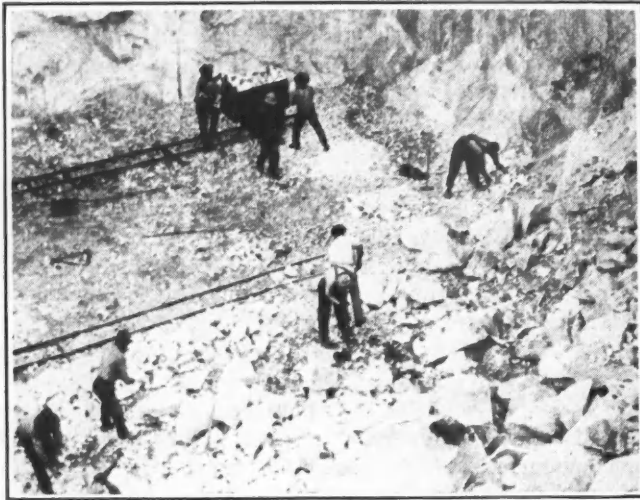
*Small-scale limestone quarrying, showing track layout for hand tramping or horse haulage*

utilizations. For California the Survey value is \$1.77 and for Michigan \$0.55 per ton. The highest valuation is for dimension limestone, the Survey valuation for building stone (limestone) in 1923 approximating \$1.11 per cubic foot. Omitting the dimension stone phase, bulk quarrying of limestone for cement, lime, crushed rock, metallurgical and other similar purposes concerns itself with a relatively low unit value and with quantities that may range from several thousand tons to nominal amounts per day. The specific problems are breaking, loading, preparation, and transportation.

Limestone deposits fall into two general types, lenticular and bedded. Topographic environment varies greatly. The shape, size, position, continuity, and topographic environment are important factors in the selection of quarry sites and require study in each instance. Each deposit is a problem in itself, and no general rules can be presented easily. In addition, the physical characteristics of the material require prelim-

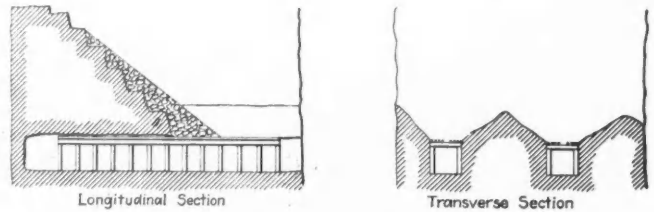
the form of motor-generator sets. Gasoline and steam locomotives avoid the direct-current equipment and the exposed trolley wire.

Power-shovel loading increases the capital outlay, and this may be avoided by resorting to tunnel loading. The tunnels suggested are 8 by 8 ft. to 10 by 10 ft. in cross-section, depending on the car dimensions, and are driven normal to the quarry face. The quarry face is carried like an underhand stope, the loading tunnel being at the toe of the "stope." The tunnel is timbered with sets, 5-ft. centers, and is lagged on the top with steel rails (or 8 by 8-in. timbers). The rails are omitted at the center section parallel with the tunnel axis for a space 2 ft. in width. This is covered with cross-boards (3 by 10 in. by 3 ft.). By removing the cross-boards, several at a time, the broken rock can be worked down and discharged into the cars beneath



*Small-scale limestone quarry operations—Hand loading and spalling to kiln size*

with a minimum of manual effort. As the quarry face is advanced the tunnels are extended and the loading points advanced. The number of loading tunnels depends upon the output, one tunnel serving for 100 to 200 tons per day for a 50-ft. bench above the tunnel top. The length of tunnel is from 50 to 100 ft. The cost of properly equipped tunnels is estimated to range from \$1,200 to \$2,000. Five tunnels would be equivalent to the cost of a  $\frac{3}{4}$ -yd. revolving steam shovel (caterpillar tractor) of 250 cu.yd., or 340 tons' loading capacity per shift, assuming its cost at \$10,000. An estimate of operating costs on the basis of a 50-ft. quarry face above the tunnel is in favor of the power shovel. In the estimate the assumption is made that four tunnels would be required to maintain two in condition for continuous loading. The capital investment would be in favor of the tunnels, but the operating cost in favor of the shovel. As the height of the quarry face above the tunnel increases, the amount available for loading at each tunnel increases and the capital charges are diminished on a tonnage basis. Fewer tunnels may be required to maintain a given output. Thus the conclusion is that, for quarry faces 60 ft. or less, power-shovel operation is more economical than tunnel loading. The steam shovel is a more elastic device, and its operation is on the whole safer than tunnel loading. It is doubtful whether the loading costs by the tunnel system are less than by power



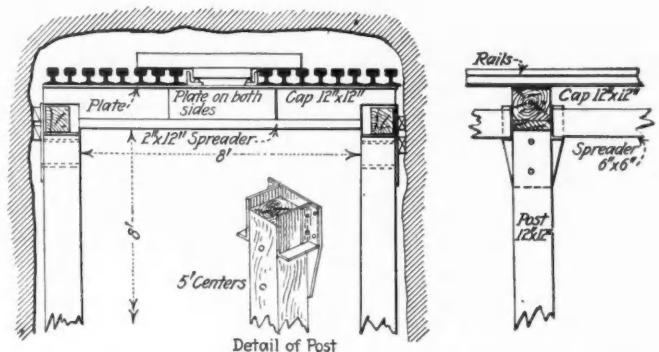
*Fig. 1—Quarry and tunnel loading drifts*

shovels, but where capital input is to be restricted, the tunnel loading system has the advantage, requiring, however, a greater capital investment than for hand loading. Operating costs by the last-named method are the highest as compared with tunnel or power-shovel loading.

Fig. 1 represents a generalized layout for tunnel loading and Fig. 2 is a suggested design for the tunnel timbering. D. T. Farnham presented a paper before the American Institute of Mining and Metallurgical Engineers in October, 1914, in which he described a tunnel loading system as applied to the quarrying of shale from a face 150 ft. in height. Hoppers are arranged between the tunnel sets and the top of the tunnel set is covered by transverse timbers, 6 by 12 in., set 8 in. apart (forming a grizzly) and supported by 14 by 16-in. stringers resting on the tunnel sets. The hopper is closed by needle bars. The design suggested in Fig. 2 involves the use of stope boards or cross-boards to close the central opening. These are lifted as desired and the broken rock worked into cars beneath. Careful blasting would be necessary in starting the lowest bench. To avoid this and to provide for chute loading, an alternative design is suggested in Fig. 3. The quarry floor is opened out 10 or 15 ft. above the top of the tunnel. Chute raises are extended up and widened out and funneled to the raise. As the lowest bench is carried back the raises are successively captured by the toe of the bench.

Glory-hole quarrying<sup>1</sup> is also a form of tunnel loading and is applicable where the height above the loading tunnel is 75 ft. or more. For lower heights than this, power-shovel loading is undoubtedly the best. An adit tunnel is necessary and chute raises are extended from this to the quarry level at intervals dependent upon the thickness of the limestone. Two types of glory-hole quarrying have been established by practice. In one the raise terminates in a chute and in the other the raise discharges upon a grizzly

<sup>1</sup>See "Quarrying Limestone by Glory-holes," *Mining Journal-Press*, Vol. 120; p. 13. Glory-Hole Mining described by R. A. Kinzie; Vol. 118; p. 732; "Fresnillo Glory-Hole Mining Practice," by T. C. Baker; Vol. 116; p. 931.



*Fig. 2—Details of tunnel support for tunnel loading*



placed in a bulldozing chamber. In the former, bulldozing is done in the glory-holes and in the latter in the bulldozing chambers. The capital investment is the least in the former, but the bulldozing work is done under more adverse conditions. If the limestone is easily broken, blockholing and bulldozing may be negligible, and in that event the simpler system is indicated. The glory-hole method has the advantage of permitting the quarrying of a much thicker mass of limestone than can be worked by power shovels where the height of bench is limited to 50 or 60 ft.

Limestone for cement manufacture or limestone to be crushed and sized in a separate plant admit of loading by power shovels, but where the limestone is to be burned to lime, hand loading is considered by certain operators to be best, as suitable-sized lumps, 10 in., can be picked. Where the output is small, no doubt, this system is as good as any, but with large outputs hand loading should be supplanted by power-shovel loading and sizing and crushing effected in a separate plant. The tunnel system of loading has obvious advantages where picking and cobbing to size are practiced.

#### DRILLING PRACTICE

Whichever method of quarrying is used, bench, tunnel, or glory-hole, power drilling is necessary, as hand drilling is applicable only in extremely small and incidental operations. In the tunnel and glory-hole methods, practice has established one drilling method. This consists in drilling small-diameter holes from 10 to 20 ft. in depth, with the tunnel operations at intervals of 4 ft. and in glory-hole work at intervals of 6 to 10 ft. The compactness of the limestone will determine the intervals. Whether to charge and blast the holes with medium powder or to chamber and blast with black powder or low-grade dynamites will depend largely on the physical characteristics of the limestone. Practice favors straight blasting without chambering as the most direct and safest method. The other method would require a smaller drilling footage per ton and probably less powder, as the holes would be spaced further apart and at greater distances back from the edge, but the oversize rock would be in most cases greatly increased. As a rule limestone drills readily and the drilling and explosives costs are not increased greatly in breaking by closely spaced holes.

Bench blasting for steam-shovel loading offers a greater variety of methods. The methods established by practice are: drilling in detail by small-diameter holes; drilling by small-diameter holes and chambering; drilling by well drills either closely spaced or at greater intervals and chambering, and by powder drifts and large blasts. The size of the quarry, the height of the bench, and the physical characteristics of the limestone are all factors that have to be considered in the selection of methods of drilling and blasting. It is difficult to lay down any fixed criterion, but probably the lowest cost per unit broken is obtained by powder drifts and the highest cost by drilling with small-diameter holes. However, it is to be noted that by the use of powder drifts the amount of blockholing may be greatly increased where a compact, tough limestone is quarried. A softer limestone, full of seams, may yield satisfactorily to this method of blasting. Drilling of 6-in. holes by well drills may answer in the softer limestones, but may not give satisfactory

cost results in the hard compact formations. Drilling by hand-held drills is a satisfactory method for the compact, hard limestones and produces the minimum of oversize, resulting in a minimum of bulldozing and blockholing. It is applicable to low benches not exceeding 20 ft. in height, but can be applied to higher quarry faces by carrying down a series of smaller benches. Mounted drills (tripod) have been used in quarrying benches up to 70 ft. in height by resorting to the expedient of working from the pile of broken rock in drilling the face holes in the bench.<sup>2</sup>

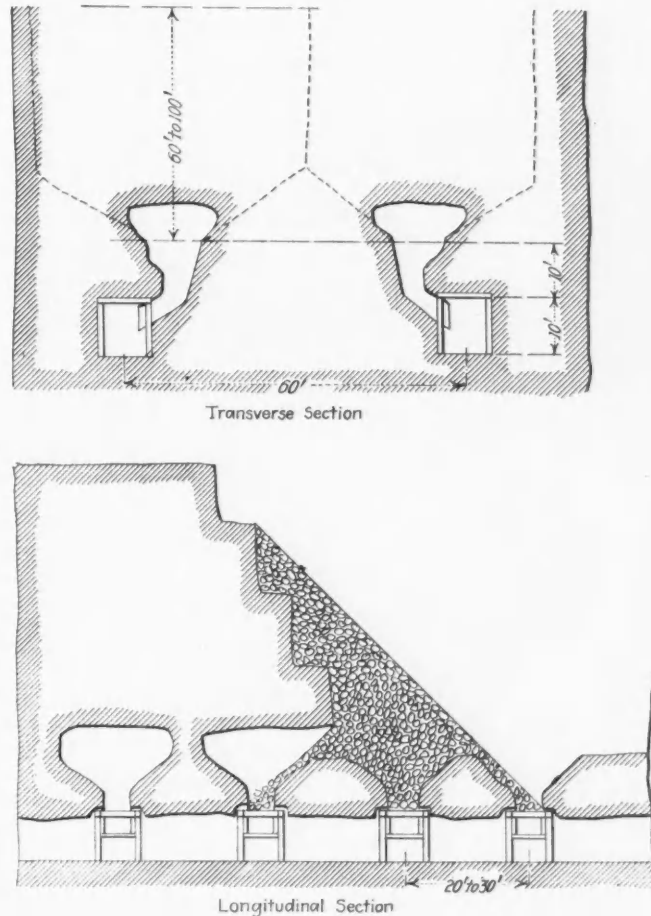


Fig. 3—Quarrying and chute loading in tunnels

The equipment requirements of limestone quarries are comparatively simple and are enumerated as follows:

*Small Quarries*—Compressor, pipe lines, hose, hand-held drills, drill steel; small tools; drill-sharpening shop, cars, track; powder magazines; blasting shelters.

*Large Bench Quarries*—Compressor, pipe lines, hose, hand-held drills, drill steel, power shovels, cars, track, locomotive (steam or gasoline), drill sharpener; powder magazine and blasting shelters; water system, drill-sharpening shop, repair shop.

*Glory-Hole and Tunnel Loading*—Compressor, pipe line, hose, hand-held drills, drill steel, sharpener, small tools; drill-sharpening shop, cars, track, locomotive (storage battery or gasoline); chute gates, grizzlies; powder magazines and blasting shelters, water system, and repair shops.

<sup>2</sup>"Breaking Ore at Utah Copper"; *Mining Journal-Press*, Vol. 118; p. 645; "Recent Developments in Open-Pit Mining," by Robert Marsh, Jr.; *Mining Journal-Press*, Vol. 119; p. 643.

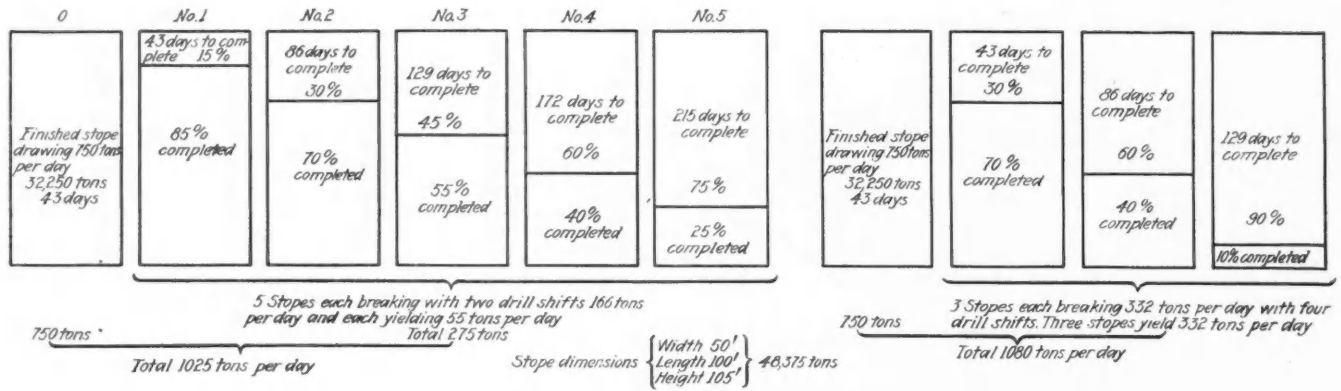


Fig. 4—Production from shrinkage stopes

In small quarry operations a single bench may represent the two divisions of the work, blasting and loading. One part of the face will be in process of drilling and blasting and the other will be loading out. In larger quarries where a long face is available the drilling will be followed by blasting and this in turn by loading out. If a short face only is available this will be divided into three parts, one drilling, one ready for blasting, and the third being loaded out. Blasting is done at the noon hour or at the close of a shift. Blockholing is done at intervals when necessary.

In tunnel loading and glory-hole operations two pits or tunnels enable an orderly sequence of operations to be maintained. In one loading out is in progress and in the other drilling and blasting. Where blockholing is done in the pit, it is not desirable to draw from the glory-hole while this work is in progress. To insure continuity of production it may be necessary to have a minimum of three glory-holes available, as raises sometimes hang up and such stoppages may require considerable time before they are removed.

UNDERGROUND MINING OF LIMESTONE

Three methods of mining limestone are worthy of consideration, shrinkage stoping,<sup>3</sup> underhand stoping and room-and-pillar mining. The first two admit of chute loading and the third method may entail the use of mechanical loading or, in case of size selection or small tonnages, hand loading. The dimensions of the shrinkage stope will be determined by the size of the deposit, its lay, and the physical characteristics of the limestone. The shrinkage stope should be long, so that one end can be completed and ready for drawing while the other end is in progress. The other alternative is to divide long stopes by pillars and to drill and blast in one while the other is being drawn, pushing the work to completion according to a schedule figured on the basis of daily production and the number of drills in operation. As an example, assume stopes 100 ft. long, 50 ft. in width, 150 ft. between levels with 20-ft. top pillars and hopper bottoms 25 ft. above the level floor, giving a stoping height of 105 ft. or 48,875 tons to the block. The finished stope would contain 32,250 tons and the stope would produce during stoping operations 16,625 tons. Assume one stope to be finished and to be drawn at the rate of 750 tons per day and five stopes to be mining. The degree of completion of each stope is shown in the Fig. 4. The

longitudinal section of a stope is shown in Fig. 5. The total output is 1,025 tons per day, each of the working stopes breaking 166 tons and producing 55 tons per day. Stope No. 1 would be completed by the time No. 0 would be drawn and would then be ready to supply 750 tons per day while No. 6 stope was started and No. 7 stope prepared for starting. This would give ten drill shifts on stoping and two drill shifts in cutting out or preparation, with a time interval of forty-three days for the preparation of a stope. Thus, twelve drill shifts per day would be necessary under the assumptions given. The number of operating stopes could be reduced by concentrating more drills in each stope and completing it within a shorter time. A drill footage of 80 ft. per shift has been assumed. As high as 140 ft. per shift has been made. It is obvious that with higher drill footages than assumed fewer stopes would be required, as shown in the lower sketch in Fig. 4.

Underhand stoping admits of two variations. In one a room is opened out on a level and a breast is developed by raising up to the upper level and cutting out from this level below a pillar or horizontal rib. The breast is carried by a series of benches, the height of each bench being determined by the depth of drilling. Ten feet is a convenient height. The starting raise is offset from the lower drift and carried up to the upper drift. The raise is extended out from the top to the limits of the rooms and benched down to the lower level. Cutting-out benches are extended from the upper drift to both walls of the room, and benching can be started from the top across the width of the room. Levels and cutting-out benches are drilled with mounted drills. Stripping down of the raise and benching is done with hand-held drills. Loading out can be done by hand or preferably by one of the mechanical loaders. By using closely spaced drill holes, 3 to 5 ft. apart and from 3 to 4 ft. back from the edge, and low-

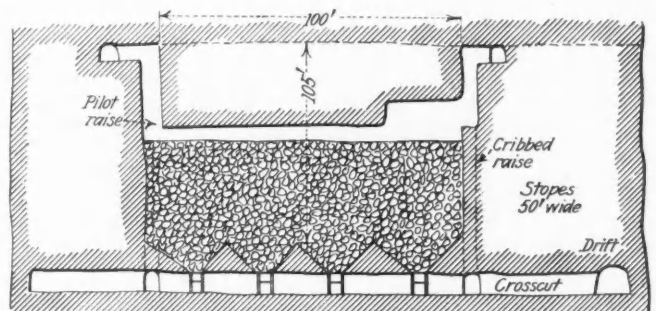


Fig. 5—Longitudinal section of shrinkage stope

<sup>3</sup>"Mining Limestone by Shrinkage Stopes," by A. B. Parsons; *Mining Journal-Press*, Vol. 118; p. 605; "Mining Limestone at Shingle Springs," *Mining Journal-Press*, Vol. 119; p. 1001.

density explosives the rock can be broken small, which will facilitate loading and reduce the amount of block-holing and sledging.

At least two rooms are necessary, in one of which drilling and blasting will be under way and in the other of which loading out will be in progress. A third room should be in course of preparation. The width and height of the room are determined by the physical characteristics of the deposit and its self-sustaining properties. In dense compact rock, wider rooms are permissible and in more or less broken fissured and weak ground the method becomes inapplicable. In ground of the latter character consideration should be given to caving methods.

Assuming a room 50 ft. wide and 60 ft. high it would require 10 drill shifts and 800 ft. of drilling to advance the faces and cutting-out benches 4 ft. This would yield 1,020 tons. With five drills in operation, it would require two shifts to drill and break 1,000 tons. With three rooms in operation, two drilling and one loading out, on a one-shift per day basis, an output of 1,000 tons per day could possibly be maintained with mechanical loading equipment. If a single loader were operated on a basis of two shifts per day, its loading duty would have to be 500 tons per shift. With hand loading at the rate of fifteen tons per worker per shift, it would require sixty-six man shifts to load out 1,000 tons. With two shifts operating and two rooms loading out, seventeen workers would be required in each room per shift for loading. Two parallel tracks would be necessary in each room for either hand or mechanical loading. The track work would require additional labor.

By opening out the rooms above the lower drift and using the loading system described under tunnel loading or by chute loading as shown in Fig. 6, the number of workers could be reduced to twenty-five or less, but more rooms would necessarily have to be available for loading. The estimate is four rooms on a one-shift basis or two rooms on a two-shift basis per day. This would require 250 tons per shift per room to be loaded out by six or seven workers. In the case of chute loading from four to six workers would be required.

A rough estimate of cost on the foregoing basis indicates that mechanical loading would be about one-quarter that of hand loading and drift loading would be intermediate and about 1.5 times that of mechanical loading. Chute loading would probably be about the same, or slightly less than mechanical loading. The maximum capital input would be required for mechanical loading and the least for hand loading. There is not much doubt that, where rooms of sufficient width can be operated, mechanical loading is the most economical and where narrow rooms are necessary chute loading would obviate the use of a number of small loading machines, with a decrease in cost and an increase in simplification.

#### CAVING IS WORTH CONSIDERATION

Caving, both in open pits and in underground operations, offers possibilities where there exists a general weakening of the rock mass by bedding planes and fracture planes. Undoubtedly this condition is not general, as in those limestone deposits which I have studied no such conditions exist and where there is weakening it is essentially local. Granted that there are examples where caving can be seriously consid-

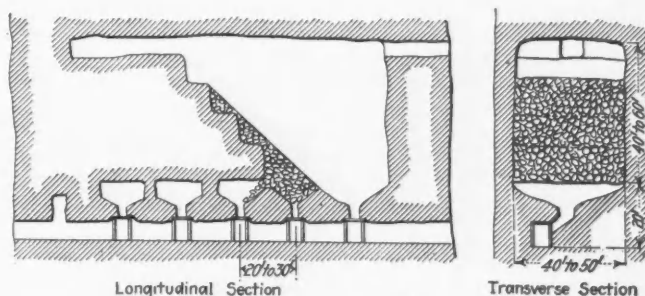


Fig. 6—Chute loading in rooms

ered, the method is relatively simple. Powder drifts are placed at regular intervals of 30 to 50 ft. normal to the face of the bench and back from the toe of the bench, 30 to 50 ft., and 10 ft. below the shovel level. These proportions would answer for a bench height of 80 to 100 ft. Black powder or low-grade blasting powder in conjunction with a small proportion of 60 per cent dynamite as a primer charge and electric exploders would be used.

