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EACH YEAR establishes a new record in iron ore cargoes on Lake Superior. The largest reported this year was taken from Two Harbors on August 5 by the barge *John Smeaton*, which carried out 8,440 net tons—or 7,536 gross tons—of iron ore. This was taken on a draft of 18 feet 6 inches. The *Smeaton* belongs to the United States Steel Corporation, and this cargo exceeds the largest reported for the season of 1901 by 119 gross tons. Quite possibly still another record may be made before the close of the present season.

IRON ORE shipments from the Mesabi and Vermilion ranges, in Minnesota, this season have been by far the largest ever reported. Our special correspondent reports that the deliveries this year up to July 31 reached a total of 7,222,263 tons, which compares with 4,678,735 tons for the same period last year, 4,831,966 tons in 1900 and 3,406,172 tons in 1899. The Minnesota mines have therefore sent out this year 55 per cent more iron ore than they did last year, and more than twice as much as they furnished in 1899.

ACCORDING to our British exchanges, some of the Welsh coal mine operators have seen an opportunity for trade in the miners' strike, and at least one cargo, of 4,000 tons, of Welsh anthracite has been shipped from Cardiff to New York. It does not appear probable, however, that any considerable trade can be developed. It is quite likely that the strike will be settled before even the preliminaries for large shipments can be arranged. Moreover the Welsh anthracite is not prepared in the sizes to which our consumers are accustomed, and it would take some time to introduce it here. The experimental cargo is a venture which will hardly be repeated.

A COMMUNICATION from a correspondent at Scranton, Pa., which appears on another page of this issue, presents a clear and interesting statement as to the situation in the anthracite region. He shows that so far as the miners are concerned, the strike is a failure, and that only the obstinacy of some of the leaders prevents general resumption of work. The distribution of the much-talked-of strike fund has sown discontent among the ranks of the strikers, and it is evident that the hold of the United Mine Workers on the anthracite region is slipping away. If Mr. Mitchell desires to retain any influence there he will do well to declare the strike officially off without more delay.

THE PROPORTION of the ore crushed to different degrees of fineness—that is to say, the percentage which will go through finer screens than what the whole is crushed to pass through, is an important factor in considering the efficiency of rolls. This is determined by a so-called screen analysis, a weighed quantity of the crushed ore being sifted by hand over a series of screens and the product remaining on each being weighed and calculated as percentage of the whole. The foreman of a fine crushing mill, says Philip Argall, should have a set of steel wire screens, about 10 to 12 inches in diameter, corresponding to the finishing screens of the various rolls. These with a percentage scale will enable him at any time to determine the condition of the rolls. This is particularly necessary with the fine crushing rolls, where a determina-

tion should be made once each shift, and should any significant falling off in the percentage of finished product be shown the cause should immediately be learned and the necessary remedy applied. Otherwise the capacity of the mill falls off and becomes less from day to day, although the power consumed is practically the same as if the rolls were doing full duty.

THE SUGGESTION which has been made—in London, not in Johannesburg—that the mining companies in the Transvaal should import Chinese coolies to supply the deficiency in unskilled labor, does not seem to present a practicable remedy for the trouble. Very strong objections are sure to come from both the English and the Boer elements in the Transvaal itself. The introduction of a large Chinese element there would result in complications which would be exceedingly undesirable, while the capacity of the Chinaman, as a laborer, in deep mines, has still to be tested. The latter point is less serious, however, than the race question, as the experience in Natal with East Indian laborers shows. Moreover, the Chinaman—who is rather particular as to where he migrates—may not take kindly to the scheme. It does not seem likely at present that any serious attempt to carry it into execution will be made.

BULLETIN No. 210, entitled "Chemicals and Allied Products," is one of the most interesting and valuable publications that has been made by the Twelfth Census, and reflects great credit upon its authors, Prof. Charles E. Munroe, of Columbia University, and Dr. Thomas M. Chatard. The chief statistician, Mr. S. N. D. North, in his letter of transmittal, refers to its unusually exhaustive and valuable character, and states that "nothing approaching it in any particular has ever before been presented at any census of the United States." The distinctive feature of this report, which comprises 306 pages, is the fulness of the text accompanying the statistical tables, the authors having summarized in a general way the advance in the chemical technology of each branch of the subject and at the same time presented some deductions of a purely technical character from the reports made to them by the producers. We have always felt that a better use might be made of the full data that becomes available through a census investigation than has been done commonly in the publications of the bureau, which are too often purely statistical and frequently misleading because of the lack of explanation and critical discussion, and we are glad to see that Messrs. Munroe and Chatard have made an innovation, which we trust will be followed in other divisions now that the census has been made a permanent establishment. An unusual and noteworthy feature of the present report is a digest of all the United States patents relating to the chemical industry, prepared by Story B. Ladd under the direction of Prof. Munroe, which comprises 143 pages of the bulletin, to which it is presented as an appendix.

MARKET CONDITIONS.

Iron and Steel.—The only change to be reported this week in the iron and steel markets is an apparently increased disposition to close contracts for 1903, especially in pig iron. Large foundry consumers have apparently made up their minds that the demand is going to continue strong, and dread a re-

newal of the conditions of this summer, when they found themselves unexpectedly short of supplies. Southern furnaces have taken a good deal of this business, and it is said that one large company has no more iron for sale next year, while others have taken all the future orders which they care to have. Bessemer and basic pig, as already noted, are pretty well contracted for through the first half of next year, and a number of furnaces have also sold their product for the third quarter.

In finished material there is little change. The pressure in structural steel continues to some extent, and there is also a strong demand for plates. The bridge-builders are refusing orders, and it is understood that the ship-building people have closed contracts for considerable new business.