The alternative method of driving crosscuts normal to the bench from a drift paralleling the bench, and drilling and blasting the pillars between, might be successful in some instances, but does not offer much chance of success in most cases, as the primary condition for successful caving necessitates the drawing of the rock from beneath the bench, which is impracticable in power-shovel loading. The application of block caving to underground mining of limestone, on the other hand, is worth consideration where shrinkage and underhand stoping are inapplicable on account of general weakness in the rock mass. A modified branch raise system is suggested, but it is doubtful whether it could be applied at a sufficiently low cost to warrant its use. Viewed in a general way, the application of caving to surface or to underground operations is of doubtful practicability.

Two general articles have appeared as publications of the American Institute of Mining and Metallurgical Engineers, dealing with the production of limestone as an engineering problem, one by J. R. Thoenen, "Limestone Production as a Mining Problem," and the other by C. C. Griggs, "Engineering in Limestone Production." Both papers are of interest in that they point out the importance of systematic working. Charles E. van Barneveld's "Mechanical Underground Loading in Metal Mines" contains information on power shovels for underground service and also exemplifies loading in certain limestone mines. These examples are suggestive. The particular reference is: Case 16 to 20, inclusive, beginning at page 561.

#### British Mining Tin in Siam

Tin-mining companies working and prospecting in the Siamese portion of the Malay Peninsula number more than twenty in all, and with one or two exceptions are of British nationality with head offices in Penang or London. According to official records a total of 44 mining leases, covering 3,967 rai (1,587 acres) and 11 temporary mining leases of 407 rai (163 acres) were issued during the last quarter of 1924, when production amounted to 35,836 piculs (1 picul = 133½ pounds).

## A New Addition Reagent for Electrolytic Refining

*Waste Product of the Paper Industry Is an Improvement on Glue,  
Which It Replaces Weight for Weight—Comparatively  
Low Cost Permits Substantial Economy*

THE ADVANTAGES of addition reagents in the electro-deposition of metals have been known for many years, and with the growth of the electrolytic refining of metals the subject of addition reagents has been an important one. In practically all of the electrolytic refining processes it has been found necessary to use some substance of this nature. Technical literature is replete with articles on addition reagents and their effects. Many theories as to their action have been advanced, but there is no agreement on any one particular theory. The substances which have been tested for this use probably run into the hundreds, but the only material which has found almost universal use in electrolytic refining is glue. In the electrolytic refining of tin, glue and other addition reagents have been used.

### SUBSTANCE IS CALLED "LIGNOL" AND "GOULAC"

A patent, No. 1,544,726, has just been issued to Frank F. Colcord and assigned to the U. S. Smelting Refining & Mining Co., Inc., for the use of a new addition reagent in the electrolytic refining of lead, copper, and tin with acid electrolytes. (Patent No. 1,544,726, abstracted in *Mining Journal Press* of July 18, 1925.) This reagent is a sulphite liquor concentrate comprising the solid or viscous materials obtained from the waste sulphite liquors produced by treating certain woods with sulphite solutions. The evaporation of these liquors leaves a colloidal substance which may be designated as sulphite lignose. The principal constituents of this substance are, or may be, lignin sulphuric acid, lignin sulphonic acid, aldehyde, sulphonic acids, furfural, and plant sugars. This substance is cheaply made from the waste sulphite liquors produced in the manufacture of paper pulp, and is known under the trade names of "Lignol" and "Goulac."

### ECONOMY IN POWER CONSUMPTION EFFECTED

The new reagent has been found to be a complete substitute for glue in the refining processes mentioned, and, because of its comparatively low cost, a substantial economy may be accomplished by its use. The replacement of glue may be accomplished weight for weight, or it may be used in conjunction with glue. This latter property permits the replacement of glue in the electrolyte with the new reagent without the necessity of a replacement of the entire electrolyte. Often, with the use of the new addition reagent, a superior cathode deposit is obtained, increasing thereby the efficiency of the operation and resulting in an important economy in power consumption. In refining metals, where precious metals and (or) deleterious impurities are present in the anode slime, the superior cathode deposit offers less opportunity for floating slime to deposit on the cathode, resulting in the production of purer cathodic metal and a smaller loss of precious metals. No accumulation in the electrolyte of substances which might finally cause the deposit to form non-adherent and crystalline deposits has been noted with this addition

reagent, as has been true with some of the addition reagents that have commonly been used heretofore in metallurgical work.

### APPLICABLE TO ELECTROLYTIC LEAD REFINING

The use of this addition reagent has given particularly excellent results in the electrolytic refining of lead with a fluosilicate electrolyte. The common addition reagent heretofore has been glue, but complete substitution of this new reagent can be effected. When used alone, it is added daily to the electrolyte in the form of a water solution at the rate of 1 to 2 lb. of the dry reagent per ton of lead produced. When used in conjunction with glue, the total quantity of the reagents added daily is 1 to 2 lb. per ton of lead produced, with the glue and the new reagent varying in such proportion as is desired. The electrolyte containing glue has usually had a somewhat cloudy appearance, but the use of the new addition reagent, either with glue or alone, has given clear, amber-colored electrolytes which may be partly the reason for the lesser deposit of precious metals or deleterious impurities on the cathode.

The reagent acts equally well in the refining of lead with electrolytes of fluosilicates and fluoborates, or fluoborates alone. It may be used also in electrolytes of lead cresol-sulphonate containing free cresol and sulphonic acid or in electrolytes of mixed cresol-sulphonic and fluosilicate electrolytes which contain free acid.

### FINELY CRYSTALLINE AND TOUGHER DEPOSITS FORMED

In the refining of copper the new reagent has a replacement value for glue of at least weight for weight; and in addition an excess has no detrimental effect, which is not true when using glue in electrolytic copper refining. The new reagent also imparts a higher throwing power to the electrolyte and forms smooth, finely crystalline and tougher deposits than glue, and nodules and dendritic crystals are restrained. The new reagent may also be used in the electrolytic refining of tin with sulphuric acid, sulphuric acid and sodium sulphate, or fluosilicate electrolytes, in conjunction with other addition reagents, especially replacing glue when used with other reagents. Glue when used with either cresol, aloes, or nicotine sulphate has given in practice satisfactory deposits. The new reagent can, however, be substituted for glue in any of these combinations, effecting thereby superior deposits in that they are less crystalline, more adherent, and denser. The noteworthy feature of the discovery is that of the many substitutes which have been tried this is one of the very few which has found practical application. Many of the other substitutes might have found practical application if it were not for their prohibitive cost, while this reagent, with a cost of 2½ to 3c. per lb. against a cost for glue of 10 to 18c. per lb., must certainly make an appeal to the electrochemist.

## Discussion

*"Engineering and Mining Journal-Press" is not responsible for statements or opinions published under "Discussion." In many cases the views expressed are diametrically opposed to editorial policy and belief.*

### Why Prices Are High

THE EDITOR:

Sir—In the United States, nowadays, the principal reason why prices are high is because gold has been demonetized by all the nations of Europe, practically, owing to conditions brought about by the late war—conditions that compelled such nations to resort to credit currencies; which action, of course, lessened the world's demand for gold for monetary purposes and thereby made that metal less valuable in terms of other commodities—that is, in comparison with them. "Demonetized" means withdrawn from use as money; gold is still the standard of exchange value or swapping value, but it is used as money only to a limited extent, both in the form of coin and as gold certificates.

The United States is on a gold basis—that is, gold is our standard of exchange value; and, because it has become less valuable, it requires more of it now to buy any particular amount of a commodity than it did when it was more valuable. This may be shown by a simple illustration: In this country, in 1896, nineteen and one-half grains of gold (84c.) would buy a bushel of wheat, whereas during this year it has at times taken double that amount, or 39 grains (\$1.68), to purchase a like quantity.

That the effects of the supply of and the demand for gold and silver, either or both, upon their monetary values may be better understood by the reader, it seems best to refer to history and point out what has happened regarding the production and monetary use of these metals in comparatively recent times.

Briefly, in 1792, when our first mint law was passed, silver was adopted by our government as the standard of exchange value, and the dollar of 371.25 grains of fine silver was arbitrarily chosen for our standard unit of value. But, because of our monetary legislation in 1837, gold became our standard of value, in place of silver, and 23.22 grains of gold was made our standard unit of value. That legislation was further fortified and confirmed by the Congress in 1853, twenty years prior to the so-called "Crime of 1873."

The world's production of silver in 1860 is estimated to have been a little less than 30,000,000 oz.; in 1870, 43,000,000 oz.; in 1871, 63,000,000 oz.; in 1881, 79,000,000 oz.; in 1888, nearly 109,000,000 oz.; and in 1898, 169,000,000,000 oz. Early in the present century the production increased, reaching 242,000,000 oz. in 1923, or more than eight times the amount produced in 1860.

It so happened that during the latter part of the nineteenth century many nations of the world demonetized silver and adopted a gold standard. How did such actions affect the price of silver? The well-known

economic law of supply and demand thereupon asserted itself, and, accordingly, the combination of a large increase in the supply of, and a great decrease in the demand for, silver played havoc with its exchange value, as expressed in its price. To illustrate: In 1860, silver was quoted at \$1.35 (31.347 grains of gold) per fine ounce; in 1870, \$1.33 (30.88 grains of gold); in 1880, \$1.14 (26.47 grains of gold); in 1890, \$1.04 (24.15 grains of gold); and in 1900, \$0.62 (14.40 grains of gold), a shrinkage in price of more than one-half in the relatively short period of thirty years.

Owing to this great depreciation in its price—i.e., the value of silver as expressed in terms of the standard, gold—the silver producers in this country and their political allies importuned our government to "do something" to restore silver to its coining value, that is, \$1.29 per oz. Very many people, in their innocence, seemed to imagine it would be only necessary for the government to pass a law saying silver was worth \$1.29 per ounce, and it would be worth that price.

During the period between the passage of the Bland-Allison Act, in 1878, and the repeal of the Sherman Act, in 1893, a prodigious amount of argument in the way of talking and writing on the subject of restoring the price of silver to its coining value was indulged in by the public, as well as by the Congress. Sundry measures for marketing silver were considered and three were tried: (a) the Bland-Allison measure, under which something more than 378,000,000 dollars were coined; (b) the coinage of the Trade dollar, of 420 grains,  $\frac{1}{16}$  fine, by which it was hoped to make an outlet for a large amount of our surplus silver in China and the East, but only 35,965,924 of such dollars were coined; and (c) the passage of the Sherman Act, providing for the purchase of as much as 4,500,000 oz. of fine silver per month—54,000,000 oz. per year, or about one-third of the world's production at that time—which enactment was repealed in a little more than two years after it was passed (during which time 187,027,345 dollars were coined), because it had the effect of inflating our currency and thereby driving gold out of the country to an extent that threatened to force us into bankruptcy. Of course, such foreign countries as had stocks of silver for sale were eagerly waiting for us to put up its price so they could dump their surpluses into our hands, in exchange for gold or its equivalent in other commodities.

So much, very briefly, for the action of the law of supply and demand on the exchange value of silver; that is to say, its price in terms of the standard of value, which, in this instance, happened to be gold.

Now let us take up gold. We find that in 1860 the world's estimated annual production of gold was 6,486,262 fine ounces, and that it averaged a little less than that amount yearly for the following thirty years. Then, owing to discoveries of the metal in Africa and the Klondike, the production increased from 7,000,000 oz. in 1892 to 22,700,000 oz. in 1915. By that time the World War began to affect trade and commerce, and

European countries had to begin the use of credit currencies at home—indoors, as it were—which greatly diminished the monetary demand for gold and, very soon, gold was practically demonetized all over the world. However, it must not be overlooked that, *internationally*, gold has been and is the *standard* of exchange value; and though international balances may have been settled in foreign exchange, such exchange has been adjusted on a gold basis.

The act of March 14, 1900, makes it mandatory upon the Secretary of the Treasury to maintain all of our various kinds of dollars (?) equal in value to our real or standard dollar—25.8 grains of standard gold—and the Secretary is empowered to purchase the amount of gold necessary to do that by selling government bonds: thus, the United States alone has been on a gold basis before, during and since the war. Of the European nations, Great Britain has, quite recently, returned to a gold basis.

The use of inconvertible credit-currency invariably results in inflation, and inflation invariably means higher prices in all countries which indulge in that luxury; for it is a luxury, and a very expensive one, too.

Incidentally, it may be interesting and instructive to consider, just here, the different kinds of things that are popularly called "money" in the United States and which now constitute our "currency" or "media of exchange."

Briefly and in round numbers, our stock of so-called "money" on March 1, 1925, amounted to \$8,400,000,000, of which total \$6,154,270,000 was "outside of the Treasury." Of this latter amount, \$1,350,000,000 was held by Federal Reserve Banks, leaving \$4,804,208,000 "in circulation," equivalent to \$42.29 per capita, for 113,600,000 population. This amount in circulation is made up of gold and gold certificates, \$1,376,826,000; silver dollars and silver certificates, \$422,700,000; paper currency or credit money, \$2,750,000,000—consisting entirely of government notes and bank notes, no gold certificates or silver certificates being included—and \$256,500,000 in subsidiary silver. However, our silver dollars and silver certificates, properly, should be classed as credit-currency because their value consists of practically 50 per cent bullion value, as expressed in terms of gold, and the remaining 50 per cent is government credit value; which would make a total "paper" circulation of \$3,172,700,000, and \$1,376,825,614 in gold—that is, \$3,172,700,000 of *convertible* currency and \$1,376,825,614 of gold; plus \$256,500,000 in subsidiary silver—"small change." The "convertible" currency is supposed to have sufficient gold and other commodities behind it to make it redeemable—in other words, "as good as gold," and, therefore, it is equivalent, in its effect on prices, to just so much more gold in circulation. If it is really "redeemable" the present seems to be a very good time in which to convert it, by using our "excessive" (?) stock of gold for that express purpose, and dispensing, absolutely, with our credit-currency (government notes and bank notes), but retaining our silver dollars and silver certificates. The gold value of the silver in the silver dollars, at 64.64c. per ounce, is a reserve fund of 50 per cent of their face value, and by putting aside another 50 per cent (\$211,350,000) in gold their *individual bullion value*—that is to say, their *commodity value*—will be equivalent to that of the gold dollar.

As was stated in the beginning, prices are high,

principally, because gold has really been demonetized and credit-currency has taken its place for money purposes. Gold, however, is still used as the standard of value internationally, as well as in this country. But, because its monetary use has been so very largely usurped by credit-currency, the demand for it in the markets of the world has not kept up with the supply, and, therefore, its value has largely depreciated, more of it being required now than previously to buy a stated quantity of any particular commodity; hence, prices are said to be high.

W. DE L. BENEDICT.

New York City.

### Tribulations of a Mine Developer

Sir—I have read with great interest "The Story of Tintic Standard. How E. J. Raddatz Overcame Serious Obstacles and Developed the Outstanding Silver-Lead Mine in the United States," as written by Arthur B. Parsons, in *Mining Journal-Press*, of Aug. 8. Mr. Parsons' description of Mr. Raddatz's early experience in connection with the Tintic Standard seems so like my own that I have thought perhaps Mr. Raddatz may be interested to hear a little bit of my hard experience in this part of British North America.

To begin at the beginning, I started my prospecting career in 1875, but nothing uncommon to prospectors happened till 1905, when my Indian guide took me into a country 15 miles from tidewater, and showed me a number of large pieces of copper-bearing rock, some of them hundreds of tons in weight, and there were hundreds of them within a radius of two miles east and west and about 300 yards wide north and south. Samples taken from many of them have assayed from 3 to 8 per cent copper, with small quantities of gold and silver.

In 1911, after six years of talking and persuading some of my immediate friends, I finally succeeded in getting them to join with me in "staking out," and later obtain from our government the exclusive right to twenty-seven claims, or locations, thirteen and one-half square miles, along the mineral belt. In 1912 we did considerable surface prospecting, and found and located a large "outcrop" of copper and iron, in place, about four miles to the west of our stake claim, by the side of the Great Gull Lake.

In 1917 we formed a local company and incorporated under the laws of Newfoundland, capitalized at \$200,000. Since then we have proved a large body of copper ore on one of our locations by shaft sinking, crosscutting, and diamond drilling, over an area 1,400 ft. long east and west, with an average width of 57 ft., and 500 ft. deep—the extent of our boring giving an average assay of between 2.75 and 3 per cent copper.

On another location of this Great Gull Lake group we have rich ore, vein matter which gave assays from 9 per cent up to as high as 17 per cent copper. Notwithstanding this, the majority of men that I have met are of the "Doubting Thomas" family.

If Mr. Raddatz or some of his plucky friends were near me I would take him or them to *another* property in which I am largely interested, where I can take samples from several veins that will assay 5 per cent copper, 8 per cent antimony, 6 per cent bismuth, and 39 oz. of silver to the ton of 2,200 lb.

Mr. Raddatz's ore was 1,000 ft. under "worthless rock," but his friends, like himself, were not of the

"tenderfoot," nor of the "Doubting," family; hence his success. But my friends argue, notwithstanding the fact that they can see the ore at "grass roots." "It is not likely," they say, "to continue at depth; it will 'cut out,' and we will lose our money, if we invest, instead of getting rich quick." "He that complies against his will is of his own opinion still;" and notwithstanding that I can show from drill records anywhere from two million to four million tons of ore assaying from 2.75 per cent to 3 per cent copper, on one location and at a depth of only 500 ft.—a depth that would be considered "hen-scratching" in your country. T. E. WELLS.  
Little Bay, Newfoundland.

### Control of the Changsha Smelter

THE EDITOR:

Sir—In the July 4 issue of the *Mining Journal-Press* there appeared an editorial titled "China Awakening," in which you have made an error by saying "At Changsha also is the country's only modern lead smelter; this is under Japanese control."

As a matter of fact, the lead smelter situated outside the South Gate of this city is a property of the Hu-nan Provincial Government. It has no outstanding debt or foreign interest. Japanese have not control over it, and even have established no business connections with it as yet.

This plant was built about eighteen years ago and was rebuilt in 1917. It is now operating two small blast furnaces of 30x48 in. dimensions at the tuyère level. These furnaces are manufactured by the Allis-Chalmers Co., of Milwaukee. The total capacity of this plant is about 400 tons of 60 per cent lead-silver ore. It produces about 200 tons of pure lead, 11,000 oz. of 999 silver, and a very insignificant amount of copper matte monthly. The recovery of metals is low, on account of lack of dust-catching equipment, and the high percentage of zinc in the ore—sometimes as high as 10 per cent. It also makes cp. litharge, test lead, and lead foils on demand. The ore smelted comes chiefly from the Swei-Kow-Shan lead and zinc mine, which is also a Hu-nan governmental property, being the largest and most modern metal mine in this country.

Mr. B. C. Tsen, a graduate of the Colorado School of Mines, is the general superintendent of this mine. Many improvements and changes have been made and much money has been saved by this able gentleman since he came to take charge of the property. The mine is now making a profit of more than a million dollars annually.

Besides, I am glad to inform you that not only this mine but also the entire mineral industry in this province is operated by domestic capital only, having no foreign interest at all. TSE Y. CHOW.

Changsha, Hu-nan, China.

### Copper Slag for Concrete

THE EDITOR:

Sir—I have recently noticed an article on the use of copper furnace slag for making concrete. At Copperhill, Tenn., and at Ducktown granulated slag has been used for many years, in place of sand, in concrete, and with satisfactory results. At Braden we poured perhaps 20,000 cu.yd. of concrete, using granulated slag

in place of sand. As the difference in price was at least \$1 per cu.yd., this meant quite a saving. In order to convince the management I wrote back to Tennessee for a record of use there, and we also tested the granulated slag against standard Ottawa sand. In every case they showed higher strength than the sand. However, the slag is very heavy, and as our coarse aggregate was lighter, we had considerable trouble in keeping the slag from settling to the bottom of the forms. The concrete was not handsome, but it was certainly sound.

New York.

W. W. TAYLOR.

### Revision of the Mining Law

THE EDITOR:

Sir—In going through the accumulated numbers of the *Mining Journal-Press* I came across the editorial in the Aug. 1 number entitled, "Troubles With the Mining Law," which I would pass without comment were it not evident that your information on a very important subject is not complete.

If you will examine the files of Representative Arentz, of Nevada, who had charge of and introduced the bill, the demise of which you lament, you will find that the "ribald animosity of the booster mining press" was not the cause of the death of said bill, but due to the intelligent consideration of the subject by those who had first-hand knowledge.

"Painstaking plans for revising and improving the mining laws" they may have seemed upon a cursory reading, but a careful consideration of the bill showed it not what its sponsors thought it to be, but the very opposite. I do not know who its authors were, but I would advise them to devote their talents to something more fruitful.

A. L. BEARDSLEY.

Taylorville, Calif.

### Opportunity in Arkansas

THE EDITOR:

Sir—The recent article in *Mining Journal-Press* on manganese deposits in Arkansas, written by Mr. Tom Shiras, might well have included mention of the district known as the Caddo Gap and De Queen Triangle. In this district are found deposits of manganese, tripoli (Professor Branner vouches for the quality), phosphate, graphite, and china clay. There are also ores of tin, lead, and copper, and barytes of good grade. Slate that will stand any test is found, and also large deposits of calcareous novaculite, the latter being suitable for all kinds of concrete work as well as for paving. This material when used in three sizes will make a pavement and, with a small covering of crude oil affords an excellent highway.

This district is lying dormant awaiting development. Heretofore lack of transportation has been the great drawback, but a program of road building is in hand and a good highway into the district will soon be finished. This, it seems to me, should remove the only obstacle to extensive development. As you stated in an editorial in the issue of Aug. 22, it is necessary for the public to risk its money if the search for ore in promising districts is to be continued. I fully believe that funds for development in this part of the country will be forthcoming.

GEORGE W. SCOTT.

Table Gap, Arkansas.

## Consultation

### Grade of Bauxite

"How rich must a deposit of aluminum ore (bauxite) be to pay for mining? Is there a market for it in large quantities?"

The question of grades of bauxite is quite a broad one, depending upon whether the ore is to be used for the metal industry, chemicals, abrasives, refractories, or cement. The analysis of a good grade of metal ore should be about as follows:

	Per Cent
Loss on ignition .....	around 28
Al <sub>2</sub> O <sub>3</sub> .....	from 55 to 63
SiO <sub>2</sub> .....	below 5
Fe <sub>2</sub> O <sub>3</sub> .....	below 8
TiO <sub>2</sub> .....	below 3
Soda and potash nil or only a trace.	

The bauxite may be anywhere from pale pink to red in color and from a clay-like formation to a hard rock in texture. However, even the hard varieties may be whittled without dulling a knife, unless the silica content is high.

The chemical and abrasive trades want an ore low in iron, preferably below 2 per cent, while the manufacturer of cement can stand up to 25 per cent of Fe<sub>2</sub>O<sub>3</sub>.

Bauxite is most often confused with impure kaolins, and one can nearly always find kaolin around a bauxite deposit, but the reverse is not always true. In the Guianas the bauxite is underlaid with impure kaolins.

If kaolin is rubbed in an agate mortar with a little water it at once becomes slippery and the sand grains in it scratch. If, however, bauxite is treated in the same way, it will grind with difficulty and will have a tendency to stick to the mortar so tightly that it will have to be scoured out.

The loss on ignition is the best quick test for good bauxite. Dry the material to a constant weight below 212 deg. F., then heat to a cherry red with a blow torch, and find the difference in weight. If it runs below 25 per cent, the material is likely to contain too much silica to be of value.

The Aluminum Company of America, Pittsburgh, Pa., is the largest producer of aluminum in the United States and in the world. It has its own deposits of bauxite, however, though it may not be averse to acquiring others. The Norton Company, Worcester, Mass., might also be interested.

### Uses of Tantalum

"Can you tell me the uses of tantalum and give me some information concerning the potential market for ores of this metal?"

Tantalum is suitable for the manufacture of dental instruments and dental spatulas, surgical tools, pen points, filament wire for incandescent lamps of thermionic tubes, plates and support wires for thermionic tubes, hypodermic needles, cathodes for use in electrochemical analysis, analytical weights, laboratory dishes, spatulas, stirrers and other devices in which a perfectly acid-proof metal would be more suitable than porcelain or glass. Other uses are: parts of scientific instruments, acid-proof pumps and parts of commercial chemical equipment, and electrolytic valves for the manufacture of rectifiers for obtaining direct current from alternating-current sources, as in battery chargers, electrolysis apparatus, radio, and similar uses.

The Fansteel Products Co., at North Chicago, is having good success in developing a market for tantalum articles, and although the actual amount of ore now used is small, the prospects for increased requirements in the future are excellent. Probably, at present, the annual world's consumption is not over ten tons of ore, containing about 56 per cent metallic tantalum.

According to David Taylor, writing in *Mining Journal-Press* of May 24, 1924, ores of tantalum are known to exist in many mineralized localities throughout the world, but have been produced in commercial quantities in only a few of them. This is probably because there has been no demand for any quantity and there has therefore been no inducement for development. The only deposits from which there has been any production in the United States are near Keystone, S. D. This ore is a columbite, and as shipped contains roughly about 35 per cent tantalum pentoxide and about 30 per cent columbium pentoxide.

Ore containing the highest percentage of tantalum (disregarding columbium and associated metals) is found in very remote regions of Australia. A few tons of it are mined and shipped to London, where it is held in warehouses and sold as occasion offers, and the mine is then closed down. When the London stock runs low the mine is opened up again and a new batch of ore is sent over to London, and the mine again closed down until the next order comes in.

The production of uniform pure metal in large enough sheets or rods to give it an extended use in this field was not accomplished until about 1921, when Dr. Clarence W. Balke, in the laboratories of the Fansteel Products Co., developed a new process which is now in use, and under which a uniform and pure metal can be produced in any size sheet or rod required.

### Plants Using Differential Flotation

"Can you tell me the principal concentrating plants in the United States, Canada, and Mexico using preferential or differential flotation?"

The following is a list of a number of plants practicing differential flotation. While the list is not complete, it was prepared by the U. S. Bureau of Mines and represents typical and important plants treating the various complex ores in the respective districts, named:

#### *Plants Treating Complex Lead-Zinc or Lead-Zinc-Iron Ores*

Consolidated Mining & Smelting Co. mill, Kimberly, B. C.  
Anaconda Copper Mining Co. mills, Anaconda, Mont.  
Timber Butte mill, Butte, Mont.  
Bunker Hill & Sullivan mill, Kellogg, Idaho.  
Federal Mining & Smelting Co. Morning mill, Wallace, Idaho.  
Tamarack & Custer mill, Wallace, Idaho.  
Constitution Mining Co. mill, Kellogg, Idaho.  
Simon Silver Lead Co. mill, Simon, Nev.  
International Smelting Co. plant, Tooele, Utah.  
Utah-Apex plant, Bingham, Utah.  
Combined Metals Reduction plant, Bauer, Utah.  
U. S. Smelting & Refining Co. plant, Midvale, Utah.  
Park City Mining & Smelting Co. plant, Park City, Utah.

#### *Plants Treating Complex Copper-Iron Ores*

Anaconda Copper Mining Co., Walker mill, California.  
Tennessee Copper & Chemical Co. plant, Copperhill, Tenn.  
Old Dominion Copper Co. plant, Globe, Ariz.  
Moctezuma Copper Co. plant, Nacozari, Mexico.  
Ducktown Sulphur, Copper & Iron Co. plant, Ducktown, Tenn.  
Britannia Mining & Smelting Co. plant, Britannia Beach, B. C.



# News of the Week

The Mining News of ENGINEERING AND MINING JOURNAL-PRESS is obtained exclusively from its own staff and correspondents, both in the United States and in foreign fields. If, under exceptional conditions, material emanating from other sources is published, due acknowledgment and credit will be accorded.

## Summary

**B**UREAU of Mines advisory committee to report to Hoover about January 1. Relation of bureau to various branches of mining industry to be thoroughly analyzed.

Graphite industry of Madagascar taking prominent place in world's markets. Largely under French control.

Eagle-Picher Company constructing factory at Joplin. Federal reports good profits from Joplin-Miami operations.

Formerly worked-out mines of South Africa attracting investors; gold production in July shows increases over June.

Proposed bonus on gold of £1 per ounce, in Australia; subsidy for discovery of oil.

A four-months' safety contest at United Verde mine and smelter.

Consolidated M. & S. Company locates claims on Boulder Creek, Ymir, B. C.; Federal M. & S. Co. seeking new mines in British Columbia.

Keeley Silver Mines Company amends by-laws in order to purchase other properties, or shares in other companies; liquid assets \$1,287,000.

Sacramento Chamber of Commerce seeks public land hearing; California mining laws criticized; reclassification of mineral lands proposed.

Proposed merger of Canadian asbestos companies making slow progress. Assets of nine companies involved.

Iron Cap Copper Company shipping high-grade ore. Flotation mill to be installed at Chloride, Arizona.

Silver-lead mines of Mexico taking on new life. New mills under construction.

### Cons. M. & S. Co. Locates Claims on Boulder Creek

#### Federal M. & S. Co. After New Mines—Other Activities in British Columbia

The Consolidated Mining & Smelting Co. of Canada recently located half a dozen claims along Boulder Creek, near Ymir, in the Nelson division of British Columbia. There has been considerable activity in this district recently, and several mines that have been idle for many years are again shipping ore.

The Federal Mining & Smelting Co. has made an offer of half a million dollars for the Bell mine, situated near the Sally mine, which the Federal company recently bought, on Wallace Mountain, in the Boundary district of British Columbia. Duncan McIntosh, who, by the purchase of his partner's one-eighth interest for \$40,000, recently gained sole possession of the Bell mine, refused the offer. Mr. McIntosh said that last year's operation of the mine netted \$60,000 profit and that there is every indication that the mine will yield a profit of at least that amount for many years.

The Pioneer mine, at Cadwallader Creek, in the Lillooet mining division of British Columbia which was reopened by an Ontario syndicate, about a year ago, is developing well and has produced \$25,000 in gold from the last three months operation. A. H. Wallbridge, one of the syndicate that is operating the Pioneer, has bonded the Coronation group, adjoining.

Lessees at the Standard mine, at Silverton, B. C., have made an impor-

### Calumet & Hecla's Improved Smelting Plant

**I**MPROVEMENTS at Calumet & Hecla Consolidated's smelter in the Michigan copper district will be completed, it is expected, before the first of the year. Of the three large units one melting and one refining furnace have been remodeled and are in commission. The third, when completed, will be used for refining the operation of the three permitting the shutting down of fourteen small furnaces. The new furnaces will be supplied with pulverized fuel and the smelting costs, it is estimated, will be cut from 20 to 25 per cent.

tant strike of silver-lead-zinc ore on the No. 8 level, and the mill is running again. This mine, which has returned to the shareholders of the Standard Silver-Lead Mining Co. \$2,700,000 in dividends and their original capital, was considered worked out half a dozen years ago and was turned over to lessees to be cleaned up. Several large bunches of ore were found, and during the last six years lessees have sent more than 1,000 tons of ore and concentrates to the smelter.

The Porcupine Goldfields Development & Finance Co., well satisfied with the development on the 125 ft. level of the Stewwinder mine, at Kimberly, B. C., has started to sink to the 250 ft. level. The company now has three diamond drills in operation, two on the Stewwinder and one on the North Star.

### Public Land Hearing Sought by Sacramento Chamber

#### California Mining Laws Criticized—Red Hill Placer and Alpine Mines To Be Opened

An effort is being made by the department of mines and mining of the Sacramento Chamber of Commerce to secure a hearing in Sacramento, Calif., on the subject of the determination of mineral lands in California. An invitation was sent to the subcommittee of the U. S. Senate Public Lands Committee to hold such a hearing in the near future. In northern California the railroad grants have been a source of difficulty, especially in Siskiyou County, and it is hoped to overcome this by a more specific basis for the determination of mineral-bearing land. A complete reclassification of mineral vs. non-mineral lands is being sought. An endeavor will be made to overcome the interferences with prospecting due to grazing land permits and other forms of land allocation. The effort will be made to obtain a clean cut basis upon which to define and establish mineral land areas and to conserve these for prospecting.

According to local reports, B. B. Smith, Register of the U. S. Land office for the southern district of California, is advocating changes in the present mining laws of California. It is contended that the present mining laws are faulty in that any number of claims can be held by performance of prescribed assessment work on one claim; that descriptions required of a locator

are so general that a claim can be changed without the fact being known to the government; that the mining year, ending July 1, in which assessment work must be completed, allows too much time to the claimholder. The changes suggested are as follows: Within 90 days after discovery assessment work should be done upon each claim and should consist of excavations, shaft or tunnel, of at least 240 cu.ft. in volume, or 4 by 6 ft. by 10 ft. deep. Within 30 days after discovery work has been performed affidavit to that effect should be filed with the County Recorder, identifying the ground with reference to government survey.

#### Placer Claims in Trinity County Leased

The Red Hill placer claims near Junction City, Trinity County, Calif., belonging to the estate of John and Henry Jacob, have been leased for a period of three years to W. H. Metson of San Francisco. The lease entails a royalty of 10 per cent of the gold taken out to the estate and 15 per cent to the mining company furnishing the water.

#### New 20-Stamp Mill in El Dorado County

Machinery for a 20-stamp mill has been received at Auburn, Calif. and will be transported to the Alpine mine, two miles south of Georgetown, El Dorado County. A working crew is to be put to work completing the road to the mine and a mill is to be erected. An ore supply is available in the dumps and underground work is to be resumed.

#### Copper-Zinc Ore to be Handled at Winthrop, California

An accumulation of over 2,000 tons of copper-zinc ore at the Mammoth Copper Co.'s smelting plant near Kennet, Calif., is being shipped to Winthrop, where it will be sent through the flotation mill of the California Zinc Co. Shipments of zinc concentrates from Winthrop for Belgium delivery continue and promise to stimulate the mining of zinc ores in Shasta County.

#### Iron Cap Copper Shipping High-Grade Ore Since Closing Mill

During the second quarter of 1925 the production of the Iron Cap Copper Co., Copper Hill, Ariz., was 1,534,102 lb. of copper, 43,714 oz. of silver, and 27 oz. of gold. Income for the quarter was \$177,487.25 and expense was \$123,503.77. The net cost of copper, including bond interest and taxes, without credit for other income, was below 10c. per pound of copper on a grade of ore averaging 3.8 per cent copper. The mill was closed the last of June, and shipments of high-grade smelting ore are being made at the rate of seventy-five tons daily.

The work of exploring the vein in the adjoining property is of prime importance to Iron Cap. Success would be a strong indication that the large orebody found in the sedimentaries in the Iron Cap property would persist below the diabase sill which appears to have interrupted the continuity of the ore on the 1,400 level.

#### Keeley Silver to Purchase Other Properties

AT THE coming annual meeting of the Keeley Silver Mines of South Lorraine, a by-law will be presented for ratification, permitting the company to buy shares in other companies. At present, the by-laws of the Keeley do not permit the purchase of other properties or shares in other companies, and as there is a substantial cash surplus the company wishes to be in a position to take advantage of any opportunities which may offer. Accompanying the dividend checks for the half yearly dividend of 12 per cent is a statement showing liquid assets amounting to \$1,287,000, of which monies due from the smelter and ore on hand and in transit amounts to \$218,000, the balance being made up of cash and bonds. It is understood that the company proposes to take an option in Gowganda on a property adjoining the Tonopah holdings.

#### New Move in Merger of Canadian Asbestos Companies

W. G. Ross, president of the Asbestos Corporation of Canada, Ltd., has issued a statement concerning the merger negotiations now in progress. He announces that the corporation has purchased the properties and assets formerly belonging to the Bennett Martin Asbestos & Chrome Mines, Ltd., and now held by a corporation known as Thetford-Vimy, Ltd. Should the merger be consummated, the new corporation will control the assets and properties of nine companies.

It is impossible definitely to state the amount of bonds and shares to be issued, but it will not exceed the following: bonds, \$7,370,000; preferred stock, 7 per cent non-cumulative and non-participating, \$7,700,000; no par value common shares, \$200,000.

Though the corporation has agreed to enter a merger, there remain several important conditions to be fulfilled before it is consummated. If these are satisfactorily completed a special general meeting of Asbestos Corporation shareholders will be held to obtain their ratification of the arrangements.

#### Madagascar Graphite Industry Growing

Madagascar's crystalline flake graphite has now taken a predominant position on the world's market, chiefly because of the relatively high cost of production in Ceylon. The general demand is on the increase, and Madagascar producers now receive usually 1,500 to 1,600 francs per metric ton, f.o.b. Tamatave, for 65 per cent graphite, with 15 francs per point above, compared with an average of 600 to 700 francs during the early part in 1924.

There has never been any scientific survey of the actual or possible cost of graphite production in Madagascar, and the variations are obviously considerable. It is estimated that in some

mines, where there is an efficient control of labor and high-grade graphite, with ample washing or separating facilities, the cost at the mine is about 75 francs per ton, not including overhead expenses. At other mines not favorably situated, or inefficiently operated, the cost sometimes runs as high as 400 or 500 francs. Bagging in either instance would cost an additional 100 to 120 francs per ton.

The graphite industry in Madagascar is in the hands of individual colonists and firms, mainly of French nationality. The French firms usually sell to the trade at European prices through their headquarters in France, while the private mine owner contracts and sells directly to the importer in Europe or in the United States at f.o.b. prices, local ports, or c.i.f., ports of destination. As the output is limited by the shortage of labor, it is necessary for producers having large orders to accumulate small lots from different mines and perhaps from different sections. It is understood that the Paris firm Société Mineraux et Metaux is considering the establishment of a graphite-refining plant in the interior and one on the east coast of Madagascar, for the treatment of ore having a low percentage of carbon. In 1924, graphite shipments from Madagascar totaled 11,656 metric tons, compared with 10,768 tons in 1923.

#### Germania Shaft, at Butte, To Be Unwatered

#### Butte-West Side Purchases Robert E. Lee Claim—Other Activities

W. F. Murray and associates have obtained a lease on the Elba claim lying north of the Germania, a short distance southwest of the School of Mines in Butte. Under the direction of Mr. Murray the Germania shaft will be unwatered to the 400 level and the Elba orebody worked through the Germania shaft. The leasers now are installing a string of 5-in. pipe through which the water will be "air lifted," the air being furnished through a 2-in. line. The present Germania shaft is 1,000 ft. deep. A contract has been given to the Butte Machinery Co. to furnish mine equipment. The Montana Power Co. is preparing to extend its power line from the Orphan Boy property to the collar of the Germania shaft.

Butte-West Side Mines Co. has purchased a controlling interest in the Robert E. Lee Mining Co., from Dr. Reins, Joe Chauvin and associates. The later company owns the "Robert E. Lee" claim, adjoining the "Minnie Jane" claim of the Butte-West Side Mines Co., these claims being situated in the West Butte district.

Neihart advices state that Frank Wright and Dave Ledbeter, of Neihart, in conjunction with George Hale Brook, of Boston, are assembling a group of claims on Carpenter Creek, west of the Silver Dyke group of the American Zinc, Lead & Smelting Co. The development of the new group will be financed by Boston mining men.

T. A. Angell and R. Ruhle, of Butte, and Robert LeRoy, of Basin, have formed the Dump Mining Co. and are working over tailings and mining ore from the Buckeye property, near Basin.

## Washington News

By Paul Wooton  
Special Correspondent

### Report of Advisory Committee, Bureau of Mines, to be Ready First of Year

#### Thorough Analysis of Research Work to Be Made—Relations to Industry to Be Studied

A much more detailed report on the activities of the Bureau of Mines than was at first contemplated is to be made by the advisory committee which is representative of industry. Secretary Hoover does not expect to receive the final report of the committee before the first of the year.

The first conception of the service which the committee was to be asked to perform was simply to analyze the work of the Bureau to the extent necessary for the commission to write "O.K." or put a question mark after the various items forming a list of the bureau's activities. The first meeting of the committee, however, revealed that no such simple disposition of the matter was possible. Much of the work pertaining to trade promotion lends itself to ready analysis. Research work of the character which the Bureau of Mines is conducting does not lend itself to a prompt appraisal of its merit.

The advisory committee has become interested in the work to the extent that it is willing to go through with the task and make the necessary detailed survey of the Bureau's work. The staff of the Bureau is of the opinion that the industry will have a new appreciation of the organization if it has an opportunity to see the inside of the machine. The opportunity is not frequently presented when busy men will take the time to make a study of this kind, and they expect to take full advantage of the opportunity to demonstrate the value of the work which the Bureau has been doing.

#### MINING A FUNDAMENTAL INDUSTRY

The public understands very well that agriculture extends to textiles and to the leather in shoes. Mining to many persons creates an impression of the wild and woolly west with gold mining as the chief industry, or of coal production. The agricultural industry has convinced the public that the farms must prosper if the people in other lines of endeavor are to prosper. The fact that mining is just as fundamental and as necessary to general prosperity has not been brought home to the people as yet. Any steps likely to advance that idea should be urged by the advisory committee.

The analysis of the Bureau's research work has revealed that some of its more important accomplishments have been byproducts of efforts directed at other objectives. Another condition which makes it difficult for a research bureau to attempt to fill any prescription which industry may tender it is the fact that the work selected is decided to some extent by the skill available. The more capable research men accomplish most when left free to pursue their work un-

hampered by any but general instructions.

Had the Bureau of Mines waited for suggestions from the outside the notable work it has done in radium and helium probably never would have been undertaken. At the same time, the committee is being assured that the Bureau wants to maintain intimate contacts with the industry so there will be less chance for the work to take impractical trends or to reach a stage where funds and brain are being absorbed by unimportant ramifications of the problem.

Everything done in connection with the transfer of the Bureau of Mines from the Department of the Interior to that of Commerce is certain to come under scrutiny later when Congress takes up reorganization. The benefits of the change in this instance or the lack of any benefits will have an important bearing on the success of the organization legislation which the administration will try to secure at the forthcoming session.

### Flotation Plant Destroyed by Fire

THE 75-ton flotation plant of the Leadville Mines Co., at Leadville, Nev., was destroyed by fire recently. The estimated loss is \$50,000, partly covered by insurance. Details have not as yet been published, but it is hoped that the newly installed engine and compressor are not irreparably damaged.

During recent months the mill has been treating 50 tons of ore per day, and shipments to smelter averaged 200 tons of concentrate per month, the value being about \$200 per ton in silver and lead.

### Eagle-Picher Co. Constructing New Factory at Joplin

The Eagle-Picher Lead Co. is erecting a new \$50,000 factory building at Joplin, Mo. The structure, which is 325 ft. long, and 100 ft. wide, is being built to take the place of the original plant, which is now entirely inadequate. When the new building is completed the company's activity in lead pipe and metal products manufacture will be approximately doubled. All equipment from the old plant will be used in the new quarters, according to J. Edward Webb, smelter plant manager at Joplin.

#### Leases Acquired in Joplin District

T. F. Coyne, of Webb City, Mo., has purchased the lease on 160 acres of land near Baxter Springs, Kan., and will begin the erection of a concentrator upon it at once. He has had six drills operating on the tract for several weeks. The Federal Mining & Smelting Co. is rebuilding the Whiskbroom mill, to handle dirt (ore) from two new shafts recently sunk on the southwest forty of the Gordon tract. The King Brand Co. has acquired a lease on 160 acres of the Opperman tract, southwest of Baxter Springs, Kan. The Underwriters Land Co. has a lease on forty-one acres of the Wakeman land, southwest of Baxter.

### Phoenix Stone Co. Acquired by Standard Soapstone

#### Deposit of 1,600 Acres, Nelson County, Virginia, Purchased—Operations to Begin At Once

The Standard Soapstone Corporation, of New York City, announces that it has completed its organization under the laws of the State of New York, with a capitalization of \$1,575,000, of which \$1,000,000 is paid in. The company has taken over the entire assets and business of the Phoenix Stone Co., Inc.

W. Wallace Benjamin and those associated with him in the management of the Phoenix Stone Co., Inc., will continue in charge of the operations and business of the Standard Soapstone Corporation, with the addition of Michael J. Copps, who has resigned as a director of the Virginia Alberene Corporation to become managing director of the Standard Soapstone Corporation. Mr. Copps was formerly vice-president and general manager of the Virginia Alberene Corporation and has been actively engaged in the soapstone business for twenty-eight years.

A soapstone deposit of more than 1,600 acres has been purchased in Nelson County, Va., including soapstone-bearing lands acquired from Thomas Fortune Ryan, who has become a director of the new corporation. The land owned, as indicated by extensive core-drilling, contains large deposits of soft, medium, and hard-grade soapstone suitable for commercial purposes. The company will engage in the quarrying, manufacture, sale, and installation of soapstone products. The entire operation will be completed and the quarries will be producing before the end of the year.

### Oil Well Regulations of New Mexico Ready for Distribution

As provided for by the 1925 Session Laws of New Mexico, E. H. Wells, State Geologist, has formulated rules and regulations to govern drilling and production of oil and gas in New Mexico. He has prepared also a series of forms to be used by drillers and operators in making reports and requests to the state geologist. Copies of the regulations and the various forms to be used are now available and may be obtained from the state geologist at Socorro, or the state land office at Santa Fe. All operators are requested to secure copies of the regulations and forms. The regulations became effective Sept. 15, 1925. The state geologist desires all available data on wells already drilled, and requests that those who have such information at their disposal send it to his office where it will be gratefully received.

### Lead Deposit Reported Near Jamestown, Ala.

L. D. Jackson and H. E. Winn, Texas oil men, have purchased 1,800 acres of lands near Jamestown, Cherokee County, Ala., which is reported to contain deposits of lead. A vein of galena was recently discovered in the vicinity of an old abandoned mine that is said to have been used by the Confederate government during the Civil War.

### Federal Reports Good Profits from Joplin-Miami Work

No small amount of interest was created in the Joplin-Miami district by the recent annual statement of F. H. Brownell, president of the Federal Mining & Smelting Co., which showed good profits for the company out of operations of its zinc mines in this district in 1924. According to the statement, one mine alone, the Brewster, a short distance east of Picher, Okla., made a profit of \$450,000 in the year. The Kansouri, located in Kansas, north of Picher, made a profit of \$345,000 in nine months. Particular interest attaches to the fact because the Kansouri was turned down by several experienced operators in this field. The Lucky Bill mine, also in the Picher field, showed a profit of \$144,000, and the Gordon a profit of \$123,000 in nine months.