The Bureau of Statistics of the Treasury Department notes that an increase of \$10,000,000 in imports of iron and steel manufactures and a decrease of \$19,000,000 in the exports of that class of articles is the most striking characteristic of the foreign commerce of the year just ended. The total imports of iron and steel manufactures in the fiscal year ended June 30 were \$27,180,255 in value, against \$17,874,789 in the preceding year, while the exports of iron and steel manufactures were \$98,552,562 against \$117,319,320 in the preceding year. This makes the imports of the year larger than those of any preceding year since 1893. This is due—as we have already noted—to the heavy domestic demand and the comparative dullness of the trade in Europe.

Copper.—The situation continues to be one somewhat difficult of explanation. The consumption in this country continues enormous; good authorities estimate that it is on a scale never before known. Stocks are not large, and producers are not generally pressing metal for sale. Nevertheless prices do not respond, and continue at the same level as last reported.

Production will be curtailed somewhat by the closing down of the United Verde Mine, on account of an extension of the fire which has been burning in the mine for some time. It is uncertain how long the shut-down will last.

Other Metals.—The current demand for supplies of tin continues good, and spot metal is rather scarce owing to the delayed arrival of one or two cargoes from the East. Consumers have not been buying much ahead, and their immediate requirements are rather large.

Lead is in somewhat better demand, and sales have been good at unchanged prices. As we have heretofore noted, consumers do not lay in heavy stocks ahead of this article, as there is very little gain in doing so.

Spelter continues strong, with little change either in demand or quotations. Ore prices in the Joplin District have been somewhat lower, first-class ore bringing about \$39, while standard 60 per cent ore sold at \$35. Sales have been rather light. Some producers are holding back their ore in anticipation of a rise in price, which buyers are not disposed to give.

Silver has been dull, with little change. There is a slight demand on Indian account, although the Indian Government is understood to have a large stock at the present time, and is not buying at all. The Mint orders from France have all been filled.

Coal.—The Western coal market continues in bad shape owing to difficulties in transportation from mines. Car supply is generally fair, but most of the coal-carrying roads seem to be short of motive power. The Lake coal trade is still much embarrassed by failure to receive coal at the loading ports, and shippers are growing excited over the possibility that they will not be able to make up arrears before the season closes. In Chicago, especially, and to some

extent in other Western cities, conditions are better and there is a pretty good stock of coal. In fact, some dealers are overloaded, having ordered heavy supplies in anticipation of a possible strike of the miners. In the Mississippi River trade supplies at lower points on the river are reported to be very short, although heavy shipments from Pittsburg have been made. It will take some time, however, for these to reach the lower river.

The seaboard bituminous trade shows no change. The only especial point is complaint from some shippers about the delay in delivery of coal from mines.

The anthracite trade continues to be non-existent. Some references to the strike conditions are made in another column. Mining operations have been resumed at a few of the collieries, but the output has not had any influence on the market. The feeling generally is that the spirit of murder, arson and outrage now prevalent in the region will bring the strike to an early close.



SPELTER IN THE FIRST HALF OF 1902.

The spelter industry during the first half of 1902 has been marked by numerous features of interest. A good consumptive demand for the metal has led to a gradual elevation of the price, which has been attended by a corresponding movement in the Joplin ore market, and there have been consolidations among the producing interests which promise to be of important effect in the industry in the future. The year opened with spelter at 4.30 cents, New York, which was already a substantial gain over the range of prices that prevailed during the major part of 1901. In February there was a slight setback, but in March a gradual rise began which became rapid toward the end of May and has continued since the end of June, until at the present writing a maximum of 5½ cents has been attained; this is a higher price for spelter than has been known since 1899. There are some features in the situation which indicate that the movement has not been due entirely to natural causes.

The average monthly prices of spelter at New York have been as follows: January, 4.27; February, 4.15; March, 4.28; April, 4.37; May, 4.47; June, 4.96. The value of ore in the Joplin market was about \$27 to \$28 during the most of the first quarter, the higher grades fetching \$30 to \$31, and the production was large. There was a slight increase about the middle of March, and toward the end of that month some of the important producers organized a pool for the purpose of compelling the smelters to pay a flat price of \$37.50 per ton for the high grade ore. A little was sold at that figure, but it was more than the smelters could afford to pay at the existing price for spelter, and they simply withdrew from the market. This disrupted the pool, and at the end of April its holdings were disposed of on a \$30 basis, which was a very fair price, considering that spelter was then only 4.15 cents at St. Louis. In May the furnacemen at Iola threatened to strike, and, because of that, the smelters became chary of selling spelter, and the price of the metal rose rapidly, attaining 4.50 cents, St. Louis, at the end of the month. The smelters being not very keen bidders for ore under the circumstances, the price for the latter remained stationary at about \$30. The threatened strike actually materialized in June at one of the works at Iola and at the Edgar Works, at Cherryvale, but it did not amount to much, and soon terminated, the union not yet being strong enough to enforce its demands. Probably this is a contest which must be fought out in the future. The price of spelter continued to advance after the disappearance of the labor difficulties, but the price of ore was not at first bid up correspondingly, and at the end of June was only \$32, though spelter was at 4.75 St. Louis, and 5 cents, New York. This condition

was, however, changed radically in July, when high grade ore sold up to \$42 per ton and 60 per cent ore ranged from \$37 to \$40.