### Lashmet and Joe Bob Mine to Be Worked as a Unit

Fred Childress, of Joplin, has bought the Lashmet mine, located in Leadville hollow, adjoining Joplin, and the Joe Bob mine, on the American Zinc, Lead & Smelting Co.'s acreage to the west, and will operate both properties, using the Joe Bob mill. An incline 1,000 ft. in length will be built between the two properties.

Childress has 140 acres under lease in this vicinity, and plans thorough development. A Texas pump is being installed at the Joe Bob shaft and the land will be drained as necessary.

### Abandoned Boska Mine to be Reopened

The Boska Mining Co. has taken a lease on the Ebbenstein land, west of Baxter Springs, in the Joplin-Miami field, and will put a number of drills at work upon it as once. The tract was at one time worked by the Chanute Spelter Co., subsidiary of the American Metal Co., but was abandoned at the same time the Hartley was turned back to its original owners. Youse and Granthem, of Baxter, purchased the land and now own it.

### Fire-Proof Mine Buildings in Joplin District

Fire-proof mine buildings are becoming popular in the Joplin-Miami district. The Anna Beaver Mining Co. has recently placed in operation two all-steel hoppers and derricks, and has under construction a steel and concrete power-house to replace the frame structure now in use.

### Katherine Mine Producing 80 Tons Per Day—Other Operations at Oatman

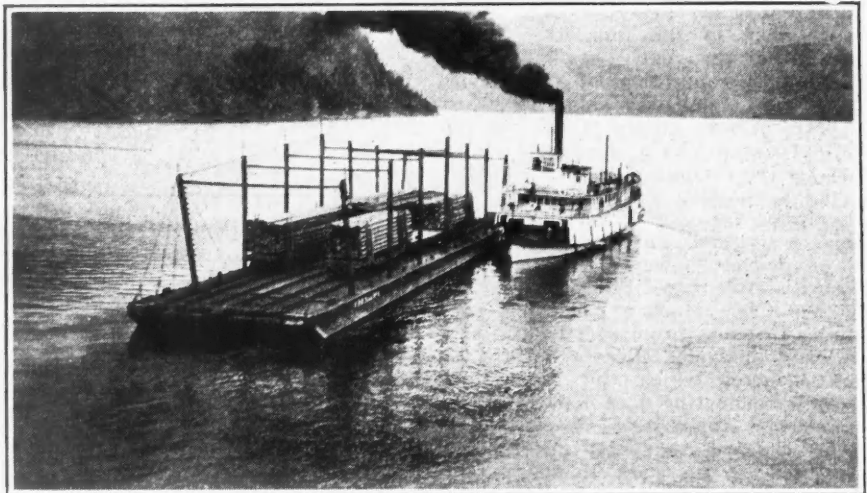
One of the most promising mines of the Oatman district of Arizona is the Katherine Gold Mining Co. Although no stoping has yet been started, the development drifts on the 1, 2, and 3 levels are producing enough ore to keep the mill up to its capacity of 80 tons per day. The values are said to run from \$5 to \$20 per ton in gold and silver. The cyanide precipitates are now being melted at the mine instead of being sent to the smelter as was

done formerly. A bullion cone weighing 1,633 oz., the result of nine days' run of mill, is now on display in the offices of the Tarr, McComb & Ware Co. at Kingman.

The Aztec lease in the Tom Reed mine, at Oatman, is now producing 50 tons of ore daily and is making a monthly clean-up of \$52,000. The success of this lease has increased activity in the district substantially. The United American is drifting toward the Aztec oreshoot and is also stoping some ore on its 700 level. The Hart lease, on the Ben Harrison mine of the Tom Reed estate, is again in operation and a lease has been started at the No. 1 shaft of the Goldroad property.

### Burma Corporation, Ltd., Produced 3,804 Tons of Lead in August

During the month of August, 27,326 tons of ore was mined, including 1,425 tons of high-grade ore. The mill handled 20,800 tons of ore, producing 7,521 tons of lead concentrate. The amount smelted was 9,678 tons of lead-bearing material, including 1,793 tons of high-grade ore, producing 3,845 tons hard lead for treatment in the refinery. Refinery products were 3,804 tons refined lead and 390,011 oz. refined silver. The experimental zinc plant produced 1,450 tons zinc concentrate, assaying 15



Canadian Pacific Railroad Co.'s barge on Kootenay Lake

### Barge Transportation Utilized by C. P. R. in Slovan District, B. C.

The accompanying photograph shows one of the C. P. R. barges transporting lumber on Kootenay Lake. Ore is transported by rail and barge in a similar manner from the Slovan district via rail to Rosebery at the head of Slovan Lake and then by barge to the south end of the lake, where the ore cars are again transferred to the rails for delivery to the smelter at Trail. As a result of this method this region has freight rates that are much lower than they would be if actual rehandling of shipments were necessary.

### Hollinger Consolidated Producing Good Ore From 1,100 Level

As a result of developments below a depth of 1,100 ft. on the Hollinger Consolidated mine, at Porcupine, in northern Ontario, it has been found that gold values, which decreased when the veins entered the porphyry formation, passed back to high grade below it. No. 1 vein above the 425 level averaged \$20 per ton, and in the porphyry below values declined to less than one half.

The increase of the capacity of Hollinger 50 per cent above the current rate depends altogether upon providing the necessary outlet for the ore. A recent test with the present hoist showed a total of approximately 3,500 tons of ore hoisted in eight hours, or at the rate of more than 10,000 tons per day.

oz. silver, 6.8 per cent lead and 43 per cent zinc. In addition to the above, 750 tons copper matte was produced from the treatment of accumulated smelter by-products and 2,358 tons copper ore. Railway traffic between mine and mill suspended from Aug. 29 to Sept. 3, on account of damage caused by cloud burst, causing reduction in tonnage milled.

### Sample Lot of Iron Ore from Iron King Mine

A 1,000-ton trial lot of iron ore is being shipped from the lower levels of the Iron King mine, East Tintic district, Utah, to the Columbia Steel corporation plant at Ironton. The Iron King mine has one of the best iron deposits in the state. On the 1,100, 140 ft. from the new shaft, silver-lead ore has been opened up in a new zone.

### Alaska Juneau Production in August

Alaska Juneau, in August, 1925, mined and trammed to its mill 316,450 tons, yielding \$202,000, or 63.83c. per ton. Operating costs and incidentals aggregated \$149,000, or at the rate of 47.15c. per ton, leaving an operating surplus of \$52,800, or 16.68c. per ton. Expenditures on capital account were \$22,500, on Ebner property \$2,500, and for interest on indebtedness \$16,550, a total of \$41,550, leaving a net surplus of \$11,250 for the month.

### Simple Flow Sheet for an All-Flotation Plant

**Especially Adapted to an Ore of the  
Disseminated Type for a One-  
Mineral Concentrate**

A study (Serial No. 2694) of flotation plants and methods by the U. S. Bureau of Mines sheds much light on this modern metallurgical process. The simplest form of an all-flotation plant representing the best present-day practice is shown in the accompanying diagram. In some instances the first flotation machine makes a clean concentrate, a middling, and a tailing, the middling being returned to the head or feed end of the machine for re-treatment. It would be applicable for use in producing a one-mineral concentrate from copper ores of the highly disseminated type—for example, such as are being concentrated by flotation in Utah, Arizona, and New Mexico—and for ores where a concentrate is wanted because it is valuable for its precious-metal content. The precious metals, gold and silver, may be associated with various mineral sulphides, and are segregated from the ore by recovering the sulphides in a float-concentrate. Certain other ores are amenable to treatment by this simple flow sheet. The number of re-treatments of the original rougher concentrate is not limited to one, but may be as many as three or four.

#### GANGUE SHOULD BE ELIMINATED AS SOON AS POSSIBLE

One of the efforts to be made by the ore dresser should be to separate out waste or worthless minerals with minimum grinding or breaking of the ore. With the general run of ores the percentage by weight to be rejected averages, roughly, 85 per cent. The logical thing to do is to reject as much of the gangue as possible, as soon as its metal content becomes so low as not to justify further grinding and treatment. However, as long as the metal content of a low-grade product, such as the coarse-sand tailing from a jig or table, justifies further grinding and treatment, it should not be discarded. These are points that can be determined only by careful testing and from a knowledge of grinding and treatment costs on a practical scale.

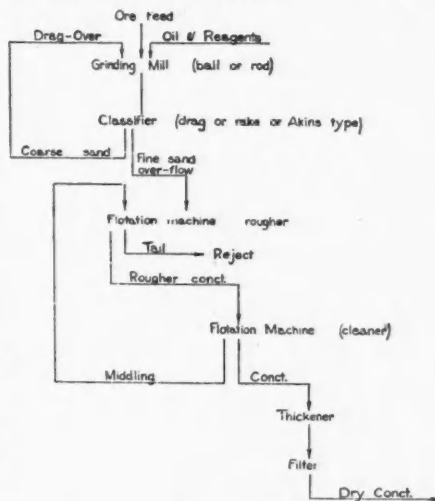
Every time a clean piece of ore mineral (usually a sulphide) is cracked, a large number of infinitely small particles of that mineral result. Subsequent methods of treatment can, of course, recover these numerous particles, but an abnormally large equipment (capacity) is required. This means (a) large first cost of plant, (b) large power requirement, and (c) less desirable concentrate product.

#### MAY BE USED IN CONNECTION WITH GRAVITY CONCENTRATION

Where the tonnage involved is large, a significant saving in flotation royalties can be made by carrying gravity concentration as far as possible. There is an instance of one plant where a saving of \$1,000 to \$2,000 per month was realized by carrying gravity concentration into the excessively fine

sizes, this same material having been previously treated by flotation.

In smelting concentrates, the granular concentrate is preferred to the concentrate consisting of exceedingly fine particles. Flotation concentrate requires costly thickening plants and filter plants, and is more expensive to handle and transport, as well as losses in smelting fine material.



Flow sheet for all-flotation plant

### Flotation Mill to Be Installed at Chloride

It is reported that the Chloride Mining Co., operating at Chloride, Mohave County, Ariz., is to be equipped with a flotation mill of 150-ton daily capacity. This decision is based on the result of experiments recently concluded. Actual construction is expected to start not later than Oct. 1. The property is developed by tunnels, and is reported to have over 4,000 ft. of workings, estimated to block out 100,000 tons of ore, showing lead-zinc-copper-silver-gold values. The company was organized in 1916. W. B. Twitchell is president.

### Recent Developments at Mine of Kay Copper Corporation

Diamond drilling from the 1,200 level to the 1,400 level of the Kay Copper Corporation property at Canon, Yavapai County, Ariz., has disclosed a 35-ft. deposit of 3½ per cent copper ore, carrying about \$3 per ton in gold and silver. A shaft is being sunk to develop this deposit further. On Sept. 5 the shaft was down 93 ft., and an assay of samples from the bottom of the shaft showed 14.8 per cent copper.

A raise is being run from the 1,200 level to the 800 level, and has broken through on the 1,000 level. During August, a drift on this level was advanced to a total length of 75 ft. R. L. Healy the mine manager, reports from the local office at Canon the striking of a number of lenses heavily impregnated with copper. Several assays across the full width of the drift show 3½ to 4½ per cent copper. About sixty men are employed in three shifts, continuing the development plan earlier outlined in recommendations by Walter Harvey Weed.

### United Verde Smelter and Mine Force to Engage in Safety Contest

Starting on Sept. 1 and continuing until Jan. 1, 1926, the mine and smelter departments of the United Verde Copper Co. are engaged in a novel safety contest. Owing to the difference in working conditions at mine and smelter, it would be a difficult matter to make a comparison of safety records, so far as the result might be shown by the actual number of accidents, so competition will be double, in the sense that both mine and smelter will compete against their own records for the last six months. The purpose of the plan is to induce each department to strive to better its safety record, and the one showing the greatest improvement will receive an appropriate trophy.

### American Leasing Co. Ships 40 Tons Daily

Shipments of the American Leasing Co., operating the Live Yankee, the Bellerophon, and the Silver Wave groups in the American Fork district, Utah, are averaging 40 tons daily of chalcopryrite ore carrying from one to one and a quarter ounces of gold to the ton, seven ounces of silver, and 7 to 8 per cent copper. Officials estimate that enough ore has been developed to maintain output at its present rate for many months.

### Porcupine Goldfields D. & F. Co., Lease Doratha Morton Mine

Porcupine Goldfields Development & Finance Company, has taken a lease and option on the Doratha Morton mine, near Fanny Bay, 120 miles north of Vancouver, and the adjoining Enid and Commonwealth groups, making a consolidation of twenty-five mineral claims. The Porcupine company is to bring the property to the producing stage, by equipping it with a 100-ton mill. The Doratha Morton mine was located in the late nineties and operated by the Fairfield Exploration Syndicate, of London, during 1898 and 1899, during which time the syndicate took out gold to the value of \$110,000. The company ran up against a fault, and, unable to locate the vein on the other side, abandoned the mine. Last year the mine was reopened by a Vancouver syndicate, which was absorbed by the Glasford Mining Corporation. The corporation located the vein on the other side of the fault, found rich ore, and had made a shipment to the Tacoma smelter before Porcupine took control.

### Water Shortage in Alaska

Passengers arriving at Seward, Alaska, from Nome and Kotzebue Sound, reported recently that placer operations had been stopped at Kotzebue because of a water shortage. They said the shortage did not affect Nome. Drilling work and thawing of ground at Nome were completed by the last of August, and two dredges of the Hammond Gold Fields Consolidated are to start operations.

## London Letter

By W. A. Doman  
Special Correspondent

### Old Mines Attracting South African Investors

#### Recent Developments Bear Out Marriott's Prediction Regarding Value at Depth.

London, Sept. 8.—Once neglected or partly worked out mines seem now to be having a day to themselves. Speculation has departed from the dividend-paying South Africans, mainly because their potentialities are fairly well gaged. But very keen interest is being evinced in such properties as Village Deep, Robinson Deep, Central West (formerly Princess Estate), Gaika (Rhodesia), and West Rand Consolidated. All report good developments in one direction or another. The Village Deep and Robinson Deep are adjacent, and what applies to one in the matter of high-grade ore at depth largely applies to the other. Robinson Deep has acquired additional ground to secure some higher-than-average grade ore. The Village Deep is working at such a great depth that it was thought working costs would be prohibitive with gold at normal price. It almost looks as though Hugh F. Marriott's prediction were proving to be correct. When president of the Institution of Mining and Metallurgy he made some audacious assertions concerning Rand values at depth. These were regarded somewhat questioningly at the time, but his views and inferences coincide closely with recent developments.

Central West is a surprise for many people, as, though profits are not large, they are being earned, and there is talk of issuing more capital for extensions. It remains to be seen at the end of the company's year how much profit will be divisible. The general public is not always pleased with resurrections, and many investors have in mind the share pushing that preceded the collapse of Great Boulder Perseverance (Western Australia.)

The Gaika (Rhodesia) can certainly boast live management, and the interests of the shareholders have not been unstudied. Stanley Edwards, the chairman, has paid two visits to the mine, and has recently returned with an encouraging account of the refractory slimes treatment. As a result of experimental tests of weathering, the refractory-ore treatment capacity is to be enlarged by approximately 2,000 tons monthly. At the third and seventh levels in the mine, new reefs showing good values are reported to have been opened up.

If the values and widths of the reef encountered during the last few months in the West Rand Consolidated Mines continue, the calculations of ore contents made in the early days of the company by Denny Brothers would appear to be coming within sight. The 800 or 900 ft. recently opened up has averaged over 80 in. in width, and values exceed 9 dwt. This property has never been over-equipped with

stamps, like the Randfontein, but it could do with more equipment, and will get it in due course.

The Prestea Block A (West Africa), in which the Central Mining & Investment Corporation had a controlling interest at one time, has come to grief, but may yet do something for new shareholders. A company called the Gold Coast Explorers has bought the property from the liquidator, and hopes with a small capital to work it successfully.

The hydro-electric power plant of the Northern Nigeria (Banchi) company at the Kwall Falls, has been completed. It consists of three separate units, each capable of developing 700 hp., on a fall of about 700 ft. The water supply is expected to be sufficient to run the full plant for six months, and smaller units for the rest of the year.

### Chilean Government Seeking Nitrate Markets Through Consular Appointees

The Chilean Government is participating in propaganda throughout the world looking to increased use of nitrate of soda. All consular appointees are being given a special course dealing with the uses and properties of nitrate and the most effective arguments to offer the possible customers. They also are acquainted with publicity methods and other means for conducting propaganda. Serious consideration is being given a proposal that consuls be empowered to make actual sales of nitrates.

#### Employ European Chemists to Study Costs

In keeping with the policy of the Chilean Nitrate Producers' Association to delve into the question of reducing the cost of producing nitrate, which has recently encountered severe competition from synthetic fertilizers, two technical experts have been employed, one from Germany, Adolfe Keupper, and one from England, G. F. Horsley. They have arrived in Chile, and are to devote themselves to the study of the cost problem. Mr. Keupper is to occupy the post of director of the Investigation Department of the Nitrate Producers Association. They will study the different methods of producing nitrate, and propose such means as may be found to be both rapid and economical. Their work will be carried on at Antofagasta and at the nitrate oficinas or plants in the interior. Such results as may be obtained from their work will be for the benefit of the several nitrate companies affiliated in the Nitrate Producers' Association.

### Diamonds in Tanganyika

News of an important diamond discovery in Tanganyika has reached London from Desparosse, South Africa. The discovery was in the Mwanza area, according to the Commissioner of Mines at Dar es Salaam. Prospecting results show thirty-five carats to every hundred loads. The small area prospected in August produced 150 carats of good-quality stones, the largest weighing seven carats.

## Mexico City Letter

By W. L. Vail  
Special Correspondent

### Silver Mines in Mexico Taking On New Life—New Mills Being Built; Old Ones Enlarged

Mexico City, Sept. 15.—The rise in silver has had a favorable result on the Mexican silver industry. Many of the most important silver camps of the Republic have resumed active operation, a notable instance being the Guanajato Mines and Reduction Co., which has been on the point of closing down because of the unprofitable prices. The states of Chihuahua and Zacatecas have been particularly favored by the improved conditions.

Reports from Chihuahua state that the Mosqueteros is now running 200 tons of lead ore through the mill daily and that the Erupcion company is installing a new plant of 1,000 tons capacity daily. It is stated that the Duponts have acquired a property in the Villa Ahumada district, and that the A. S. & R. Co. is building a large reduction plant at Villa Ahumada. The Don Ignacio and La Carolina, in the same district, are being worked after being idle several years.

The Sierra Pinta Co., has completed the installation of its plant near the Bay of San Jorge, on the Gulf of California. The ores are reported to contain both gold and silver.

The Pittsburg Vetagrande, Zacatecas, is installing a cyanide plant of 600 tons capacity at El Bote, to work over something like 1,000,000 tons of low-grade ores in the dumps and mines. The Mexican Corporation is increasing the capacity of its cyanide plant at Fresnillo, Zacatecas, by 200 tons. The capacity of the plant at the present is 3,600 tons daily.

The Teziutlan Copper Co., under lease to the Mexican Corporation, is erecting a new flotation plant to treat copper and zinc ores.

The El Oro Mining and Milling Co. is installing a 250-ton cyanide plant to treat ores from La Noria and San Pantelón, Sombrette, Zacatecas.

The new mill being installed at El Triunfo, near Santa Rosalia, Lower California, is expected to be in operation before the end of the year. The Triunfo was recently acquired by the El Boleo Copper Co.

### Guggenheim Brothers Acquire Placer Tin Deposits in Bolivia

Guggenheim Brothers have acquired a tin dredging property in Bolivia and will immediately equip it with modern dredges and a hydro-electric power plant. Engineers for the firm have spent six months in a thorough investigation of the property, and their reports indicate easy operating conditions, there being no boulders or clay to interfere with dredging and cause high operating costs, as in some other countries. The acquisition of this property is in line with the policy of this firm to extend its holdings in the various tin-producing countries of the world.

## South African July Gold Production Shows Increase Over That of June

Shortage of Native Labor—Platinum Developments Occupy Public Attention; Annual Production May Reach 20,000 Oz.

By John Watson

Special Johannesburg Correspondent

THE Transvaal gold output for July, 1925, was declared by the Chamber of Mines as 818,202 oz., having a value of £3,475,501. These figures show an increase over June of 37,196 oz., equal in value to £161,205.

The shortage of native labor is limiting the output on several gold mines. At the end of July, the native labor returns show 168,900 natives employed on the gold mines of the Rand, whereas at the end of February there were 182,099.

The following table shows results from fourteen leading gold-mining companies for the month of July. The mines are arranged in order of profits earned:

	Tons Crushed	Revenue or Value £	Costs per Ton Milled s. d.	Estimated Profit £
<b>Government</b>				
Areas.....	169,000	317,852	16 4.9	181,114
New Modder.....	130,000	275,331	16 8.2	166,906
Crown Mines.....	229,000	293,965	18 0.4	87,475
Modder Deep.....	45,100	102,021	15 7.0	66,851
Springs.....	68,000	127,507	20 0.2	59,449
Brakpan.....	86,000	137,613	18 6.8	57,758
New State Areas.....	74,000	125,225	19 11.6	51,650
Van Ryn Deep.....	69,800	106,293	16 6.4	50,268
Geduld.....	79,000	117,225	17 7.0	47,652
City Deep.....	92,500	151,799	23 10.3	41,462
Modder B.....	64,500	102,183	18 11.4	41,080
<b>Randfontein</b>				
Estate.....	200,000	211,091	17 7.5	37,692
Robinson Deep.....	77,000	.....	17 2.2	33,523
West Springs.....	49,600	76,887	17 8.0	33,082

### Six Months' Mineral Production, Union of South Africa

The output of minerals in the Union for the six months ended June 30, 1924 and 1925 is as follows:

	—First Six Months—	
	1925	1924
Gold (at standard value) ..	£20,318,802	£19,980,467
Silver.....	86,882	96,265
Osmidium.....	68,195	36,320
Diamonds.....	3,950,095	3,926,066
Coal.....	1,948,047	1,858,746
Copper ore and concentrate	276,636	217,916
Tin concentrate and metallic	138,172	148,206
Other minerals.....	132,904	129,946

### The Lydenburg Platinum Area

D. Wylie King, mining editor of the *Financial Times*, London, recently visited the Lydenburg platinum area, where he had a week's tour of the central section of the Lydenburg platinum belt, covering 50 miles, south to north, from St. Edmund's farm (Platinum Proprietary) to Forest Hill and Hackney (Transvaal Development Co.)

Fully 40,000 tons of dunite ore, averaging 1 oz. of platinum per ton, has been proved by the Onverwacht shaft, now 172 ft. deep. The persistence of ore in depth is indicated by the drilling operations at the Mooihoek farm of the Lydenburg Platinum Co., 5 miles north of Onverwacht. Drilling has just been stopped, there, at a depth of 461 ft. Apparently, the drill was still in ore, although much lower grade than in the first 300 ft. The great problem of the future price of platinum is not

an immediate one, because it is unlikely that the output of the whole Transvaal will reach the rate of 20,000 oz. per annum before the end of next year. This should give time to organize control in view of the probable eventual large production of these fields.

### Platinum Deposits Contain Sulphides of Copper and Nickel

A report on the operations of Lydenburg Platinum, Ltd., has recently been issued by Dr. Hans Merensky, who says: "During the past half year the platinumiferous dunite orebody has been proved to be persistent, with good values at depth; the main orebody shows the same values in the sulphide zone as in the oxidized portion. Concentration of the sulphide ores by the flotation process gave little difficulty; and a 90 per cent extraction was obtained. Besides platinumoids, the sulphide concentrate contains copper and nickel, which represent a considerable value by themselves, more especially if these byproducts could be used for the production of the valuable Monel metal, which might lead to the establishment of a new industry in South Africa."

### Increased Demand for Non-Ferrous Metals in Germany

Germany's consumption of non-ferrous metals in the first six months of 1925 more than doubles that of a like period in 1924, as shown by imports.

### German Imports of Non-Ferrous Metals

Metal	Figures in Metric Tons		
	First Half of 1924	First Half of 1925	From the United States in 1925
Copper.....	44,031	127,686	102,356
Lead.....	15,340	84,905	30,452
Zinc.....	16,903	55,728	8,605
Silver.....	109	211	33

### Katanga Cobalt on American Market

It is officially announced that the Union Miniere du Haut Katanga is now producing cobalt metal, salts and oxides from African ores. These products of the Belgian refineries and chemical plants will be placed on the American market early in November. The company's New York office is 67 Wall St.

### Proposed Change in Mining Law, Bahia, Brazil

A law making radical changes in the state's mining code is now under discussion in the legislature at Bahia, Brazil. Its principal object is to make it possible for companies of large capital to exploit the diamond lands by improved methods.

## Melbourne Letter

By Peter G. Tait

Special Correspondent

### Commonwealth Subsidy in Search for Oil to Be Granted

#### Bonus of £1 Per Ounce of Gold Proposed—Tin Mines in Western Tasmania to Consolidate

Melbourne, Aug. 24—The Commonwealth government, after considering the reports of Dr. A. Wade and the recommendation of the recent conference of Australian geologists, has decided to withdraw the offer of a reward or bonus of £50,000 for the discovery of oil in commercial quantities in Australia, and, in lieu, to authorize the expenditure of a sum of £50,000 in the following directions:

In New South Wales boring will be subsidized on £1 for £1 basis up to £22,500, provided the bores are put down in the area described by Dr. Wade as the Belford Dome in the Hunter river district.

In Western Australia the Commonwealth government will subsidize boring on a £1 for £1 basis up to £22,500, provided the bores are put down within the area described by Dr. Wade as the Fitzroy area, and in the vicinity known as Price's creek.

In view of the terms of Dr. Wade's report on Queensland the Commonwealth government is prepared to join with the state government on equal shares up to £5,000 each to enable a thorough and detailed geological survey to be made of the area in the vicinity of Longreach, Blackall and Ruthven, and such areas referred to by Dr. Wade as may be agreed upon.

It was stated by the prime minister, S. M. Bruce, that the areas set out above were those in which the government was advised that there was a reasonable chance of the occurrence of oil, and with a view to having these areas thoroughly tested the policy outlined has been decided upon.

Mr. Richard Hamilton, general manager of the Great Boulder gold mine, Kalgoorlie, and president of the Chamber of Mines, Western Australia, is visiting Melbourne to discuss with the gold producers in the Eastern states the best policy in order to further the claims of the gold mining industry in connection with the proposal of a bonus of £1 on each oz. of gold produced. A committee of those interested has been formed to further the proposal.

The Wiluna Development Co. which has been carrying out prospecting operations on the old Gwalia Consolidated mine at Wiluna, Western Australia, has completed prospecting work.

An amalgamation of various tin mining leases on the west coast of Tasmania is under consideration. The mines concerned are the Dreadnought-Boulder, Montana and Renison Bell. There are large tonnages of pyritic ore available on the various leases and it is felt that the formation of a strong company would lead to the development of the field on sound lines. Engineers representing A. Victor Leggo, of Melbourne, are engaged sampling the properties.

## Societies, Addresses, and Reports

### How High Tariffs Affect Copper

Benjamin M. Anderson Argues for Moderate Protection—  
Situation Changed Since 1913

**I**N THE "Chase Economic Bulletin," Benjamin M. Anderson, economist of the Chase National Bank, discusses under the title "A World Afraid of Production," *Inter-Allied Debts, Reparations, and High Protective Tariffs*. The following extracts should be of particular interest to the American copper mining industry:

We have maintained our favorable balance of trade [excess in value of exported over imported goods] in the last few years for the following reasons: (a) because Europe, until recently, has paid almost nothing to our government, (b) because Europe has been draining itself until recently of gold with which to make such payments as have been made, (c) because our very high tariffs have checked imports, erecting a temporary barrier against an adverse trade balance, deferring the time of the adverse trade balance, but making an even greater adverse trade balance inevitable when it finally comes. Tariffs, if they are high enough, can even permanently defer the time when a larger volume of imports comes in, but they cannot permanently defer an adverse trade balance. If they permanently check imports, they will merely lead to a great falling off of exports when the abnormal factors sustaining the volume of exports cease to operate. (d) The main influence sustaining our favorable trade balance has been the vast volume of foreign loans which we have been making. . . .

#### Eventually an Unfavorable Trade Balance Must Come

Ultimately, we shall have an unfavorable trade balance. This may come in a good way or in a bad way. The good way would be to have an increase of imports with sustained exports. The bad way would be to have imports held down, but exports violently reduced. Exports must be reduced unless they can be paid for. They can only be paid for with dollars. Dollars may be obtained primarily either from the proceeds of goods sold in our markets or from funds borrowed in our markets. Borrowing at the present rate cannot permanently continue. Unless imports increase to replace the borrowing, exports must fall off.

A sharp reduction in our export of agricultural goods, of copper and of other extractive products, means an actual decline in the industries affected. A substantial increase in the volume of imports of manufactures, on the other hand, in a country where industry has been growing as rapidly as it has in the United States, where industry is as resourceful and as flexible as it is in the United States, and where the multiplication and expansion of wants on the part of the people is as rapid as it is in the United States, would be more

likely to mean variations in the rate of progress of particular industries rather than an absolute setback to any that are very important.

#### What a Tariff Can Do

A protective tariff is effective only to the extent that it reduces supplies in the domestic market. Commodities which we produce in excess of our domestic requirements, as wheat and cotton, cannot be raised in price by the tariff. Of course special grades of wheat or even special grades of cotton might be raised in price, in accordance with this principle, if the domestic production of these particular grades is inadequate for domestic consumption, and some foreign cotton or wheat of these grades must be imported. A protective tariff can build up an industry which would not otherwise be developed in a country because the country's aptitudes in other lines are greater. It does this, however, only at the expense of other industries, by drawing labor and supplies away from them or by imposing burdens on them. A tariff on a commodity which is used as a raw material, or a semifinished material, in some other industry is injurious to the other industry quite as much as it is beneficial to the first industry. The one is pulled down as the other is built up. There is no magic in the protective tariff. An act of Congress cannot create wealth.

Certain of our industries are clearly dependent on the tariff if they are to continue to exist on their present scale in the United States. They have higher costs as compared with the same industries in other countries. This is true, of course, when we try to compete with the tropics in producing goods for which they have great natural advantages. It is particularly true of industries which employ a great deal of labor in comparison with the amount of machinery and capital used. It is particularly true of specialties where only a few units can be produced from a given model. In the United States we have a relative abundance of land, a relative abundance of capital, and a relative scarcity of labor. We succeed best in those industries where land and capital can be employed lavishly and labor economized—that is to say, in mass production where a multitude of identical articles can be produced from a single model. We cannot compete with Europe in making bicycles to individual order. We must turn out standardized bicycles. We cannot compete with Switzerland in making watches of unique pattern. We must turn out large numbers of watches of a standardized pattern.

The great reason why labor costs are high for such industries in the United States is that labor can be so advantageously employed in other industries

in the United States. There is no mystery about the high wage scales in America. These high wage scales are not begotten by the tariff, nor are they dependent upon the tariff. They grow out of the high efficiency of labor *per individual*. This high efficiency is due (a) to the widespread education and good native qualities of the labor, and (b) to the comparative abundance of land and capital with which our labor may work. In Europe labor is relatively abundant and land and capital are relatively scarce. Europe can produce at lower costs than we specialized articles and, in general, those commodities which call for a relatively large amount of labor and a relatively small amount of land and capital. The most formidable competitors, however, of our industries dependent upon the tariff are not the Europeans who offer cheaper goods, but rather other industries in America which offer and can well afford to pay higher wages. This class of industries dependent upon the tariff is important, but is a small minority of American industries. The removal of the tariffs would not destroy these industries as a rule. It would, however, drive out of them the least efficient producers and it would, in many cases, compel them to give up many of their most specialized products involving the most lavish use of labor.

The rest of our industries are injured by the tariff in one or both of two ways: (1) because their costs are raised to the extent that they have to make use in the processes of production of commodities which are higher priced because of the tariffs on them or on their component parts and (2) because in many cases the rest of our industries are dependent in a greater or less degree upon foreign markets, and their foreign markets are injured by the reduced ability of their foreign customers to sell goods in the United States and get dollars with which to buy the goods they wish to export. A typical case where both these factors apply is agriculture. Our farmers, by and large, are injured by the tariff both through having their costs raised and through having their foreign markets reduced. Copper productions stands on the same footing. Various other raw material interests are in the same position.

#### Henry Ford Gains Nothing from Tariff "Protection"

A large body of our export manufacturing interests are in this same position. The Ford automobile company gains nothing from tariff protection. No country outside the United States can produce cars competitive with the Ford cars at the same low cost. The cheapness of the Ford car comes not from low wages, but from such an economy in the use of labor that the labor element in cost is relatively small. The same is true of others of the cheaper automobiles. It is true of much of our farm machinery. The typical case here is where mass production has been highly developed and where the domestic market is very big.

Another large body of occupations injured by the tariff, and in no way benefited by the tariff, consists of those which have almost exclusively a domes-



tic market which is not subject to foreign competition. These are hurt as producers by the tariffs by having their costs raised, but are not helped as producers by any increase in their prices growing out of the tariff. A very large, highly important and very miscellaneous group of occupations belongs in this class.

#### Who Is Hurt by a High Protective Tariff

Some of the more important of these include, the railroads; the building trades; wholesalers, retailers, and other distributors; public utilities, such as light, power, and telephone; newspapers; hotels; public employees including the Army and Navy; all educational institutions; hospitals; professional men generally.

All of these interests are hurt by protective tariffs on other industries by having their costs of production raised. All would be benefited by having the general tariff fabric lowered. Any injury that might come to the business fabric through reduction in tariffs injuring the minority of our industries referred to above would be more than offset by the increased profits of all these industries as their costs were lowered.

Another large body of our industries injured by the tariff is found among those manufacturers who get less tariff protection than the tariff element in their costs amounts to. Steel, apart from specialties, with the present low tariffs on steel, is probably in this class. Steel used to be a very highly protected industry. With the great development of skill and capacity in steel production in the United States, and our great natural resources in iron and coal, the tariffs have gone lower and lower until the present tariff on steel under the Fordney Bill is trifling indeed as compared with the rates in the 80's and 90's. Steel also has a great interest in the export situation. Many tariff-protected producers, if they would reckon carefully the additions to their costs made by tariffs benefiting other people, would find that the net result was against them.

Another large class of producers injured by the tariff is that very large class placed on the free list. They get no protection themselves, but in almost all cases find their costs higher than would otherwise be the case as a result of the tariff on goods which they must use. This class overlaps in part other classes listed above, but it includes also certain classes which have formidable foreign competition, notably certain fertilizer interests which have sought protection but have failed to get it because of the political strength of the farmers, and the industry supplying newsprint paper.

Other important items in this list are petroleum, anthracite coal, most bituminous coal, agricultural implements, copper ore and copper bars and ingots, leather boots and shoes, and chemical and mechanically ground wood pulp.

Finally, everybody is hurt by the tariff as a consumer. Everybody in the United States pays more for many commodities than it would be necessary to

pay if there were not tariffs on these commodities. This extra payment by the consumers constitutes the price which the country pays for maintaining in present volume certain industries for which the country is not so well adapted comparatively as it is for other industries. It constitutes the subsidy which the country supplies to certain industries to enable them to bid away labor and capital from other industries which could use the labor and capital better if there were no tariffs.

The analysis which has preceded is in no sense to be interpreted as a demand for free trade. It is an argument for moderate tariffs. It is consistent with a large measure of protection. There was a great deal of protection in the tariff of 1913. The rates in the tariff of 1913, and in many cases rates somewhat higher than those in the 1913 schedules, would accomplish what is needed. What is called for is a tariff policy which will admit European manufacturers on a scale adequate to permit Europe to pay interest and amortize her debts here, and to continue buying goods in our market on a sufficient scale to keep our farmers and copper producers and other export interests in balance with our manufacturing interests. This is desirable from the standpoint of our manufacturing interests themselves, since they need customers, and if our farmers cannot buy from them and our raw-material producers cannot buy from them, and the outside world cannot buy from them, their freedom from foreign competition is a very illusory advantage. They had better share with a stable outside world an expanding market than to fight for a disproportionate share of an unstable and precarious market. The most urgent part of the foregoing argument rests on considerations that were not applicable in 1913 when the world was in balance, when we were a debtor country, and when industry, both at home and abroad, was more or less adjusted to existing tariff schedules.

#### Times Have Changed

The foregoing argument is quite consistent with the contention that in earlier periods in the history of the country the tariff has been beneficial by stimulating industries for which the country was adapted and bringing them into existence earlier than they would otherwise have come—the so-called “infant industries” argument, particularly applicable to a new and undeveloped country, though in some measure applicable even in later stages of development. Recognition may be accorded also to past services of the tariff in giving us a greater diversification of industry than we might otherwise have had. Recognition may also be given to political and military arguments in behalf of tariffs on certain key industries needed for self-sufficiency in time of war. Finally, the desirability of distributing the existing situation as little as possible should be accorded substantial weight. Long-established industries, dependent upon the tariff, should not be suddenly denuded of all protection. But we should be clear-eyed in all this. We should recognize that protective tariffs always involve a cost,

and should give very special weight to the new factors of world unbalance which the present situation involves. The balancing of all these considerations justifies the conclusion that what is called for is not free trade but a moderate protective tariff policy.

#### New York Section Will Hear Coal Discussion

The first fall meeting of the New York Section of the A.I.M.E. will be held on Tuesday evening, Sept. 29, at the Machinery Club, 50 Church Street. The subject of the meeting will be “The Future of the Anthracite Coal Industry.” The committee hopes to have the following men discuss the situation: E. W. Parker, director, Anthracite Bureau of Information; S. D. Warriner, president, Lehigh Coal & Navigation Co.; Major William W. Inglis, president Glen Alden Coal Co. and chairman Anthracite Operators' Committee, and R. V. Norris, consulting engineer.

The meeting at the Machinery Club will be preceded by an informal dinner at 6 p.m. The program will commence at 8 p.m. sharp. The officers of the section are particularly anxious to have a full attendance at this meeting and promise an informing and interesting evening.

#### Montana Society of Engineers Meets at Butte

The thirty-eighth annual meeting of the Montana Society of Engineers was held in Butte on Sept. 10, 11, and 12. For the first time in the history of the society, ladies were invited to participate, and a large number were in the party that made a tour of inspection of industrial plants and mines, including a trip to the underground workings of the Leonard mine of the Anaconda company. A visit to the great smelting and reduction plant at Anaconda was also part of the program.

Charles H. Clapp, president of the University of Montana, was elected president of the society for the coming year. Other officers chosen follow:

W. N. Tanner, Anaconda, first vice-president; A. V. Corry, Butte, second vice-president; W. A. O'Kelley, Butte, secretary and librarian; Arthur E. Adami, Butte, treasurer; George T. McGee, Helena, trustee for one year; A. V. Corry and E. V. Daveler, trustees for two years. New members admitted were Clarence A. Champ and Walter S. Marsh, Jr., both of Butte.

#### Board of American Engineering Council Meets in October

The next meeting of the administrative board of the American Engineering Council will be held in Columbus, Ohio, Oct. 29 and 30, under the auspices of the Engineers Club of Columbus. Chief among the topics to come before the Board is the study of commercial aviation now being made by the Council jointly with the Department of Commerce. Numerous reports of other activities of the Council will be presented.

## Recent Technical Publications

Reviews, Abstracts, and References

### A New Work on Gems

**Gems and Gem Minerals**, by Edward Henry Kraus and Edward Fuller Holden. McGraw-Hill Book Co., New York, 1925; 191 pages, 5x7; 23 figures. Price \$3.

The names of the authors are a guarantee of the accuracy and interest of this volume, which is beautifully presented. The subjects treated by chapters are: Crystal Forms; Physical Properties; Optical Properties; Chemical Properties; Formation and Occurrence of Gem Minerals; Cutting and Polishing of Gems; the Naming of Gems; Manufacturing Stones. Part II contains a description of individual gems and a classification of gem materials according to various properties.

**Useful Aspects of Geology**, by S. J. Shand. D. Van Nostrand Co., New York, 1925; 191 pages, 5x7, 23 figures. Price \$2.50.

This little volume by Dr. Shand, professor in the University of Stellenbosch, in South Africa, may prove of interest to beginners in geology, for whom it was written. The chapters are on: First Observations; Geological Age; Geological Structure; the Composition of Eruptive Rocks; the Eruptive Rocks; Mineral Deposits Connected With Eruptive Rocks; Weathering, Soil and Sediment; Sedimentary Rocks and Their Useful Aspects; the Metamorphic Rocks; Rocks as Building Materials; Water-Finding; Oil Geology; and Some Engineering Problems.

**Bauxite and Aluminum**—The bulletin entitled "Bauxite and Aluminum in 1924," by James M. Hill, that has just been received from the U. S. Geological Survey, comprises pages 21 to 29 inclusive of "Mineral Resources of the United States," 1924, Part 1, which is in course of preparation.

**Geology, Northeastern Mississippi**—Bulletin 781-A, issued by the U. S. Geological Survey, contains a paper entitled "Paleozoic Formations Penetrated by Wells in Tishomingo County, Northeastern Mississippi," by M. N. Bramlette, with notes on Paleozoic rocks found in a well near Florence, Ala., by H. D. Miser.

**New Mexico, Texas**—Another set of advance pages of "Mineral Resources of the United States," 1923, Part 1, including pages 593 to 609 inclusive, have been received. They contain the mine report by C. W. Henderson, entitled "Gold, Silver, Copper, Lead, and Zinc in New Mexico and Texas in 1923."

**Australasian Institute**—The *Proceedings* of the Australasian Institute of Mining and Metallurgy, dated Dec. 21, 1924, which has just come to hand, contains the presidential address of Professor Ernest W. Skeats, which is entitled "Some Applications of Geology to Mining and Metallurgy." In concluding, Professor Skeats discusses the Federal Geological Survey proposed by Australia. He says: "The example of

the United States is pertinent. Practically all the states have their own state surveys, but in addition here is a fine Federal Geological Survey which for many years has done magnificent work on scientific and economic problems."

**Lead**—Research Investigations for 1924-1925, published by the University of Utah Engineering Experiment Station, Salt Lake City, Utah, as Bulletin 16, contains a 21-page article entitled "Lime Leaching of Lead-Silver Ores With Electrolytic Precipitation," by R. F. Newton, G. L. Oldright, and Robert D. Bradford.

**Flotation**—Bulletin 16 of the University of Utah Engineering Experiment Station, Salt Lake City, Utah, also contains a 19-page article entitled, "Some Flotation Fundamentals and Their Practical Application," by John F. Gates and L. K. Jacobsen.

**Fine Crushing**—A third article contained in Bulletin 16, issued by the University of Utah Engineering Experiment Station, Salt Lake City, Utah, is entitled, "Surface Measurement on Finely Ground Particles and Its Relationship to the Crushing Laws," by John Gross, S. R. Simmerley, and S. J. Swainson.

**Shaft Lining**—A. K. Broadhead is the author of an interesting article entitled "Concrete Lining of Shafts," in the July 5 issue of *Chemical Engineering & Mining Review*, published in Melbourne, Australia.

**Screen Sizing**—Bulletin 234 of the U. S. Bureau of Mines is entitled "Screen Sizing of Coal, Ores, and Other Minerals," by E. A. Holbrook and Thomas Fraser. After giving an historical résumé of the subject, the authors treat their topic under eight heads—namely, "Screening Practice," "Screening Surface," "Screen Scales," "Stationary Screens," "Revolving Screens," "Shaking Screens," and "Vibrating Screens." The bulletin contains 140 pages.

**Treating Slimes, Broken Hill**—R. D. Nevett, milling and flotation metallurgists of the Mount Morgan Gold Mining Co., Queensland, has written a paper entitled "The Development of a Process for the Treatment of Weathered Slimes at Broken Hill," which is printed in the June 5 issue of *Chemical Engineering and Mining Review*, Melbourne, Australia. The substance of the article, Mr. Nevett says, is the result of the combined efforts of the staff of Junction North Broken Hill mine during the last six years.

In the same issue is a paper entitled "Application of the Flotation Process to Gold Ores," by B. H. Moore and A. S. Winter, of the School of Mines, at Kalgoorlie. It contains a summary of flotation tests made on South Kalgoorlie ore.

A third article in the same issue is one describing the oil-shale deposits of New South Wales. This was a lecture delivered by E. J. Kenny, of the

N. S. W. Geological Survey, at the Mining Museum in Sydney.

**Geology, Cement**—Edmund Shaw, editor of *Rock Products*, has an article in the July 25 issue of that publication, entitled "Geology of the Greatest Cement Producing District." The substance of the article is based on an interview with Prof. F. B. Peck, of Lafayette College, who tells how the rocks from which cement materials produced in the Eastern-Bethlehem-Allentown section of Pennsylvania were laid down.

**Liquid Oxygen**—In the August issue of *Compressed Air Magazine*, F. W. O'Neill, of the Ingersoll-Rand Co., and C. M. Parkes, managing director of Liquid Oxygen Explosives, Ltd., London, discuss the subject of liquid oxygen explosives. The article is four pages in length and is well illustrated.

**Platinum**—Bernard W. Holman, assistant professor of mining at the Royal School of Mines, London, is the author of an article entitled "Treatment of Platinum Ores," which is printed in the May issue of *The Mining Magazine*, of London. The article is also reprinted in the *South African Mining and Engineering Journal* of June 27, because of the interest centering in the new platinum discoveries in South Africa.

**Concrete Dams**—The bulletin of the technical series issued by the School of Mines and Metallurgy at Rolla, Mo., contains a 53-page article entitled "A Study on Reinforced Concrete Dams," by Almo G. Harris. The article contains several illustrations and will doubtless be of value to those mining companies having construction work of this nature to do.

**Platinum**—An interesting item on platinum in southern Rhodesia is contained in *The Statist*, London, for Aug. 8, page 216. It includes a map showing the location of the "Great Dyke."

**Petroleum**—Professional Paper 132, of the U. S. Geological Survey, contains ten papers previously published as advance chapters on rock formations in Utah, Arizona, Wyoming, Colorado, and Pennsylvania; fossils from Montana, Texas, and Idaho; the evolution and disintegration of matter; the origin of the bog head coals; and Aniakhak Crater, Alaska.