The production of zinc ore in the Joplin district during the first half of 1902 was 136,007 tons, worth \$3,873,933, or about \$28.55 per ton, and if this rate be maintained during the remainder of the year there will be a substantial increase over 1901, when the total output was 257,500 tons; but in comparing the output of the first half of 1902 with that of the first half of 1901, in which period it amounted to 133,866 tons, it does not appear that there has been any material increase in the rate of production in 1902. However, it is to be considered that the smelters have been obtaining larger supplies of ore from Colorado and elsewhere. The smelters have been running at their full capacity and have increased their means. During the spring the new works of A. B. Cockerill and the Standard Acid Company, each three-block plants, were put in operation. The works of the latter were soon purchased by the interests that had been operating the Southwestern Chemical Works at Argentine, Kan., and the two were consolidated under the name of the United Zinc and Chemical Company. In May the New Jersey Zinc Company purchased the plants of A. B. Cockerill and the Prime Western Spelter Company at Gas, near Iola, and later bought the works of George E. Nicholson at Nevada, Mo., and Iola, Kan. The works at Nevada, which employed coal as fuel, have been closed, and the three in the gas field are operated under the name of the New Prime Western Spelter Company. Two new blocks of furnaces have been added to each of the plants at Gas, which are immediately adjoining, so that the three plants of the company in that district have now an aggregate of 15 blocks of furnaces, and in point of capacity the new company is equal to the Lanyon Zinc Company, which has been the largest individual producer heretofore. A new plant is being erected by the Lanyon Brothers' Spelter Company at Neodesha and will soon be ready to go into operation.



THE RESUMPTION OF ANTHRACITE MINING.

We older men can remember the war-cry, "On to Richmond!" sounded in 1861 by that ardent strategist, Horace Greeley, and how much harder it proved to do the thing in the field than to shout it in the sanctum.

Somewhat later, when the question of specie payment was under discussion, the same sort of easy advice was heard in the maxim, "The way to resume is to resume!"

In January, 1888, the *New York Evening Post*, quoting with approval my address on the anthracite strike of that year, said that, in view of the facts therein stated, the coal-mining companies ought to proceed to substitute other miners for those who refused to work at fair wages. At that time I discussed this suggestion editorially, as follows: (ENGINEERING AND MINING JOURNAL, January 21, 1888.)

"This is one of those theoretical suggestions that are utterly impracticable. In the first place, the proper conduct of a colliery does not permit the wholesale substitution of new and unaccustomed men. Even if skilled coal-miners could be got in sufficient numbers (as they could not), their lack of knowledge as to the peculiar conditions of each colliery would lead to much injury and loss. In the second place, the anthracite-regions are peculiarly exposed to two kinds of destruction. The great "breakers" are the most inflammable of buildings; and the mines cannot, like most metal mines, endure flooding. In many collieries, the coal seams are underlaid or overlaid with beds of clay, which swell irresistibly when the water rises to them, and crush the timbering and the pillars of coal themselves. The expensive plant of the anthracite business is thus literally in peril between fire and water.

"Now, so long as the mining population consider a pending dispute between themselves and their employers as a temporary affair, to be ended sooner or

later by a victory or a compromise, they are directly interested in preserving the property of the companies. Burning a breaker will make work for builders, but throw miners out of work. Moreover, at one time, when the burning of breakers to "make work" (for carpenters, etc.) had become too frequent, a company thus afflicted quietly omitted to rebuild a breaker thus burned; since which time it has been a little uncertain whether such incendiary devices will make work for anybody, and the practice has measurably ceased. On the other hand, flooding a mine may lead to its abandonment for years, forcing the mining population to move away, and destroying the value of their houses and building-lots. For these reasons the protection of property during an anthracite coal-miners' strike is not very difficult. A few extra watchmen, with the general sentiment of a laboring community on their side, are quite enough to guard against the drunken and the crazy. We believe that no acts of wanton injury to mines or machinery have characterized the present strike. The half-dozen crimes of that kind which have been reported were directed against the railroad company, being attempts to wreck trains or burn bridges. The story of "labor leaders" is that these were sham outrages devised by "Pinkerton men," to throw odium on the cause of labor. With those who believe this we have no controversy. But the fact remains that neither Pinkerton's men nor anybody else have set fire to coal-breakers, if we except the burning of Coxe Brothers' breaker at Drifton, or stopped or disabled pumping-engines at the idle collieries. Nor need such outrages be seriously feared so long as the miners expect that the worst result of their strike will be a return to work at former wages, and a patient waiting till their treasury is again full for another struggle.

"But let a movement once begin for the operation of any colliery with a new set of men, and not all the police and militia of Pennsylvania could prevent the reckless destruction of property. The community, no matter how much it may be shivering, cannot compel the colliery proprietors to take this certain peril unless it is ready to pay the damage they suffer. The suggestion of the *Post* is unfortunate, because designing persons have already attempted to inflame the striking miners by the story that the course it recommends is, in fact, contemplated by Lehigh employers; and its advocacy may tend to make some credulous or excited people believe the hoax. We have authority for saying that no such purpose has been, or is now, entertained.

"In our judgment, the present strike in the coal-regions should be firmly endured without yielding, but without irritating measures, by the companies involved; and the community should patiently take its share of the trouble, realizing that the issue is one in which all are interested, and that the result, if it should be the overthrow of a monstrous, irresponsible and reckless tyranny of so-called 'organized labor,' will be something in which all can rejoice."

This statement may be repeated to-day, without the change of a word, as a reply to the same proposition. Nor is the occasion for its utterance lacking; for the *New York Evening Post*, and still more urgently the *New York Times*, are declaring that "the way to resume is to resumé," and that the anthracite operators are neglecting their duty in not starting their collieries at once.

But my statement of 1888 can now be reinforced with an additional argument. For, after the failure of the strike of 1888, the Act of 1889, "To provide for the health and safety of the persons employed in and about the anthracite coal-mines," etc., was passed by the Legislature of Pennsylvania; and in 1897, a supplementary and amendatory act, covering the additional purpose, "to provide for the examination of persons seeking employment as miners in the anthracite region, and to prevent the employment of incompetent persons as miners in anthracite coal-mines," etc.

The first of these statutes provided that examining boards, created by county courts, should recommend, and the Governor should appoint thereupon, a mine-inspector for each of the eight districts into which it divided the anthracite region. Moreover, in each district, an examining board, consisting of the mine-inspector, two miners, and one owner, operator or superintendent, was authorized to issue "certificates of qualification" to mine-foremen and assistant foremen; and without such certificate, duly registered, no person was permitted to act in either of these capacities.