**Clays**—The Bulletin of the School of Mines and Metallurgy, Rolla, Mo., for February, 1925, contains a treatise on Missouri clays. It comprises 69 pages and is profusely illustrated. A "clay map" of Missouri is included.

**Economic Geology**—The September-October 1925 issue of *Economic Geology* contains the following articles: "Silicification of Erosion Surfaces," by C. K. Leith, 11 pages; "Relation of Earth Temperatures to Buried Hills and Anticlinal Folds," by W. T. Thom, Jr., 7 pages; "Quantitative Standards for Hardness of Ore Minerals," by S. B. Talmage, 23 pages; "Silver-Lead Deposits of Slocan District, British Columbia," by A. M. Bateman, 19 pages; "Deformation in Ores, Coeur d'Alene District, Idaho," by W. A. Waldschmidt, 14 pages; and "Some Magnetite-Hematite Relations," G. Gilbert, 10 pages.

## Men You Should Know About

**F. H. Brownell**, vice-president of the A. S. & R. Co., was recently in San Francisco.

**Bancroft Gore** recently arrived in New York from Buenos Ayres on the steamship "Western World."

**H. T. Leslie**, formerly of the Dome Mines staff, has been appointed manager of the Goudreau Gold Mines in Northern Ontario.

**Dr. J. A. L. Henderson**, geologist, who has specialized in oil investigations, will soon make a visit to Canada.

**Lucius W. Mayer**, of Rogers, Mayer & Ball, has returned to New York after an absence of a month in Guatemala and Honduras.

**R. H. Humphrey**, mining engineer of San Francisco, recently returned from British Columbia, where he examined dredging ground.

**H. G. Ferguson**, of the U. S. Geological Survey, is at Mina, Nev., completing the geological map of the Hawthorne quadrangle.

**John W. Sherwin**, general manager for the West End Consolidated Mining Co., has been in Tonopah, Nev., from his Oakland headquarters.

**F. C. Ninnis**, mill superintendent for the West End Consolidated Mining Co., at Tonopah, has returned to Tonopah from an extended trip to various California points.

**Emmet D. Boyle**, general manager of the Mason Valley Mines Co. of Thompson, Nev., was recently in San Francisco on business connected with the operations of his company.

**W. W. Anderson**, of Tonopah, Nev., has purchased the Nevada Laboratories, Inc., of Reno, Nev., and will conduct a general assaying and analytical laboratory for commercial work.

**Hugh D. Miser** has been appointed State Geologist of Tennessee, by the Board of Natural Resources of that state, succeeding **Wilbur A. Nelson**. The appointment was as of Sept. 1.

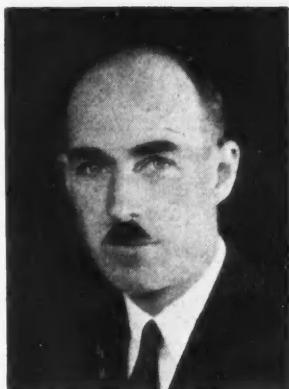
**S. K. Dahl** has returned to his Los Angeles office from Texas and Arizona, where he has spent the last three weeks on professional business in connection with operation and construction of cyanide and concentrating plants.

**F. Julius Fohs**, vice-president and head of the geological department of the Humphreys Oil Co., was in Houston recently. From there he went to Casper, Wyo., to attend the meeting of the petroleum section of the A.I.M.E.

**Charles R. Romanowitz** has returned to his old position as sales manager for the Yuba Manufacturing Co., of San Francisco. Mr. Romanowitz was for a long time identified with the gold-dredging industry of California and has many friends in the industry.

**Gerald Fitzgerald**, head of a U. S. Geological Survey body that has spent the last summer in visiting the valleys of the Colville and Noatak rivers, on the Arctic slope of Alaska, has returned to the United States, arriving in Seattle on Sept. 16. He reports the discovery of oil in the regions visited.

**D. E. A. (Ted) Charlton** has been appointed manager of mining sales for the Goheen Corporation, of New Jersey, paint manufacturers. He assumed his new duties on Sept. 21. After several years of mining experience Mr. Charlton joined the editorial staff of *Mining Journal-Press* in 1917, and assumed the post of managing editor in 1919. In August, 1922, he was transferred to the business department, becoming business manager in 1923. Charlton is a member of the A. I. M. E. and has been active in the affairs of the Institute. He also enjoys an enviable reputation as a raconteur, his "Cousin Jack" stories being familiar to a wide circle of



D. E. A. Charlton

friends and acquaintances. Mr. Charlton makes his new headquarters at the New York office of the Goheen Corporation, at 331 Madison Avenue.

**C. Kingsley Thomas** lately finished his work as a Royal Commissioner to report on the mining industry of West Australia. He says the Kalgoorlie mines have been most wasteful in their methods of ore treatment, and is convinced that something will soon be done in the way of the more economical application of power to mining.

**E. Bails** has terminated his engagement as mine superintendent of Mount Isa Mines, Ltd., and **W. H. Corbould** is now in charge of the mining operations of the company on the field. Mr. Bails took up the position about the middle of last year, in succession to **E. C. Saint-Smith**, who resigned in August, 1924, to return to the service of the Queensland Geological Survey.

**Guy C. Riddell** is making a trip to England and the Continent, returning in October to new offices at No. 1 Broadway, New York City. He will still retain his residence in Washington, D. C., where the Alaska Pacific Coal Company has headquarters. He had just returned from an inspection of the field operation of the S. T. V. Company in California, Utah and Wyoming. At Santa Maria petroleum from the diatomaceous earth shale deposits of California is being produced commercially, and is marketed for fuel oil and

as flotation oil in South America, Alaska, and the United States. The original plant, in operation for three years, is now being quadrupled in size.

**Prof. Courtenay DeKalb**, of Tuscon, Ariz., has been appointed head of the Department of Mines of the University of Alabama. Professor DeKalb has an enviable reputation as a mining engineer. During his forty years of experience in the mining field, he has been president and general manager of the Pacific Smelting & Mining Co., manager and consulting engineer for a number of other mines, associate editor of the *Mining and Scientific Press*, and professor of mining and metallurgy at the University of Missouri and at Queen's University, Canada. Professor DeKalb is the author of a number of books, including "Handbook of Explosives," "Nicaragua Canal—Our's or England's," and "A Visit to King Solomon's Mines." He is an honorary member of the Geological Society of Peru, and a member of the American Institute of Mining Engineers, American Chemical Society, and a number of other organizations.

**Richard W. Smith**, for over four years assistant geologist on the Tennessee Geological Survey, will leave soon for a year's study at Cornell University. Mr. Smith came to Tennessee in 1921, immediately after receiving his degree of Bachelor of Science in geology and geological engineering from the Massachusetts Institute of Technology. His first work on the state survey was assisting **Dr. R. S. Bassler** of the U. S. National Museum in a survey of the geology and mineral resources of the Franklin Quadrangle. In 1923 Mr. Smith started an investigation of the phosphate deposits and industry of Tennessee, the results of which will be published this winter in a bulletin of the Tennessee Geological Survey. At Cornell University Mr. Smith plans to take a Master's degree in economic geology, studying under **Dr. H. Ries**, an authority on non-metallic mineral deposits. His thesis will be a microscopic examination of Tennessee phosphatic limestones for the purpose of learning more of the origin of the phosphates.

### Obituary

**Arthur Dale Knowlton**, mining and civil engineer of Salt Lake City, Utah, was killed on or about Sept. 10 while working on a party headed by **J. J. Beeson** that was making an examination of the Engineer mine at Atlin, B. C., for the Pope Yeatman interests. Details of the accident, which were meager, stated that Mr. Knowlton had been struck by a falling plank and died without regaining consciousness.

Mr. Knowlton, who was born in Salt Lake forty-two years ago, the son of the late **John Quincy** and **Ellen Knowlton**, was widely known both as a capable, resourceful engineer and a man of many sterling qualities. He was a graduate of the University of Utah. During the late war he was stationed in the east as a captain in the engineers' corps. He is survived by his widow, **Elizabeth Palmer Knowlton**, and two daughters.

## New Machinery and Inventions

### A Refinement in Anti-friction Bearings

Design of Tapered Roller Type Improved to Provide  
Two-area Contact—Perfect Alignment—  
Special Alloy Steel Used

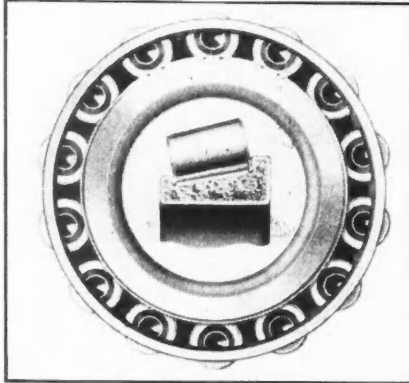
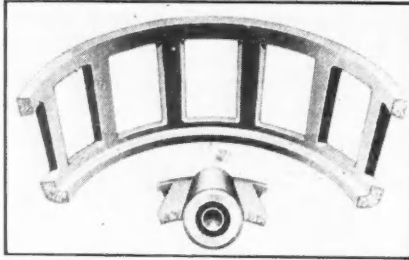
An improved type of tapered roller bearing, differing from the well-known Timken bearing in certain refinements, but retaining all essential elements which have characterized the tapered design of this bearing, is now being produced by the Timken Roller Bearing Co., Canton, Ohio. Nickel-molybdenum steel, of special formula, has been adopted for all bearings. The inclusion of the alloys, nickel and molybdenum, produces a steel possessing properties of grain texture, toughness, hardening, heat-treating and machining which reflect favorably in the life of anti-friction bearings.

In the bearing itself the design of the roll has been changed so that the surface of the large end presents a right-angle relation to the center line of the roll. The contact then between the large end of the roll and the rib of the cone is in two areas, the latter being slightly undercut. This two-area contact insures perfect axial alignment between the center line of the roll and the center line of the bearing at all times. Likewise, there is always absolute line contact between the surface of the roll and the surface of the cone, and between the surface of roll and the surface of the cup.

An added purpose served by the two-area contact is self-alignment of rolls on cone, in the cup, without resorting to a cage fixture to retain the alignment. The primary purpose served by the cage is to retain the rolls, properly spaced about the cone, and to make the cone with its set of rollers a unit assembly. The skewing of the roll on the cone raceway is impossible, since the two areas on the end of the roll make generously separated points of contact with the shoulder or rib of the cone, as shown in the illustration.

The Timken cage has been improved along with the cone and roller assembly. Previously, the cage was cold-pressed into the shape of a cup, the bottom was stamped out, and the pockets for the rolls were punched out, one at a time, by an automatic punch press. The result of this single stamping operation was positive uniformity of cage pockets, yet it produced a progressive error in alignment, due to stretching of the metal, as the indexing fixture advanced the metal cage to the final perforation. To correct this microscopic error, a multiple perforating die was developed which perforates all roll pockets in the cage by a single impact. Further to safeguard against any possibility of error during this operation, due to distortion, an inwardly turned flange has been retained on the smaller side of the cage. To insure smoothness and a perfect fit of the rollers in the cage, the lateral edges of the cage are swedged inward so that

the contour of the sides of the cage pocket conform to the contour of the roll. This operation is termed "winging." Dies similar to the multiple perforator are used, so that all cage pockets are winged simultaneously. The



An improved type of tapered roller bearing

The skewing of the roller on the cone raceway is impossible, since the two areas of the end of the roll make generously separated points of contact with the shoulder or rib of the cone, as shown.

inwardly turned flange and the results of the winging operation are shown in the illustration.

With the introduction of more quietly running parts in certain machine installations, the manufacturer has kept pace by reducing the noise in the bearing to a marked degree, by the self-aligning principle and the accurately perforated cage. These special installations require a definite uniform standard of quietness. To secure this uniformity specially tested bearings are necessary. For this purpose an electrical sound-testing machine was developed which measures the noise in a running bearing by means of an electric current. A sounding box connected to a telephone receiver, and a set of radio tubes carry the amplified noise vibrations of a running bearing to a galvanometer connected to an arbitrarily indexed dial. The human element is removed entirely, the noise being registered with unflinching accuracy on the dial where it can be read by the operator. By the use of this machine it is possible to select bear-

ings to a set standard suitable for the most quiet applications, as well as to locate the cause of noise.

Although the older type of bearing showed a remarkably low co-efficient of friction, yet in the improved type this is reduced materially. The self-aligning properties of the rolls to the cone face admit much higher running speeds. The nickel-molybdenum steel used reduces wear, so that in most cases the initial adjustment need never be disturbed.

These various refinements make the improved bearing especially adaptable to all industrial uses, and particularly to high speeds common in machine tools. The tapered construction of cone, cup, and rollers is retained, since this is the only type of construction which will carry successfully all loads without resorting to thrust washers or special thrust bearings.

### Protection for Galvanized Iron in Paint

Every galvanized iron surface, exterior and interior, requires protection. Evidence indicates that ordinary paints will not hold on new galvanized iron. The galvanizing process, it seems, leaves upon the metal a film of zinc chloride which prevents the paint from forming a perfect bond and causes it to peel. Removal of the zinc chloride with an acid wash tends to nullify the object of galvanizing and necessitates the use of a priming coat, which means additional cost for labor and material. Besides, it does not solve the painting problem.

Weathering is sometimes used as an alternative. But the objection to weathering is that it allows rust to start immediately in the numberless surface abrasions or pores, especially around rivet holes. Rust once started is difficult to arrest, and the structure is ultimately doomed unless frequently repainted.

A special paint known as Galvanum, is said to overcome the objections mentioned and provide successful protection to galvanized iron. It may be applied directly to the metal—eliminating the use of a special primer—and requires no preliminary treatment. It is made in eight colors, which can be tinted to any shade, as well as special shades. This paint is made by the Goheen Corporation of New Jersey, Newark, N. J. The New York office is at 331 Madison Ave.

### New Mining Catalog Out

The new edition of "The Mining Catalog," has been received from the Keystone Consolidated Publishing Co., Inc., 800 Penn Ave., Pittsburgh, Pa. It has been completely revised. Its 928 pages contain the catalogs of manufacturers who are making about sixty different classes of equipment. The book is divided into twenty-six sections, each one covering a special division of the mining and metallurgical field. The book is styled by the publisher as the "Metal-Quarry Edition," which is intended to serve the metal and non-metallic mining industries as well as the sand, gravel, quarry and cement industries.

### Roller Bearings Feature New Induction Motors

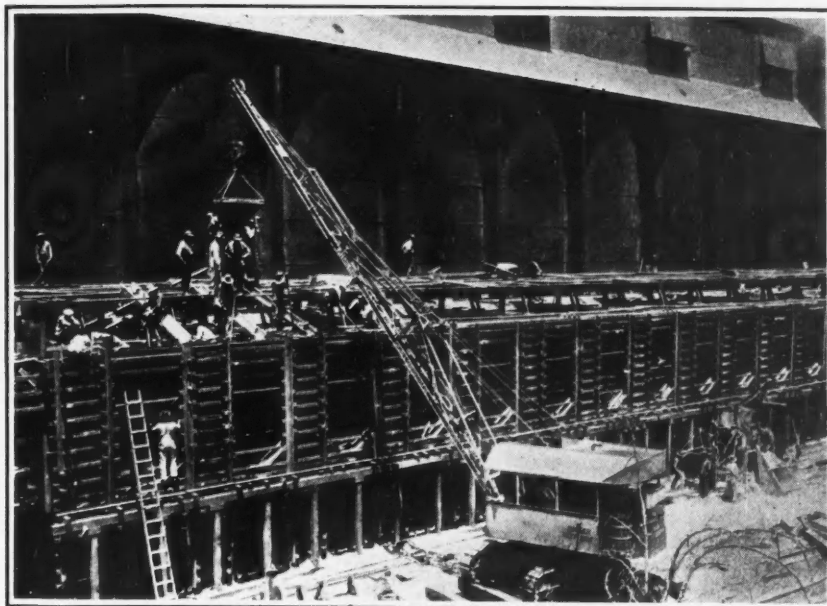
After two years of experimental and development work, the Allis-Chalmers Mfg. Co., Milwaukee, Wis., has placed on the market a complete line of twenty-five and sixty-cycle squirrel-cage and slip-ring induction motors equipped with Timken tapered roller bearings; this is in addition to its line of sleeve-bearing motors. The tapered roller bearing has been used because of its ability to withstand continued heavy radial and thrust loads without undue heating or appreciable wear. It is particularly suited to heavy service and will operate satisfactorily at the high speeds found in the general-purpose induction motor. Because of the rolling action of the bearing, there is practically no wear, so that the factory-adjusted air gap is maintained indefinitely, eliminating any possibility of the rotor striking the stator.

The important question of lubrication is greatly simplified, as grease is used, requiring very infrequent attention on the part of the operator. This is an important point, because it has been found that many motor troubles can be traced to improper lubrication. The bearings have grease-tight inclosures, effectively excluding dirt or abrasive matter that might cause undue wear. The mounting of the bearings is simple, being only a light press fit for both the cone and cup, and not requiring the use of a lock nut or other means of holding the races in place. This also facilitates the removal of the bearings whenever necessary.

In addition to the bearings, special attention has been given to many other features of design of this line of motors. The frame is made of steel, with feet cast integral, to withstand shocks encountered in use with the Allis-Chalmers' company's crushers, grinders, and other machinery. In applying the motors to centrifugal pumps, severe conditions of moisture are often met, so the coils are thoroughly insulated and baked in a water-proof varnish.

In cement mills, motors must operate in very dusty places, and the method of ventilation must successfully meet these conditions. The openings in the housings and frames for ventilation are so placed in vertical planes that falling objects cannot enter the motor. The roller-bearing motor is particularly adapted to many applications, because the over-all length is considerably less than for a sleeve machine.

This motor, equipped with roller bearings, can now be obtained in all ratings.



*Pouring concrete for fine-crushing bins in course of erecting Inspiration Consolidated's new leaching plant*

### Crane Does Well on Unusual Work—Pouring Concrete

A rather new type of application for corduroy cranes was made during the erection of the new leaching plant for the Inspiration Consolidated Copper Co., in Arizona. It was necessary to form a monolithic structure about 40 ft. high and of considerable length, containing a total of 1,050 cu.yd. of concrete. The work of hoisting the hoppers of concrete from the concrete mixer to the place of pouring was all performed by a P. & H. model 206 crane, equipped with a 38-ft. boom with a 12-ft. extension. This machine ran continuously from 7 a.m. June 1 to 5:40 p.m. June 5, a total of 106 hours and 40 minutes, with only one stop for draining the oil from the crank case. The workmen were divided into three sections, each working an eight-hour shift, but the machinery ran continuously, with provision made to take on

gasoline and water through a hose connection while working.

The batch hoppers were of  $\frac{1}{2}$  cu.yd. capacity, but on this job they carried only 12 cu.ft., owing to the limited capacity of the mixer. The crane averaged one cycle every 2.7 minutes throughout the period.

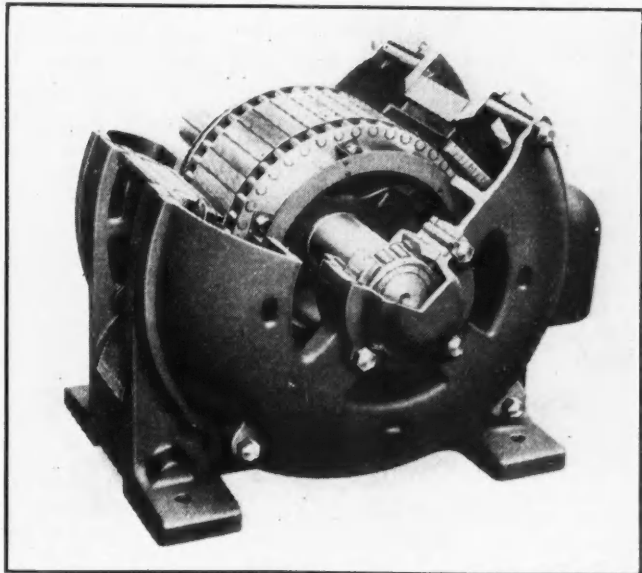
This same equipment was also used later in building the walls of the solution tanks and leaching tanks.

### Selby Metals Handsomely Advertised

One of the most beautiful specimens of the printer's art that has come to hand is the new 208-page catalog (No. 25) gotten out by the American Smelting & Refining Co.'s Selby Smelting Works at San Francisco. It is published, the company states, to aid buyers and users of lead and those products of which lead is a part, as well as of alloyed metals. Its dimensions, 5 x 6 $\frac{1}{2}$  in., make it convenient for the purchasing agent to slip in his pocket when going to a ball game, and in decided contrast to some catalogs whose bulk rivals that of the New York City telephone directory. Every page is a handsome example of two-color printing. A wide variety of products are covered, ranging from pig lead to fishing sinkers. The address of the Selby Smelting Works, Sales Dept., is 201 First St., San Francisco. The book is attractively bound in leather, stamped in gilt.

**Wire Rope**—The September number of "The Hercules Record" has been received. This is published monthly in St. Louis, by A. Leschen & Sons Rope Company. It contains various items of interest to users of wire rope.

**Gas Regulators**—Bulletin 200 A. of the Alexander Milburn Co., 1416 West Baltimore St., Baltimore, Md., describes Milburn pressure gages and regulators for the accurate reduction of varying gas pressures to the pressure required for welding and cutting.



*Sectionalized view of roller-bearing motor*

# The Market Report

## Metal Markets Less Active

### Copper Prices Decline Through Vigorous Selling by One Company —Zinc Somewhat Stronger; Lead and Tin Steady

New York, Sept. 23, 1925—The week ending today has not been so active in the non-ferrous metal markets as those immediately preceding, though actual consumption of the metals seems to be going on unabated. Copper has been the worst performer, sales being only half what they were last week. The price of that metal has also declined. Zinc sales have been in satisfactory

volume and the price has strengthened further, with lead and tin substantially unchanged from last week.

#### Copper at 14½c. Delivered

On Thursday, Friday, Saturday and Monday copper generally sold around 14½c. for Eastern deliveries, with 14¼@14½c. obtainable in the Middle West. In the last two days, however, it has

been more difficult to get these prices, and today it seems to have been impossible to realize more than 14½c. on such sales as have been made, which have all been to Eastern points; in fact, one lot was sold for 14.45c. One seller has been especially active all week and has sold more than all the others put together. Naturally, it has been necessary to cut prices to secure such a large proportion of the business. Other sellers have sold only modest amounts at the higher prices that they have quoted. Today, some large sellers have not yet decided to compete at the 14½c. level, though at least three or four are offering at that figure.

Copper has again been unsaleable all week in Europe, and some sellers here feel that more European buying is necessary if recent prices are to persist. Though recent statistics have been extremely favorable, they feel that the present conditions in the European market do not guarantee a continuance of the good news from the statisticians. Others maintain that this is a short-sighted view of the situation; that European buying must soon re-assert itself, and when it does, the price of copper will quickly react.

Most of the sales have been for deliveries extending over the last three months of the year, though there is little difference between spot and January prices.

#### Zinc Reaches 7⅞c.

Sales of zinc have been in fair volume during the last week, and the market has advanced slowly to 7⅞c. which was paid for prompt zinc today. Forward metal has sold for about 2½ points less. The strength in zinc is very pronounced. The English zinc operators are bullish and some of them are buying heavily at present levels, possibly trying to engineer a squeeze in metal for prompt delivery. A large domestic inquiry for brass special came into the market during the week and high-grade zinc prices were again advanced, 9¼c. now being quoted for this grade delivered in the East.

#### Lead Market Steady

The American Smelting & Refining Co. continues its official contract price for New York lead at 9.50c. A comparatively small tonnage of prompt metal has been sold at 9.60c. but the amount involved is small compared with the volume of contract sales. In the St. Louis market, the leading factor continues to sell freely through October at 9.25c. There appears, however, to be a scarcity of spot lead and small lots brought as much as 9.40c. on Monday and Tuesday of this week. However, this premium is less evident today. Backwardation in the London market has reached the unusual figure of £3-5s., reflecting a scarcity of prompt

### Daily Prices of Metals

Sept.	Copper N. Y. net refinery*		Tin		Lead		Zinc
	Electrolytic	99 Per Cent	Straits	N. Y.	St. L.	St. L.	
17	14.40	56.75	58.875	9.50	9.25	7.725@7.75	
18	14.375	56.50	58.625	9.50	9.25	7.75	
19	14.375	56.50	58.625	9.50	9.25	7.80	
21	14.375	56.75	58.75	9.50	9.25@9.30	7.80@7.825	
22	14.35	56.375	58.375	9.50@9.55	9.25@9.275	7.80@7.85	
23	14.25	57.125	58.75	9.50	9.25	7.85@7.875	
Av.	14.354	56.667	58.667	9.504	9.256	7.798	

\*The prices correspond to the following quotations for copper delivered: Sept. 17th, 14.65c.; 18th, 19th and 21st, 14.625c.; 22nd, 14.60c.; 23rd, 14.50c.

The above quotations are our appraisal of the average of the major markets based generally on sales as made and reported by producers and agencies, and represent to the best of our judgment the prevailing values of the metals for deliveries constituting the major markets, reduced to the basis of New York cash, except where St. Louis is the normal basing point, or as otherwise noted. All prices are in cents per pound. Copper is commonly sold "delivered," which means that the seller pays the freight from the refinery to the buyer's destination.

Quotations for copper are for ordinary forms of wire bars, ingot bars and cakes. For ingots an extra of 0.05c. per lb. is charged and there are other extras for other shapes. Cathodes are sold at a discount of 0.125c. per lb.

Quotations for zinc are for ordinary Prime Western brands. Quotations for lead reflect prices obtained for common lead, and do not include grades on which a premium is asked.

The quotations are arrived at by a committee consisting of the market editors of *Mining Journal-Press* and a special representative of the Bureau of Mines and the Bureau of Foreign and Domestic Commerce.

### London

Sept.	Copper			Tin		Lead		Zinc	
	Standard		Electrolytic	Spot	3M	Spot	3M	Spot	3M
	Spot	3M							
17	62	63	68	260½	262½	39 1/16	36 1/2	37 3/16	36 11/16
18	61¾	62¾	67¾	260½	262½	40	36 1/8	37 5/16	36 3/4
21	62	62 7/8	68	262	264	40 1/2	37 1/4	37 5/8	36 1/2
22	61¾	62¾	68	261 5/8	262 7/8	39 7/8	36 3/4	37 7/8	37 3/16
23	61½	62½	67½	264 1/4	264 1/2	39 5/8	36 5/8	38 1/4	37 5/16

The above table gives the closing quotations on the London Metal Exchange. All prices in pounds sterling per ton of 2,240 lb.

### Silver, Gold, and Sterling Exchange

Sept.	Sterling Exchange "Checks"	Silver		Gold London	Sept.	Sterling Exchange "Checks"	Silver		Gold London
		New York	London				New York	London	
17	4.84 1/4	70 7/8	32 1/8	84s 11 1/2 d	21	4.84 1/8	72	33 1/8	84s 11 1/2 d
18	4.84 1/4	70 3/4	32 5/8	84s 11 1/2 d	22	4.84	71 3/4	33 7/16	84s 11 1/2 d
19	4.84 1/4	71 1/8	32 3/4	...	23	4.84 1/8	71 1/4	33	84s 11 1/2 d

New York quotations are as reported by Handy & Harman and are in cents per troy ounce of bar silver, 999 fine. London silver quotations are in pence per troy ounce of sterling silver, 925 fine. Sterling quotations represent the demand market in the forenoon. Cables command three-eighths cent premium.

metal in that market. This is probably accounted for by the difficulties of shipping which may interfere with deliveries of Australian metal. Estimates of the American Bureau of Metal Statistics indicate a decrease of 2,000 tons in world production for August.

Demand by cable makers is particularly brisk with inquiries somewhat better this week than during the latter part of last week.

**Tin Continues Dull**

There has been little activity in the tin market, though the price has remained fairly steady, with spot metal commanding a modest premium over future shipment. The sag on Sept. 22 was accounted for by the arrival of a good-sized cargo on one boat, and the price today is again fairly firm at 58.75c. An increase of £2 12s. 6d. in London today has been a factor.

**Silver Market Fluctuates**

The fluctuations in the silver market in both New York and London during the week were caused by the varying positions taken by China. India has shown some disposition to buy, but at rates somewhat below the New York market. New York silver is quoted today at slightly under the London parity for the first time since July 14.

Mexican Dollars: Sept. 17th, 54½c.; 18th, 54¼c.; 19th, 54½c.; 21st, 55¼c.; 22nd, 55½c.; 23rd, 54¾c.

**Foreign Exchange Steady**

A slight improvement in French francs and a correspondingly small decline in Italian lire took place during the week. Closing quotations of the principal foreign exchanges on Tuesday noon Sept. 22 were as follows: francs 4.73c.; Italian lire 4.08c.; and German marks 23.8c. Canadian dollars are at par.

**Other Metals**

Quotations cover large wholesale lots unless otherwise specified.

**Aluminum**—99 per cent grade, 28c. per lb.; 98 per cent, 27c. London, £118 @ £120 per long ton for 98 per cent.

**Antimony**—Chinese brands, spot, 17@17½c. per lb.; September, 16½@17c.

Market firm and active, with good demand for forward; fair demand for spot.

Cookson's "C" grade, spot, 19½c. Needle and oxide nominally unchanged from quotations in the Sept. 5 issue.

**Bismuth**—\$2.65@£2.70 per lb., in ton lots. London, 10s.

**Cadmium**—60c. per lb. London, 2s. 3d.

**Iridium**—\$400 per oz. for 98@99 per cent. Nominal. London, £80.

**Nickel**—Ingot, 33@34c.; shot, 34@35c.; electrolytic, 38c.; London, £170@£175 per long ton.

**Palladium**—\$78@£83 per oz. Crude, \$65. London, £16@£16 10s. nominal.

**Platinum**—\$120 per oz. refined officially quoted. Sales also at \$115@£118. Crude, \$113.50@£114. London, £25 per oz. for refined; crude £23.

**Quicksilver**—\$81.50@£82.50 per 75-

lb. flask. San Francisco, \$80.83. London, £13 10s.@£13 12s. 6d. Market very dull.

**Ruthenium**—\$98@£100 per oz.

The prices of Cobalt, Germanium Oxide, Lithium, Magnesium, Molybdenum, Monel Metal, Osmiridium, Osmium, Radium, Rhodium, Selenium, Tantalum, Tellurium, Thallium, Tungsten and Zirconium are unchanged from the Sept. 5 issue.

**Metallic Ores**

**Manganese Ore**—Per long ton unit of Mn, c.i.f. North Atlantic ports:

Brazilian, 42@44c.

Indian, 44c.

Caucasian (unwashed), 42c.

Caucasian (washed), 44c.

Market, both domestic and foreign, quiet. Little activity expected till first of year.

**Tungsten Ore**—Per unit of WO<sub>3</sub>, N.Y.:

High-grade wolframite, \$12.50. Ordinary quality, \$11.75@£12. Market quiet as a consequence of large buying during the last month. Consumers fairly well covered for remainder of the year. Prices in Europe are better.

High-grade Western scheelite, \$12.50 @£13, nominal.

**Chrome Ore**—Indian ore—second grade—offered c.i.f. New York at \$19 per long ton. High grade Indian ore, \$22@£23. Rhodesian ore offered at \$23. Prices largely nominal.

Galena and Pyrite Radio Crystals, Iron Ore, Molybdenum, Tantalum, and Vanadium Ores are unchanged from quotations in the Sept. 5 issue.

**Zinc Blende Stronger—**

**Lead Ore Unchanged**

Joplin, Mo., Sept. 19, 1925

Zinc Blende		Per Ton
High	.....	\$59.05
Premium, basis 60 per cent zinc	.....	\$56.00@£57.00
Prime Western, 60 per cent zinc	.....	\$54.00@£55.00
Fines and slimes, 60 per cent zinc	.....	\$53.00@£50.00
Average settling price, all..	.....	\$53.41

**Lead Ore**

High	.....	\$134.87
Basis 80 per cent lead	.....	\$115.00
Average settling price, all..	.....	\$127.30

Shipments for the week: Blende, 18,430 tons; lead, 3,071 tons. Value, all ores the week, \$1,378,330.

Zinc quotations, as above, do not indicate the full strength of the market, as a considerable increased tonnage sold on the \$55 basis. In order not to change the range of quotations some buyers are introducing new variations, by adding \$1 per ton to the offering. This simply means no reduction for iron, and this has been carried to 3 per cent content. It is a process of getting the ore by advancing prices on a fictitious quotation.

Platteville, Wis., Sept. 19, 1925

Zinc Blende		Per Ton
Blende, basis 60 per cent zinc	.....	\$56.50
<b>Lead Ore</b>		
Lead, basis 80 per cent lead	.....	\$115.00

Shipments for the week: Blende, 1,011 tons; lead, 225 tons. Shipments for the year: Blende, 34,239; lead, 1,621 tons. Shipments for the week to separating plants, 1,604 tons blende.

**Non-Metallic Minerals**

Amblygonite, Andalusite, Asbestos, Barytes, Bauxite, Beryl, Borax, Celestite, Chalk, China Clay, Diatomaceous Earth, Emery, Feldspar, Fluorspar, Fuller's Earth, Garnet, Gilsonite, Graphite, Greensand, Gypsum, Ilmenite, Iron Oxide, Lepidolite, Limestone, Magnesite, Manjak, Mica, Monazite, Ocher, Phosphate, Potash, Pumice, Pyrites, Quartz Rock Crystals, Rutile, Silica, Spodumene, Sulphur, Talc, Tripoli, and Zircon are unchanged from prices in the Sept. 5 issue.

**Mineral Products**

Arsenious Oxide (White arsenic)—3.50@3.75c. per lb.

Copper Sulphate, Sodium Nitrate, Sodium Sulphate, and Zinc Oxide are unchanged from prices in the Sept. 5 issue.

**Ferro-Alloys**

Ferrotungsten — \$1.15 per lb. contained W. Market firm, with tendency toward better price.

Ferrocerium, Ferrochrome, Ferromanganese, Ferromolybdenum, Ferrosilicon, Ferrotitanium, Ferro-uranium and Ferrovandium are unchanged from the prices in the Sept. 5 issue.

**Metal Products**

Rolled Copper — Sheets, 22½c.; wire, 16½c. per lb.

Nickel Silver—29½c. per lb. for 13 per cent nickel Grade A sheets.

Yellow (Muntz) Metal—Sheets, 20½c. per lb.; rods, 17½c.

Lead Sheets—Rolled, 13½c.; clipped, 13½c.

Zinc Sheets — 11c. per lb., f.o.b. works.

**Refractories**

Chrome Brick, Firebrick, Magnesite Brick, Silica Brick, and Zirkite are unchanged from prices in the Sept. 5 issue.

**Steel Remains Steady—**

**Pig Iron Dull**

(Pittsburgh, Sept. 22, 1925)

The steel trade has now reached as high a stage of activity as can be expected for this half year. Consumption is heavy, but has already been reflected in buying and in production, while there is nothing to suggest a further increase in consumption as a whole. On the other hand some lines will have a seasonal tapering off.

Steel prices are steady. Merchant bars were under question about a month ago but have stood the ordeal well, being firm at 2c. Shapes, plates, sheets and wire products are not showing the slightest weakening tendency. In many lines prices vary according to tonnage, territory, etc.

**Pig Iron**—The active furnaces, which are covered, have advanced prices 50c., to \$19.50 for bessemer, \$18.50 for basic and \$19 for foundry, f.o.b. valley furnaces.

**Connellsville Coke**—Asking prices for spot furnace are \$4 and higher, but the market is hardly above the level of a week ago, \$3.50@£3.75. Spot foundry is in particularly poor demand and remains quotable at \$4@£4.50.

## International Nickel Back in Ranks of Dividend Payers

The following dividends were paid during September by mining and metallurgical companies operating in the Americas:

Companies in the United States	Situation	Per Share	Total
American Metal	U. S. and Mex.	\$0.75 Q	\$443,657
American Metal pfd.	U. S. and Mex.	1.75 Q	87,500
American Smelting & Refining pfd.	U. S. and Mex.	1.75 Q	875,000
Bingham Mines, s. l.	Utah	0.50 Q	32,500
Butte & Superior, z. s.	Mont.	0.50 Q	145,048
Calumet & Arizona, c.	Ariz.	1.00 QX	642,532
California Rand Silver	Calif.	0.02 M	25,600
Calumet & Hecla Con. Co.	Mich.	0.50 Q	1,002,740
Eagle Picher Lead, l. z.	U. S.	0.40 Q	400,000
Federal Mining & Smelting pfd. s. l. z.	Idaho and Okla.	1.75 Q	210,000
Hecla Mining, s. l.	Idaho	0.50 Q	500,000
Homestake Mining, g.	S. D.	0.50 M	125,580
Inland Steel	Minn.	0.625 Q	629,379
Mohawk Mining, c.	Mich.	1.00 Q	115,000
National Lead	U. S.	2.00 Q	413,108
National Lead pfd.	U. S.	1.75 Q	426,433
St. Joseph Lead	Mo.	0.50 Q	968,033
Slas-Sheffield Steel & Iron	Ala.	1.50 Q	150,000
Tennessee Copper & Chemical	Tenn.	0.25 Q	198,650
Texas Gulf Sulphur	Texas	2.00 Q	1,270,000
Tintic Standard, s. l. c.	Utah	0.40 Q	459,766
U. S. Gypsum, pfd.	Various	1.75 Q	150,745
U. S. Gypsum	Various	1.40 Q	699,720
U. S. Steel	U. S.	1.75 Q	8,895,294
United Verde Copper	Ariz.	2.00 Q	600,000
Utah Copper	Utah	1.00 Q	1,624,490
Companies in other countries			
Chile Copper	Chile	0.625 Q	2,375,000
Hollinger Consolidated Gold	Ont.	0.08 4 wks.	393,600
International Nickel	Ont.	0.50 Q	836,680
Keeley Silver Mines	Ont.	0.12 QB	240,000
Lake Shore, g.	Ont.	0.05 Q	100,000
Lucky Tiger, s.	Sonora	0.07	50,073
McIntyre-Porcupine, g.	Ont.	0.25 Q	199,500

Q, quarterly; X, includes extra; M, monthly; SA, semi-annually; B, includes bonus of 4c.; C, includes extra distribution of \$1.; s, silver; l, lead; c, copper; z, zinc; g, gold.

An interesting feature of the mining company dividend list for September is the re-entry of the International Nickel Co., an absentee since 1919, when the decrease in demand following the conclusion of the war cut into profits. Butte & Superior and Calumet & Hecla, each with a disbursement of 50c., appear to be on a regular quarterly basis for the time being at any rate. The U. S. Gypsum Co. paid an extra dividend of \$1 per share on its 499,800 shares of common stock, in addition to the regular distribution.

Texas Gulf Sulphur and Lake Shore omitted the extra disbursements of last June but paid the regular quarterly amounts, \$2 and \$0.05 respectively. Mother Lode Coalition, which paid \$0.375 in June, is absent this month because it is on a semi-annual basis. In other respects there is little change between the table here shown and that for June.

## Sees Shortage of Zinc in Europe

Market prospects for zinc promise well for the fourth quarter from the producers' viewpoint, according to A. J. M. Sharpe, honorary foreign correspondent of the American Zinc Institute. In Europe the dwindling output which he forecast is coming to pass, and in the face of a steady expansion in consumption a shortage of metal is developing. There has been a certain amount of buying of American zinc by European importers since his report of a month ago, but as the St. Louis parity has generally ruled at about 10s. a ton higher than the London price, delivered, Liverpool basis, it will be readily understood that foreign buying has been much less than would otherwise have been the case. "I make bold to say now, however, that, irrespective of price considerations, European importers—British dealers particularly—must purchase United States slab zinc on a larger scale during the last quarter of the year," says Mr. Sharpe.

The order books of British galvanizers are in sound condition, and they are by no means well covered ahead for their needs. As is customary, they are leaving themselves in the hands of the dealers to whom they regularly look for supplies, so that these operators must perforce import American metal more freely as the Continental supply dries up. Belgian smelters are offering forward delivery reluctantly, and because moderate tonnages of Tri-State ore are being imported, it does not follow that this will increase the tonnage of Belgian zinc available for Britain. Indeed, this United States ore is being imported solely by the Vieille Montagne Co., which fabricates all of its output of

slab. The same buyer will adopt a precisely similar policy in connection with the western American concentrates that it is importing via Portland. So busy is the Vieille Montagne just now that it is taking eight weeks to deliver sheet zinc orders and cannot accept fresh business for any shorter delivery.

The ore situation strictly governs the European zinc industry, and now that the last of the British Columbian concentrates for Belgium have been shipped, and there is a very limited tonnage of Broken Hill ore to be delivered under the Australian contract, the contraction in the output of slab zinc over the next few months is marked.

For the first time this year the insistent demand for high-grade metal has been overtaken. Spot delivery has invariably commanded a substantial premium. At the moment, in consequence of the German brass makers having filled their requirements, second-hands in that country are offering 99.9 per cent zinc at a premium of merely 13 over the price of G. O. B. metal, or what is equivalent to Prime Western.

The Coley zinc process, to which reference was made some months ago, is likely to attract much publicity at an early date. The tests made by independent engineers at the small demonstration plant were not carried to a conclusion, owing to mechanical breakdowns. The results obtained, however, were sufficiently heartening to the company owning the process to encourage it to proceed immediately with the erection of a full working unit. This will have a capacity of ten tons of ore per twenty-four hours, and is expected to be ready about the end of October. Meanwhile, one of the leading European zinc smelters is sending four different classes of zinc ore to London for testing purposes in the small demonstration plant and will carry out the trials by its own men, who are coming to England for the express purpose. Mr. Sharpe still believes that if the Coley process stands up under working tests in the pilot plant now in course of erection, and corroborates the results attained in the little plant, it will in time revolutionize zinc-smelting practice. Of the number of European and American zinc people who have seen the process in operation, none has condemned it and each retains an open mind pending the repetition or otherwise of results on a larger scale.

Mr. Sharpe estimates world stocks of zinc as at Sept. 1, 1925, as follows:

	Metric Tons
United States	15,490
Germany and Poland	5,400
Canada	700
Great Britain	600
Belgium	1,700
France	800
Scandinavia	200
Australia (including unsold shipments afloat)	2,000
Far East	500
Elsewhere	500
Total	27,890

"This is surely a most satisfactory statistical position, as, apart from the United States, the stocks elsewhere are purely the constant tonnage on smelter floors awaiting delivery to markets," he concludes.

## August Copper Production Lowest of Year

Copper production by the countries of the world which furnished about 97 per cent of the world's total in 1923 and 1924 declined in August, according to the following table from the American Bureau of Metal Statistics. In the main, production of blister copper is shown without any attempt to segregate according to countries of origin.

### World Copper Production in 1925 in Short Tons

	April	May	June	July	Aug.	Jan.-Aug.
United States	79,149	77,041	76,587	76,335	72,861	629,995
Mexico	2,468	2,323	3,080	3,001	2,693	22,111
Canada	1,590	2,527	2,410	1,649	2,356	16,106
Chile and Peru	17,405	18,504	18,453	18,966	18,154	148,823
Japan	5,928	6,562	5,838	(a) 6,000	(a) 6,000	47,712
Australia	890	1,473	1,989	741	876	8,688
Europe (b)	9,300	8,700	7,700	9,300	9,000	70,100
Belgian Congo	7,562	8,856	9,418	9,048	10,004	67,208
Rhodesia	218	250	210	210	(a) 200	1,726
Totals	124,510	126,236	125,685	125,250	122,144	1,012,469
Estimated for non-reporting countries	3,800	3,900	3,900	3,900	3,900	31,400
World's total	128,300	130,100	129,600	129,200	126,000	1,043,900

(a) Estimated. (b) Incomplete; partly estimated.



# Current Prices of Mine Materials and Supplies

## Rise and Fall of the Market

The current market for mine materials and supplies show an excess of advances over declines. Pine timbers are higher in Chicago, Boston and Kansas City, while Denver reports weakness in Douglas fir. In New York, the price of 3x12 to 12x12, 20-ft., l.-l. yel. pine timbers has not fluctuated, perceptibly, in three months. There is some unevenness in prices of track supplies in the St. Louis district. Galvanized steel sheets, structural shapes, c.-i. pipe, lime and linseed oil are firmer, generally, while nails and hollow tile are down, particularly in the West.

**SHEETS**—Quotations are per 100 lb. in various cities from warehouse also the base quotations from mill:

	Pittsburgh, Large Mill Lots	St. Louis	Chicago	San Francisco	New York
Blue Annealed					
No. 10	\$2.25@2.30	\$3.60	\$3.50	\$3.70	\$3.89
Black					
No. 28	3.10@3.20	4.50	4.00	4.65	4.35
Galvanized					
No. 28	4.20@4.30	5.50	5.00	5.75	5.35

**STEEL RAILS**—The following quotations are per ton f.o.b. Pittsburgh and Chicago for carload or larger lots:

	Pittsburgh		Chicago	
	Current	Year Ago	Current	Year Ago
Standard bessemer rails	\$43.00	\$43.00	\$43.00	\$43.00
Standard openhearth rails	43.00	43.00	43.00	43.00

**TRACK SUPPLIES**—The following prices are base per 100 lb. f.o.b. Pittsburgh for carload lots, together with the warehouse prices at the places named:

	Pittsburgh		Chicago		St. Louis	San Francisco	Birmingham
	Current	One Year Ago	Current	One Year Ago	Current	Current	Current
Standard spikes, 1/2-in. and larger	\$2.80	\$2.80	\$3.55	\$3.65	\$4.35	\$2.90	\$2.90
Track bolts	3.90@4.15	3.75	4.55	3.25	5.85	3.90	3.90
Standard section angle bars	2.75	2.75	3.30	3.25@3.75	4.00	3.85	3.85

**STRUCTURAL MATERIAL**—Following are base prices f.o.b. mill, Pittsburgh and Birmingham together with quotations per 100 lb. from warehouses at places named:

	Pittsburgh, Mill	Birmingham, Mill	New York	Dallas	St. Louis	Chicago	San Francisco
Beams, 3 to 15 in.	\$1.90@2.00	\$2.05	\$3.34	\$4.00	\$3.25	\$3.10	\$3.30
Channel, 3 to 15 in.	1.90@2.00	2.10	3.34	4.00	3.25	3.10	3.30
Angles, 3 to 6 in., 1/2 in. thick	1.90@2.00	2.10	3.34	4.00	3.25	3.10	3.30
Tees, 3 in. and larger	1.90@2.00	2.10	3.34	4.00	3.25	3.10	3.30
Plates	1.80@1.90	2.00	3.34	4.00	3.25	3.10	3.30

**WIRE ROPE**—Discounts from list price, f.o.b. New York and east of Missouri River, on regular grades of bright and galvanized are as follows:

Cast steel round strand rope	20%
Galvanized steel rigging and guy rope	7 1/2%
Round strand iron and iron tiller	5%
Plow steel round strand rope	35%
Special steel round strand rope	30%
Galvanized iron rigging and guy rope	+12 1/2%

Drill Rod (from list)	New York	Cleveland	Chicago
	60%	55%	60%

**WROUGHT PIPE**—The following discounts are to jobbers for carload lots at Pittsburgh mill:

	Steel		Iron	
	Inches	Galv.	Inches	Galv.
BUTT WELD—	1 to 3	62	50 1/2	30
LAP WELD—	2 1/2 to 6	59	47 1/2	28

**STEEL PIPE**—From warehouses at the places named the following discounts hold for steel pipe:

	Black		
	New York	Chicago	St. Louis
3 1/2 to 6 in. lap welded	48%	51%	46%

**CAST-IRON PIPE**—The following are prices per net ton for carload lots:

	New York		Birmingham	Chicago	St. Louis	San Francisco
	Current	One Year Ago	Current	Current	Current	Current
6 in. and over	\$50.60@51.60	\$60.60@61.60	\$40.30@42.00 base	\$49.20@50.20	\$47.60	\$54.00

**NUTS**—Semi-finished, 1 1/2-in., 2c. each. Discount 70% for 1 1/4-in. and smaller; 65% for 1 1/2-in. and larger. Case hardened, 6c. each, less 50%.