The mine-inspectors appointed under this law have

been in the main honest, intelligent and self-educated practical miners, and neither employers nor employees have had serious reason to complain of them. But the miners' union is not satisfied with them, because they are too fair, and there is now a plan to amend the law so that mine-inspectors shall be elected by the miners of each district. A slight study of the statute defining their duties will show what an outrageous travesty of justice in legislation this change would be. But all things are possible under the influence of the lobby which dictates "labor-legislation" at Harrisburg, and I give this warning now, because, after the failure of this present strike, the mine-workers will pretty certainly try to secure, as they have repeatedly secured already, legislative aid for their next conflict. What they sought in 1889, and how far and why they were disappointed then, need not now be considered.

The statute of 1897 covered a bold attempt to make the operation of anthracite collieries during a strike, and against the will of the strikers, a penal offense. Like that of 1889, it applies exclusively to the anthracite region, and the much briefer laws relating to the bituminous fields conspicuously lack the elaborate provisions for the health, safety and competency of miners which have been deemed necessary for a particular part of the State only. I need not point out the significance of this fact.

The Act of 1897 forbids the engagement or employment of any person "as a miner in any anthracite coal-mine" who has not obtained and registered in that particular district "a certificate of competency and qualification so to do from the Miners' Examining Board of the proper district." This board is composed of miners (no mine-inspectors, mining engineers or operators). It is to meet publicly "once a month, and not oftener," and it cannot issue a certificate to any person who has not had two years' experience as a miner or mine-laborer in Pennsylvania, or "cannot answer intelligently and correctly at least twelve questions in the English language pertaining to the requirements of a practical miner; and be identified under oath as a mine-laborer by at least one practical miner holding miners' certificates." The board can determine the twelve questions for itself, and can reject an English-speaking applicant as well as a foreigner if these questions are not answered to its satisfaction (a feature borrowed from some of the Southern election-laws). Moreover, it is not at all limited as to refusing, but only as to granting, applications. And—not to pursue the analysis further—there is no punishment provided for neglect on the part of the board to hold a meeting.

A correspondent of the *Times* having called his attention to this law, the editor replies (August 5), saying, among other things:

"We do not believe that the provisions of the law to which our correspondent refers, and with which we are perfectly familiar, stand between the operators and the resumption of mining when they shall see fit to resume. If they do, the operators owe it to themselves and to the communities with which they are identified to make this so evident that the first act of the next legislative session will be its repeal. There is no reason to suppose that the strike will end until the operators choose to end it. The only possible vindication of their present attitude would be to make an honest effort to resume mining and show themselves unable to do so. This effort they have not made."

Perhaps the *Times* will kindly elucidate this declaration. It says the courts can review the action of the examining board, and seems to think that this is an available remedy. But there is now no objectionable action to be reviewed. No examining board has met since the strike began. Does the *Times* think the operators should resume work with uncertificated miners, and go to jail with their superintendents and mine-foremen for violating the express terms of the law, simply in order to furnish an object-lesson to

the newspapers? And how soon, and in what quantity, would this measure furnish anthracite coal to the public at rates acceptable to the *Times*?

Or does the *Times* think that the operators should legally force the examining boards of the eight anthracite districts to hold public meetings and issue certificates to non-union miners in sufficient number for the resumption of mining? How long would it take to get a mandamus or its equivalent for this purpose? Would any court compel such a board to meet *publicly* at the risk of mob and murder, for the express purpose of licensing men to break down a pending strike? If such a board should nevertheless meet (being in sympathy with the strike already) and reject all new applicants, is there anything in the law which would permit a court to review this exercise of discretion, except by a separate proceeding in each individual case, and a separate hearing of the reasons of the board for its action?

But the board is explicitly commanded to require from all applicants for miners' certificates at least two years' prior service as miners or mine-laborers, and sworn proof thereof from at least one certificated practical miner. Even supposing, then, that such a board should have the courage, and the necessary protection, for a public meeting in the midst of the strikers, whence could it expect applications for miners' certificates? Practically all who could be legally thus licensed already hold certificates, and are, willingly or unwillingly, supporting the strike.

Once more: Even upon the extreme supposition that a board could and would and did meet, and that there were legally qualified applicants in abundance, and that the board bravely and fairly granted their applications, how long would it take to ask of each the twelve questions required by the law (if no other inquiry whatever were made), and to accept the credentials of each? And how soon could the board qualify enough men to run a single colliery, if it obeyed the positive mandate of the law, not to sit longer than three days at one meeting, and not to meet oftener than once a month? This provision was clearly intended to prevent the licensing of any considerable number of miners at one time; and, so far as I can see, it is impregnable and conclusive.

That the law ought to be amended is true enough, but I do not think that further proof of that necessity is required, at the risk of bloodshed and damage to property. Nor do I think that any such measure as the *Times* vaguely urges would hasten the resumption of anthracite mining. On the contrary, it would indefinitely postpone that desirable result. It is perfectly clear that, for any early relief of the public, the mining of anthracite must be resumed by the men who are now on strike. A large proportion of these men undoubtedly desire to return to work. In fact, there are enough in that class to operate a considerable number of collieries, if it were lawful to employ, without further formality, in any one of the eight districts, duly certificated miners from another district. But this has been cleverly forbidden by the statute. In a word, the Mine Workers' Union, through its organized terrorism and ingenious manipulation of the Legislature, has got what we call in the West a "cinch" on the anthracite operators and the public; and such honest representatives of the public as the *Evening Post* and the *Times* ought not to hesitate in supporting the operators heartily against the common enemy.

If I am mistaken in this view, let the *Times* set me right by saying plainly what step it would have the operators now take, and what result it would expect from that step. As its article of August 5 says, the point as to the legal situation "is of such interest as to invite discussion." I think I can promise further discussion, if the *Times* can offer further material for it.

R. W. RAYMOND.

RED RIVER TIN STREAM, CORNWALL.

By EDWARD SKEWES.

This stream, most appropriately named from the ruddy appearance of its waters, is formed or produced from the pumpings from mines situated in the Camborne and Illogan districts in West Cornwall, England. The entire length of the stream may be approximately fixed at 6 miles; the course is north for about a mile, till it reaches the village of Tuckingmill, when it runs west-northwest, emptying itself into the eastern portion of St. Ives Bay, near the Godrevy Lighthouse.

According to the estimate given by Mr. John Tonkin, consulting engineer, Carn Brea, the quantity of water pumped into this stream daily is 10,037,600

Dead frames are an evolution from the live or turntable frame whose capacity was extremely limited, in the best cases not more than 6 hundred-weight; oftener 3 hundred-weight, requiring the services of a skilled workman. The dead frame is simply an inclined wooden frame, varying from 6 to 7 feet in length and about 6 feet wide, having an angle of 3 inches to the foot. Of course the angle of inclination is a matter of taste and adaptability to the kind of pulp under treatment.

Unfortunately for the shareholders in Cornish mines, but fortunately for the mine manager, no percentage of the extraction of tin is given in the returns, nor is it known. I do not regard it as complimentary to Cornish mining that the system of vanning is still resorted to, as it is obsolete elsewhere.

tailings which are being treated by the streamers are not as rich as formerly. The opinions of the managers on different parts of the stream vary as to the value of the introduction of the Frue vanners; some contend that the Frue vanner is one cause of the impoverishment of the stream, while others maintain that the stream would be better than ever if the grade of ore maintained its value.

To this latter view I am inclined, as the mines "never lost any tin" and that the streamers nearest the mine also "extracted all the tin," yet for miles values were obtained, and even to the beach one individual has been at work for nearly thirty years, and will continue, he or his successor, for thirty years more even if the mines were to close down.

The theory at one time was that the sands and slimes were valueless when leaving the mine, but that in its passage to the sea "enriched themselves." The remarkable point is that the waste continues to yield values after a number of washings.

In the first mile below Tuckingmill over £350,000 has been expended on machinery, excavations, etc., by hard-headed, shrewd Cornishmen. This amount has been raised locally in a very small district, principally among Camborne merchants and bankers, and I cannot think they entered into the scheme without counting the cost.

The loss of tin by the mines is undoubtedly due to an insufficient supply of pure or clean water. The greater part of the water used for concentration or dressing is pumped from the mine; it is also used for condensing, in the changing house for the miners to wash, and for stamping. In connection with the engine and stamps, large quantities of oil and grease are used. The water is collected from all sources and used for concentration. Again some of the rock itself is steatitic and contains a large proportion of fine tin. Thus it is evident that when the mineral is mixed with such water no machinery can save all the values. The oil process of concentration should

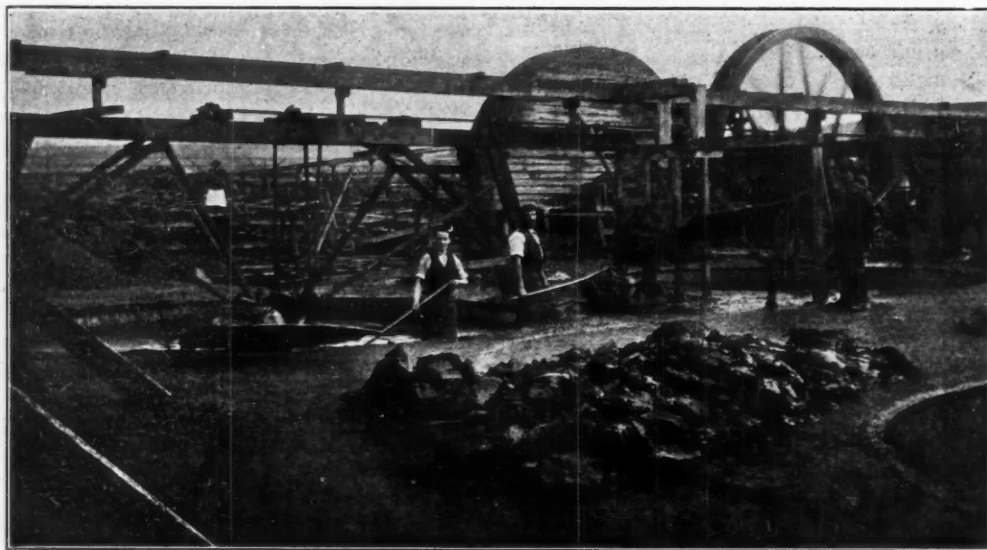


FIG. 1.—RESKADINNICK TIN YARD.

gallons. This estimate was given September 25, 1901, regarded as the dry season.

Mr. I. Champion Keast, the recorder of the duty of pumping engines for Cornwall, writes on October 9 last regarding the same matter: "At present the quantity is about 2,900 gallons per minute, or 18,600 tons in 24 hours; the present time is the very slackest of the year, the maximum in April and May being perhaps 70 per cent more than the above, and the average for the year about 30 per cent above the minimum. This gives an average of 3,800 gallons per minute and 24,000 tons in 24 hours. As to the quantity from abandoned mines and the natural drainage above adit level, it is almost impossible to form an estimate with any degree of certainty. I should say it will equal from 50 to 100 per cent of the quantity pumped.