**HOLLOW TILE**—Price per block in carload lots to contractor for hollow building tile.

	New York		Chicago	Philadelphia	St. Louis	San Francisco	Perth Amboy N. J.
	Current	One Year Ago	Current	Current	Current	Current	Factory
4x12x12	\$0.1162	\$0.1162	\$0.075	\$0.12	\$0.07	\$0.108	
6x12x12	.1743	.1743	.096	.12	.095	.156	\$0.252*
8x12x12	.2179	.2179	.135	.12	.132	.244	.312†

\* 10x12x12; † 12x12x12.

**MACHINE BOLTS**—1/2x1 1/2-in., per 100, \$1.70. Discount at New York warehouses on all sizes up to 1x30-in., 40%.

**LUMBER**—Prices of rough Douglas Fir No. 1 common, in carload lots to dealers at yards in San Francisco. To contractors, \$2 per M. ft. additional.

	6-8 and 12 Ft.	10-16-18 and 20 Ft.	22 and 24 Ft.	25 to 32 Ft.
3x3 and 4	\$26.00	\$27.00	\$28.00	\$31.00
3x6 and 8	26.00	27.00	28.00	31.00
4x4-6 and 8	26.00	27.00	28.00	31.00

Wholesale prices to dealers of long leaf yellow pine. To contractors in New York City, delivered from lighters or cars to job, \$5 additional.

	New York		Chicago	
	20 Ft. and Under	22-24 Ft.	20 Ft. and Under	22-24 Ft.
3x4 to 8x8	\$45.00	\$46.00	\$38.00	\$39.00
3x10 to 10x10	50.00	51.00	41.00	42.00
3x12 to 12x12	54.00	55.00	45.00	46.00

**Other Cities**

	8 x 8-In. x 20 Ft. and Under				12 x 12-In. 20 Ft. and Under	
	Pine	Fir*	Hemlock	Spruce	Pine	Fir*
Boston	\$51.00	\$48.00†	\$50.00	\$50.00	\$60.00	\$58.00†
Cincinnati	37.00	73.00	75.00	85.00	48.00	77.00
Denver	32.25	32.25				33.75
Minneapolis	43.00	38.75	35.00		44.50	38.75
Kansas City, Mo.	42.50	40.75			53.50	41.75
Philadelphia	54.00	34.00	37.00	40.00	62.00	34.00

\* Douglas fir. † Prime.

**NAILS**—The following quotations are per keg from warehouse:

	Pittsburgh, Mill	Chicago	San Francisco	Dallas	St. Louis	Montreal
Wire	\$2.65	\$3.15	\$3.50	\$4.20	\$2.90	\$4.95
Cut	2.90		5.00	5.00	3.30	5.00

**PORTLAND CEMENT**—Prices to contractors per bbl. in carload lots without bags. Cash discount not deducted.

	Current	One Month Ago	One Year Ago
New York, del. by truck	\$2.50@2.60	\$2.50@2.60	\$2.50@2.60
Chicago, f.o.b.	2.20	2.20	2.20
Cleveland, f.o.b.	2.39	2.39	2.39

**LIME**—Warehouse prices:

	Hydrated, per Ton		Lump, per Barrel 280-lb. net	
	Finishing	Common	Finishing	Common
New York	\$18.20	\$12.00@13.10	\$3.50	\$2.25@2.75
Chicago	20.00	18.00	1.45 (180-lb. net)	1.45

**INSEED OIL**—These prices are per gallon:

	New York		Chicago	
	Current	One Year Ago	Current	One Year Ago
Raw in barrel (5 bbl. lots)	\$1.08	\$1.07	\$1.05	\$1.05

**WHITE AND RED LEAD**—In 100-lb. kegs, base price in cents per pound:

	Dry		In Oil	
	Current	1 Yr. Ago	Current	1 Yr. Ago
Red	15.75	14.75	17.25	16.25
White	15.75	14.75	15.75	14.75

**HOSE**—Quotations at New York warehouses:

	Fire Protection	50-Ft. Lengths
Underwriters' 2 1/2-in. coupled, single jacket		65¢ per ft.
Air—Best Grade		
3-in., per ft.	3 ply \$0.36	4 ply \$0.44
First grade	40%	Second grade 40-50% Third grade 40-100%

**RUBBER BELTING**—List price 6-in., 6 ply, \$1.83 per lin. ft. for rubber transmission belting.

Best grade	50-5%	Second grade	50-10-50%
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**LEATHER BELTING**—List price, 24c. per lin. ft. per inch of width for single ply at New York warehouses:

Grade	Discount from list
Medium	40%
Heavy	30-10%

**RAWHIDE LACING** { For cut, best grade, 50%, 2nd grade, 60%.  
For laces in sides, best, 41c. per sq. ft.; 2nd, 37c.  
Semi-tanned: cut, 50%; sides, 41c. per sq. ft.

**PACKING**—Prices per pound:

Rubber and duck for low-pressure steam, 1/2 in.	\$0.90
Rubber sheet	.45
Rubber sheet, wire insertion	.70

**MANILA ROPE**—Per lb., 1/2-in. and larger, 1,200-ft. coils.

Atlanta	\$0.33	New Orleans	\$0.24‡
New York	.27	Seattle	.24
Chicago	.24	San Francisco	.24

**EXPLOSIVES**—Prices per pound of dynamite in small lots:

	Gelatin	
	40%	60%
New York	\$0.27	\$0.295
Minneapolis	.1917	.2123
Denver	.2025	.2275
Seattle	.165	.19
Cincinnati	.22	.245
New Orleans	.233	.26
San Francisco	.1625	.1925

**FLOTATION OIL**—

Pine tar, 50 gal. bbl., gross weight 500 lb., f.o.b. New York, carload lots, per gal.	\$0.35
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**CHEMICALS**—

Zinc dust, 550 lb. casks, f.o.b. Palmerton, Pa., per lb.	\$0.09 1/2
Litharge, f.o.b. New York, kegs, per 100 lb.	15.75
Sodium cyanide, 220 lb. single case lots, f.o.b. works, per lb.	.18@.22

# Mining Stocks—Week Ended September 19, 1925

Stock	Exch.	High	Low	Last	Last Div.
<b>COPPER</b>					
Anaconda	New York	46	44	45	Jy. 18, Au. 24, Q 0.75
Armadillo Consol.	Boston	1	1	1	
Ariz. Com'l.	Boston	14	13	13	Jy. 21, Jy. 31 SA 0.50
Calaveras	N. Y. Curb				
Calumet & Hecla	New York	51	51	51	Se. 4, Se. 21 Q 1.00
Canario Copper	Boston	15	15	15	
Cerro de Pasco	N. Y. Curb	7	7	7	
Chile Copper	New York	55	53	54	Au. 21, Se. 1, Q 1.75
Chino	New York	36	34	35	Sep. 2, Sep. 28, Q 0.62
Con. Coppermines	New York	22	22	22	Sept., 1920 0.37
Copper Range	N. Y. Curb	2	2	2	
Crystal Copper	Boston	22	21	22	Ap. 9, My. 4 1.00
East Butte	Boston Curb	*38	*34	*36	
First National	Boston	4	4	4	Dec., 1919 0.50
Franklin	Boston Curb	*17	*16	*16	Feb., 1919 0.15
Granby Consol.	Boston	90	*80	*90	
Greene-Canaan	New York	19	18	18	May, 1919 1.25
Hancock	New York	14	12	12	Nov., 1920 0.50
Howe Sound, new r. t. c.	Boston	*75	*75	*75	
Inspiration Consol.	New York	24	23	24	Oct. 5, Oct. 15 0.50
Iron Cap	New York	28	27	27	Se. 17, Oct. 5, Q 0.50
Isle Royale	Boston Curb	2	2	2	May, 1923 0.15
Jerome Verde Dev.	Boston	13	13	13	Sept., 1923 0.50
Kennecott	N. Y. Curb	*84	*70	*70	
Lake Copper	New York	56	55	55	Se. 11, Oct. 1, Q 0.75
Magma Copper	Boston	1	1	1	Jan. 1, Jn. 15 Q 0.50
Mason Valley	New York	44	42	42	Oct. 1, Oct. 15, 0.75
Mass Consolidated	N. Y. Curb	2	2	2	
Miami Copper	Boston	*70	*55	*70	Nov., 1917 1.00
Mohawk	New York	9	9	9	Au. 1, Au. 15 Q 0.25
Mother Lode Consol.	Boston	33	32	32	Aug. 1, Sept. 2 1.00
Nevada Consol.	New York	8	7	7	Jn. 12, Jn. 30 0.37
New Cornelia	New York	13	13	13	Sept., 1920 0.25
North Butte	Boston	19	19	19	Aug. 7, Aug. 24 0.25
Ohio Copper	Boston	1	1	1	Oct., 1918 0.25
Old Dominion	N. Y. Curb	*90	*85	*90	Nov. 14, Dec. 2 0.05
Phelps Dodge	Boston	21	20	20	Dec., 1918 1.00
Quincy	Open Mar.	†123	†120	†120	Se. 19, Oct. 2 Q 1.00
Ray Consolidated	Boston	26	25	25	Mar., 1920 1.00
Ray Hercules	New York	14	13	13	Dec., 1920 0.25
St. Mary's Min. Id.	N. Y. Curb	36	35	36	Ap. 20, My. 20, 3.00
Shannon	Boston	*65	*60	*60	Nov., 1917 0.25
Shattuck Arizona	New York	6	6	6	Jan., 1920 0.25
Superior & Boston	Boston	1	1	1	
Tenn. C. & C.	New York	11	10	11	De. 31, Ja. 15, Q 0.25
United Verde Ex.	N. Y. Curb	27	25	27	Oct. 6, Nov. 20 0.75
Utah Copper	New York	100	100	100	Se. 18, Se. 30, Q 1.00
Utah Metal & T.	Boston	100	*50	*87	Dec., 1917 0.30
Victoria	Boston			*40	
Walker Mining	Salt Lake	2	10	2	05
<b>NICKEL-COPPER</b>					
Internat. Nickel	New York	34	33	34	Se. 11, Se. 30, Q 0.50
Internat. Nickel pfd.	New York	99	99	99	Jy. 16, Au. 1, Q 1.50
<b>LEAD</b>					
Carnegie Lead & Zinc	Pittsburgh			61	
Gladstone M. M. Co.	Spokane			*25	Jy. 1, Jy. 10 0.01
National Lead	New York	166	154	161	Sep. 11, Sep. 30 2.00
National Lead pfd.	New York	117	116	116	Aug. 21, Sep. 15 1.75
St. Joseph Lead	New York	43	41	42	Jn. 9, Jn. 22, 0.50
<b>ZINC</b>					
Am. Z. L. & S.	New York	8	8	8	May, 1920 1.00
Am. Z. L. & S. pfd.	New York	32	29	31	Nov., 1920 1.50
Butte C. & Z.	New York	6	6	6	De. 10, De. 24 0.50
Butte & Superior	New York	12	11	11	Se. 18, Se. 30 0.50
Callahan Zn-Id.	New York	2	2	2	Dec., 1920 0.50
New Jersey Zn	N. Y. Curb	194	193	193	Jn. 20, Jy. 10 Ex. 2.00
United Zinc	N. Y. Curb			*35	
Yellow Pine	Los Angeles	*71	*67	*68	De. 10, De. 15 Q 0.04
<b>GOLD</b>					
Alaska Juneau	New York	11	11	11	
Argonaut	Toronto	*26	*26	*26	
Barry-Hollinger	Toronto	*23	*22	*23	
Carson Hill	Boston	*63	*65	*65	
Consol. W. Dome L.	Toronto	*13	*12	*12	
Cresson Consol. G.	N. Y. Curb	3	2	2	Mh. 31, Ap. 10 Q 0.10
Crown Reserve	Toronto	*17	*16	*16	Jan. 1917 0.05
Dome Mines	New York	15	15	15	Se. 30, Oct. 20, Q 0.50
Golden Cycle	Colo. Springs			51	Dec. 11, 1924 0.03
Hollinger Consol.	Toronto	15.40	15.10	15.30	Se. 21, Oct. 7 0.08
Homestake Mining	New York	50	46	50	Se. 19, Se. 25 M 0.50
Kirkland Lake	Toronto	*41	*40	*40	
Lake Shore	Toronto	6.41	6.30	6.40	Se. 1, Se. 15 0.05
McIntyre-Porcupine	New York	18	18	18	Aug. 1, Sept. 1 0.25
Newray	Toronto	*22	*22	*22	
Night Hawk Pen.	Toronto			*20	
Portland	Colo. Springs			*43	Oct., 1920 0.01
Rand Mines	New York			36	Au. 17, Au. 25 1.52
Teck-Hughes	Toronto	1.92	1.86	1.91	
Tom Reed	Los Angeles	*60	*50	*55	Dec., 1919 0.02
Tough-Oakes	Toronto	*49	*44	*48	
United Eastern	N. Y. Curb	*52	*49	*52	July, 1924 0.05
Vipond Cons.	Toronto	1.21	1.14	1.19	
Wright-Hargreaves	Toronto	5.63	5.50	5.50	Se. 15, Oct. 1, Q Ex. 0.5
<b>GOLD AND SILVER</b>					
Black Oak	N. Y. Curb			*81	
Con. Cortez	N. Y. Curb	*8	*8	*8	
Con. Virginia	San Francisco	5	5	5	
Continental Mines	N. Y. Curb			1	
Dolores Esperanza	N. Y. Curb			*50	July, 1923 0.05
Premier Gold	N. Y. Curb	2	2	2	Se. 18, Oct. 3, 0.08
Tonopah Belmont	N. Y. Curb	*77	*77	*77	Sep. 15, Oct. 1, 0.05
Tonopah Divide	N. Y. Curb			*23	Oct., 1923 0.10
Tonopah Extension	N. Y. Curb	1	1	1	Mh. 11, Ap. 1, Q 0.05
Tonopah Mining	N. Y. Curb	4	4	4	Se. 30, Oct. 21, 0.07
Unity Gold	N. Y. Curb	*70	*60	*60	
West End Consol.	N. Y. Curb			*50	Mar., 1923 0.05
Yukon Gold	N. Y. Curb	*30	*30	*30	June, 1918 0.02

Stock	Exch.	High	Low	Last	Last Div.
<b>SILVER</b>					
Alvarado	Boston Curb	†1	†25	†1	Oct., 1920 0.50
Beaver Consol.	Toronto	*29	*28	*28	May, 1920 0.03
Castle-Trethewey	Toronto	1.18	1.08	1.10	
Coniagas	Toronto	1.60	1.55	1.55	May, 1924 0.12
Keceley	Toronto	1.68	1.50	1.60	Au. 31, Se. 15RX 0.12
Kerr Lake	N. Y. Curb	1	1	1	Oct. 1, Oct. 15 Q 0.12
La Rose	Toronto	*41	*40	*41	Apr., 1922 0.10
Lorrain Trout Lake	Toronto	*95	*95	*95	Jy. 2, Jy. 15 0.05
McKinley-Dar-Sav.	Toronto	*22	*21	*21	Oct., 1920 0.03
Mining Corp. Can.	Toronto	2.94	2.88	2.92	Jy. 1, Jy. 15 0.12
Nipissing	N. Y. Curb	4	4	4	Jn. 30, Jy. 20, Q 0.15
Ontario Silver	New York	7	7	7	Jan., 1919 0.50
Temiskaming	Toronto	*18	*18	*18	Jan., 1920 0.40
<b>SILVER-LEAD</b>					
Ahumada	New York	11	10	11	Se. 19, Oct. 2, OEx 0.25
Bingham Mines	Boston	49	43	47	Se. 19, Se. 30 Q 0.50
Cardiff M. & M.	Salt Lake	*75	*62	*70	Se. 16, No. 18 0.10
Chief Consol.	Salt Lake	2.90	2.90	2.90	Ap. 10, My. 1 0.10
Columbus Rexall	Salt Lake	*7	*7	*7	Aug., 1923 0.05
Eruption	Boston Curb	2	2	2	Se. 19, Oct. 2, Q Ex 0.15
Federal M. & S.	New York	19	18	19	Fe. 26, Mh. 15 Q 1.75
Federal M. & S. pfd.	New York	64	62	63	Au. 25, Se. 15, 1.75
Hecla Mining	N. Y. Curb	16	15	16	Au. 15, Se. 15 Q 0.50
Iron Blossom Con.	Salt Lake			*39	Oct. 25, 1924 0.01
Iron King Mining	Salt Lake	*51	*51	*51	
Keystone Mining	Salt Lake	*75	*69	*75	Au. 12, Au. 26 0.07
Lucky Jim	Spokane	14	12	12	
Mammoth Mining	Salt Lake	2.80	2.75	2.80	My. 15, My. 25 0.10
Marsh Mines	Spokane	*8	*6	*7	Se. 15, Oct. 1 0.15
Park Utah	Salt Lake	6.15	6.15	6.15	Se. 15, Oct. 1 0.15
Prince Consol.	Salt Lake	*34	*25	*34	
Silver King Coal	Salt Lake	9.60	9.50	9.50	Se. 20, Oct. 1, Q 0.25
Silversmith	Spokane	*23	*21	*23	Jy. 1, Jy. 10 0.01
Tamarack-Custer	Spokane	*50	*45	*50	Sept., 1924 0.25
Tintic Standard	Salt Lake	13.75	13.75	13.75	Se. 22, Se. 29 0.40
Utah-Apex	Boston	7	6	6	Jy. 3, Jy. 15, Q 0.35
Western Utah Copper	N. Y. Curb	*10	*10	*10	
<b>IRON</b>					
Bethlehem Steel	New York	43	41	42	July, 1924 1.25
Char. Iron	Detroit			*20	
Char. Iron pfd.	Detroit			*85	
Colorado Fuel & Iron	New York	41	39	40	May, 1921 0.75
Gt. North'n Iron Ore	New York	32	28	31	Ap. 11, Ap. 30 1.00
Inland Steel	New York	43	43	43	Au. 14, Sep. 1, Q 0.62
Mesabi Iron	N. Y. Curb	28	28	28	
Replough Steel	New York	17	14	16	
Republic I. & S.	New York	54	50	51	May, 1921 1.50
Republic I. & S. pfd.	New York	91	90	91	Se. 15, Oct. 1, Q 1.75
Sloss-Sheffield S. & I.	New York	102	99	100	Se. 10, Se. 21, Q 1.50
Sloss-Shef. S. & I. pfd.	New York	98	98	98	Se. 21, Oct. 1, Q 1.75
U. S. Steel	New York	125	122	124	Au. 29, Au. 31, Q Ex 1.75
U. S. Steel pfd.	New York	125	124	125	Aug. 3, Aug. 29, Q 1.75
Virginia I. C. & C.	New York	37	37	37	Jan., 1924 1.50
Virginia I. C. & C. pfd.	New York			73	Jn. 20, Jy. 2, 2.50
<b>VANADIUM</b>					
Vanadium Corp.	New York	31	30	30	Aug. 1, Aug. 15 0.50
<b>ASBESTOS</b>					
Asbestos Corp.	Montreal	94	87	89	Se. 30, Oct. 15 Q 1.50
Asbestos Corp., pfd.	Montreal	112	109	109	Se. 30, Oct. 15, Q 1.50
<b>SULPHUR</b>					
Freeport Texas	New York	17	15	16	Nov., 1919 1.00
Texas Gulf	New York	112	108	111	Au. 31, Se. 15, Q 2.00
<b>DIAMONDS</b>					
De Beers Consol.	New York	2	2	2	Jy. 27, Au. 30 0.97
<b>PLATINUM</b>					
So. Am. Gold & P.	N. Y. Curb	2	2	2	
<b>MINING, SMELTING, REFINING AND GENERAL</b>					
Amer. Metal	New York	52	51	51	Aug. 20, Sep. 1, Q 0.75
Amer. Metal pfd.	New York			116	Aug. 21, Sep. 1, Q 1.75
Amer. Sm. & Ref.	New York	114	111	112	Jy. 10, Au. 1, Q 1.50
Amer. Sm. & Ref. pfd.	New York	114	112	113	Au. 7, Se. 1, Q 1.75
Consol. M. & S.	Montreal	120	116	116	Jn. 30, Jy. 15 0.75
Federated Metals	N. Y. Curb	2	2	2	
Newmont Mining	N. Y. Curb	45	44	44	Oct. 1, Oct. 15 0.60
Southwest Metals	N. Y. Curb			1	
U. S. Sm. R. & M.	New York	46	45	45	Jy. 6, Jy. 15 Q 0.75
U. S. Sm. R. & M. pfd.	New York	47	46	47	Jy. 6, Jy. 15 Q 0.87
* Cents per share. † Bid or asked. Q. Quarterly. SA. Semi-annually. M. Monthly. K. Irregular. I. Initial. X. Includes extra. The first date given is that of the closing of the books; the second that of the payment of the dividend.					
Boston quotations courtesy Boston Stock Exchange; Toronto quotations those of the Standard Stock Exchange of Toronto, by courtesy of Arthur E. Mosey & Co.; Spokane, Pohlman Investment Co.; Salt Lake, Stock and Mining Exchange and George H. Watson & Co.; Colorado Springs, Colorado Springs Stock Exchange					
<b>LONDON QUOTATIONS, WEEK ENDED SEPT. 12, 1925</b>					
	High	Low	Last	Date	Per Cent
Aramayo Mines (25 frs.)	77/6	75/7	77/6	Aug. 1925	5(c)
British Platinum	9/6	8/6	9/3	Feb. 1925	2