The amount of tailings, consisting of sand and slime, that flows into the stream daily, is approximately 900 tons, made up as follows: Wheat Grenville Mine, 125 tons; Dolcoath, 300; South Crofty, 40; East Pool, 180; Carn Brea and Gincroft, 180; South Condurron, etc., 30. The Dolcoath dressing floors were very extensive prior to the introduction of the Frue and other vanners; they consisted largely of round buddles and dead frames, which required an ample of space for a small capacity. The buddle, both concave and convex, has been tried as a concentrator, and has signally failed, the writer thinks, as the waste is, in the best, not more than 40 per cent of the pulp, and it has, moreover, to be shoveled out of the buddle, then the seconds, perhaps 30 per cent, have to be retreated or rebuddled, and the head, which contains the greater part of the value, is about 30 per cent, and that is not equal in value to the portion saved by the vanners. In the revolving-belt concentrators a small percentage of the pulp only is saved. In one silver mine in Canada the concentrates were 1 to 50. As a mining man I have buried the buddle for any and all kinds of ore; Belshazzar's obituary may be repeated over it, even in Cornwall, where it was first used over 150 years ago. The plate, taken from Pryce's *Cornubiensis*, published in 1770, shows this old method.

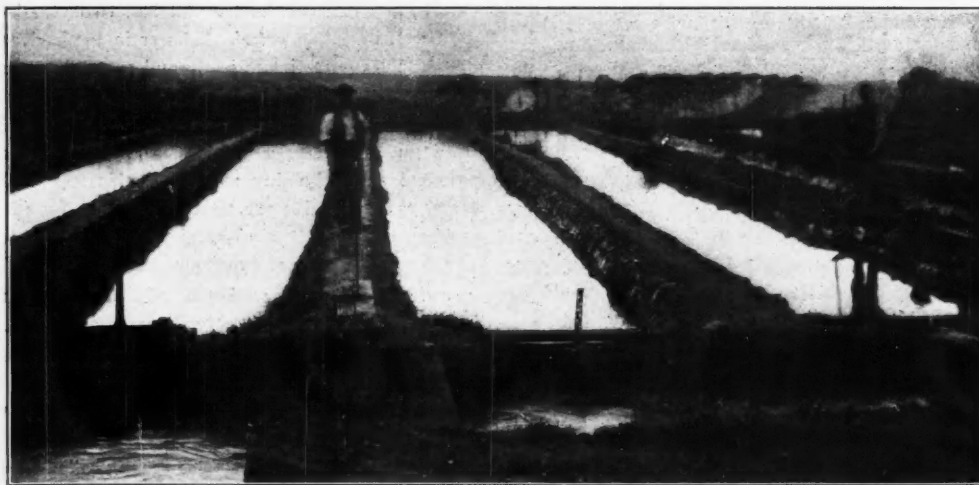


FIG. 2.—RESKADINNICK SLIME PITS.

The dead frame as a concentrator for heavy minerals, such as cassiterite, wolfram, iron or copper pyrites associated with a light waste, has no equal, but its capacity is confined to a maximum of one ton per day, and the majority of the frames on the Red River stream to one-half ton a day. Formerly the flow of pulp from the launder to the frame was through a $\frac{3}{4}$ -inch round hole, but now only $\frac{3}{8}$ -inch and 7-16-inch are used on some parts of the stream, thus reducing the tonnage treated one-half. This has been imperative on account of the lower grade of ore treated at the mines, and also the introduction of more machinery at the mines. For instance, at Dolcoath, in the first six months of 1895 the product was 79 pounds of tin per ton of ore; the last six months, to December 31, 1901, only 47 pounds.

Carn Brea and Tincroft production for the six months ending June 30, 1901, and December 31, 1901, was for 27,603 and 25,806 tons of ore, 26.50 and 28.16 pounds per ton, respectively. East Pool has declined from 70 to 31 pounds per ton.

It may readily be seen from such figures that the

do well on these slimes, and some day it will be used. The mines could make a higher percentage of extraction if clean water was used, and in this respect some of the streamers have the advantage over the mines.

The bed of the stream at and about Roscroghan has been raised from 7 to 8 feet during the last twenty-five years by the streamers, who wish to get as much level as possible to work their machinery. This consists in some cases of pulverizers, scoop-wheels, buddles and round frames. The Tolvadden, Trevarno, Tehidy, Evans, Hocking, and Wickett use steam power to drive their machinery; Tuckingmill, Tehidy Mill, Reskadinnick, and Kieve mills use water-power.

The mode of operation is first to dig a series of narrow pits of lengths varying from 100 to 250 feet and from 6 to 10 feet wide, depending on the contour, and from 6 to 10 feet deep, according to levels. The stream is allowed to flow into the pits and settle. Then the clear water is generally used to drive a water-wheel and for the automatic washing of the frames, etc. When a pit is full a small current of water flows through it and washes the slime on to the

rag frames, and from the rag frames back to the stream, which again flows on to other pits and settles. What passes over the rag frames is carried to the stream again to be subsequently treated, and what remains on the frames after perhaps 3 to 5 minutes flow of the pulp is washed by means of an automatic saddle box the length of the frame, located near the top of frame into a rectangular box locally known as "cover." From this cover the valuable slime is elevated by scoop-wheels to flow over second frames, the values of which in turn flow over the cleaning frames, which in some cases are longer than either the rags or the seconds. From the cleaners the pulp is elevated to the round frames, and again buddled,

wore the surface of the frame much faster than the regular frame. The frame was made of matched lumber. The cost of this machine was originally £40, on account of the unnecessary weight of iron for center pieces, but it has been reduced fully 50 per cent, and the cost is now £20. The launder supplying the slimes for the frame has a fall of 16 inches. These launders are circular, corresponding to the frame. The machine requires but little attention. I should say it is the best machine that has been introduced into Cornwall for many years and is the result of years of low price of tin, a constant decrease of values in the slimes, and the working of the Factory act. The capacity is small for the space

water. Other drawbacks are a royalty of 10 per cent on the gross output, interference of the land-owners in many instances, no falls, a very confined area, and steadily increasing wages with lessened hours for work. I know that many of the gold mines in California have mined and milled for less than 3s. a ton, but it was a free-milling gold ore; whereas in this case the slimes are valueless to the miners, as when leaving the mines all the best, heaviest and richest have been extracted.

Cornwall has ceased, unfortunately, to be the mecca of the mining engineer, but is still classic ground of the profession, and the metallurgist can find an interest in the Red River stream which has scarcely an equal in the world.

Several of the works along the stream have pulverizers for grinding the sands, but they are getting too poor to pay for grinding in the summer time. The work is done by a series of revolving iron barrels, into which scrap iron is thrown with the sand. This is the predecessor of the pulverizers which substitute Norway flints for scrap iron.

The values after being concentrated are also calcined, which adds to the cost. The slimes carry iron and copper pyrites, arsenic, wolfram (but not in commercial quantities), which seriously interfere with the produce of the black tin when sold to the smelter. The cost of calcining is about £2 10s. per ton, including carriage to and from the calciner. From the calciner the witts (the name of the roasted slimes) are of a red color, owing to the iron oxide formed. They are brought to the cleaning department, where they are framed and buddled till marketable. The tin streamers never find fault with the tin smelters, unlike some other miners.

The economies which have been introduced of late have been many. Speaking generally, the labor costs have been reduced over 50 per cent, although wages

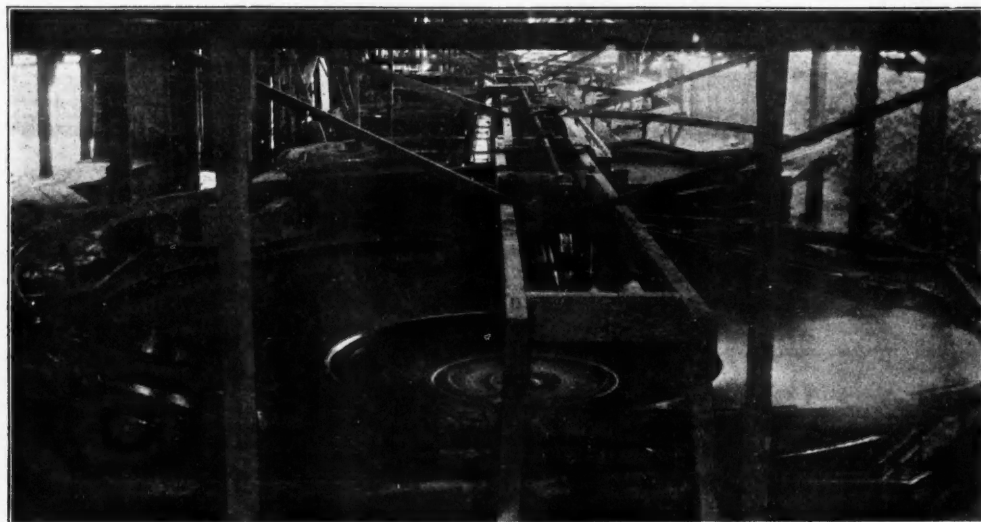


FIG. 3.—ROUND FRAME.

and after being burnt or calcined is known as "witts," which are again buddled until they become marketable.

On inquiry I find that there is a big difference between the estimated amount that a rag frame can treat in a day of ten hours. One manager estimated 2½ tons per day, and said that the washing out of one pit usually lasted 2½ days. After measuring the full capacity of the pit, each frame was equal to a little less than 2 tons. Another manager told me if his rags averaged one-half ton per day he was well pleased. The latter had 664 rags, and was a long ways down the stream, where the pulp was very light. The former streamer had only 460 rag frames, consequently had to work them to the maximum, and he was nearer the mines, so both may have been right.

On an average there is one second to every four rag frames. The same ratio holds good to the cleaners and second frames. Approximately the number of rag frames on the stream is 8,000, with about 2,500 seconds and 1,000 cleaners. In addition, there are about 80 buddles and 100 round frames, varying from 18 to 22 feet in diameter.

The round frame is not patented and is peculiarly adapted to slimes, more so than any percussion table or vanner, although it is not of equal capacity and requires more space. The capacity of a round frame approximates 3 tons every 10 hours. Specific gravity, combined with a perfectly steady revolving motion, separates the lighter gangue from the mineral. The round frame makes one revolution in about 6 or 7 minutes. There are in most of the round frames that are 18 feet in diameter nine 6-foot heads, which distribute the pulp and water evenly over the frame, which is 6 feet deep and of the same angle of inclination as the dead frames. The pulp flows over the table from 5 heads, while from 4 heads clean water is allowed to flow to wash the pulp, and when cleaned a brush moves automatically backwards and forwards 6 inches, sweeping and washing the values on the frames into a separate launder, when they flow to covers. At one of the works the round frame was 22 feet in diameter, with an empty space of 9 feet in the middle, with a revolving brush to clean the frame; but this revolving brush was expensive and

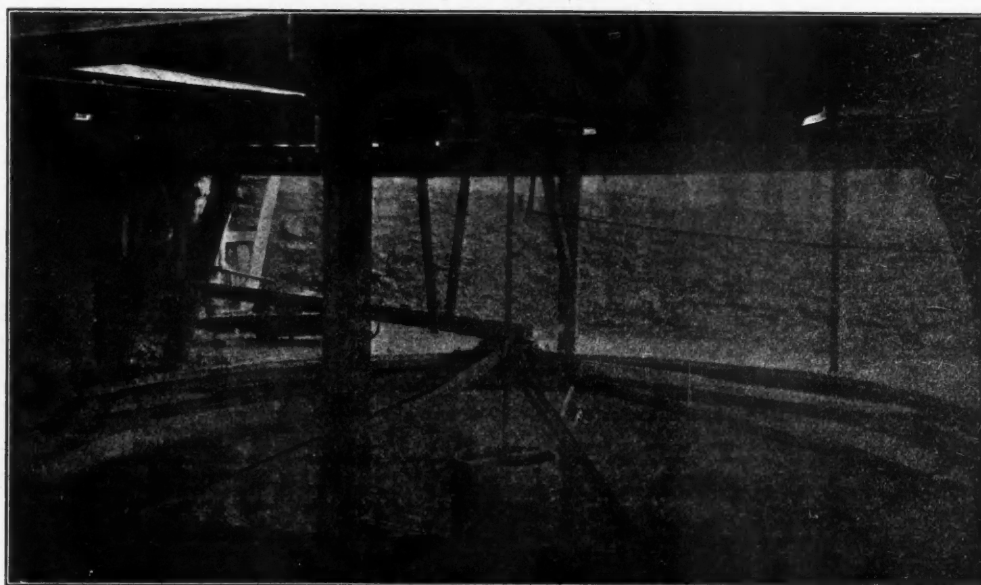


FIG. 4.—TOLVADDEN—WITTS BUDDLE.

occupied; with round machinery so much more room is unavailable. The round frame has considerably reduced the labor in the cleaning yard. In some of the yards the slimes are only buddled twice instead of eight times, as formerly. The wear and tear must be very limited. As with all machinery in Cornwall, it must not only be automatic, but self-supporting, self-feeding, self-lubricating, self-repairing, and even self-renewing; otherwise it is not appreciated. It is somewhat the custom to decry Cornishmen and Cornish machinery, but I must say that as a rule the more a Cornish machine is used the better it works.

A shake is not conducive to the best concentration of very poor slimes. I know of but few places in the world where a ton of 2,240 pounds can be successfully handled for 6 pence per ton, which is all these slimes are worth with tin at £60 per ton, and all these streamers kept afloat with tin at less than £40 per ton. The natural facilities have been against the streamers; in summer there is too little, and in winter too much

have risen. A shilling a day is now the minimum, whereas a few years ago 6 pence and even 4 pence was often paid. Some of the employees were principally boys and girls, but since the Red River stream has come under the control of the Factory act no one under 14 is allowed to work unless he has passed the standard at school and has been examined by the doctor. In one place one boy attends to 60 cleaners, where formerly 10 girls and a foreman were considered necessary. At this place an effective and cheap arrangement is used. The slimes were turned on to frames by means of a cam motion; clean water to wash them before going to the covers was also supplied. Two pans about 15 inches in diameter and 2 inches deep, the upper revolving on the lower one, which was stationary, with as many divisions as there were number of frames to be served. While the upper pan was slowly revolving a third or fifth of the circle the water flowed on a given frame. The beauty of this machine was it never wanted to

gossip or even to linger longer at one frame than another. It is by means of such devices that it is possible to work the Red River stream at a profit.

None of the works are run by public companies, but by individuals, or as partnerships. The Cornishman has no partiality for companies.

Another alteration noticeable is the substitution of flat screens for revolving ones, to prevent any chips or refuse from getting on the frames; the revolving screens were more expensive and required a little power to revolve them; now they are laid flat, and only require an occasional brush to keep them clean.

The streamers have taught the mines a valuable lesson, and the latter have adopted some of the machinery used on the stream, and probably they are not

in the case of copper sulphate, inasmuch as only the product of chemical works is reported. This amounted to 34,734,601 pounds, valued at \$1,718,898. In 1899 the copper smelting works, according to Mr. Kirchhoff's report for the Census, produced 27,298,926 pounds, valued at \$1,225,745. There is also some copper sulphate produced by the lead refiners. *The Mineral Industry* reported the total production in 1900 as 78,218,478 pounds.

It is obvious that the Census Report does not include the total production of niter cake and salt cake, and the figures for ammonia and ammonium sulphate probably do not fully represent the entire output of those substances, although they are likely nearly correct. The statistics of copperas produc-

BRITISH COLUMBIA: COMOX AND QUATSINO COAL-FIELDS, VANCOUVER ISLAND.

BY WILLIAM M. BREWER.

To the northwest from Nanoose Harbor, after crossing a narrow belt of rocks belonging to the "Vancouver Series," an area of Cretaceous formation occurs overlying these trappean rocks. Apparently the sandstones and conglomerates maintain continuity along the coast line for a distance of about 70 miles to the mouth of the Campbell River near the southern entrance to Discovery Passage which separates Vancouver Island from Valdez Island. The width of this area is, according to Mr. J. Richardson's report of 1876-77 in Reports of Progress Geological Survey of Canada, comparatively narrow for about 40 miles to a point opposite the north end of Denman Island. From that point up the coast the Cretaceous area is much wider, but the exact extent has not yet been determined. It apparently reaches its maximum width where it is traversed by the Campbell River. According to the late Dr. Dawson, the Cretaceous rocks may possibly continue to the northwest beyond the mouth of Campbell River, for he says in his report, 1887: "The Cretaceous rocks seen along the coast south of Orange Point (2 miles north of the mouth of Campbell River) rather resembles those of Mr. Richardson's lower division, the 'Productive Measures,' than those of the overlying 'Lower Shales,' to one of which divisions they are probably referable.

"Beyond Seymour Narrows the coast of Vancouver Island makes a projection to the northeast, and from the occurrence of sandstone and coal on the Campbell River, together with the general strike of the Cretaceous rocks, I have little doubt that these continue inland in a northwesterly direction, leaving the coast near Orange Point and running behind the promontory just alluded to, possibly as far



FIG. 5.—TOLVADDEN TIN YARD, CORNWALL.

sending as large a quantity of tin down the stream as heretofore.

The tin ore that escapes from the mine is very light, the specific gravity not being more than 1.5, and the slimes in the pits are often so fine as to float. This gives an idea of the care required and the close work done.

PRODUCTION OF VARIOUS CHEMICALS IN THE UNITED STATES.

The production of the various minor chemicals (we use the term only to distinguish them from the heavy chemicals) in the United States in 1900, as reported by the Twelfth Census, is given in the following table, which, although admittedly incomplete in some respects, is nevertheless instructive and valuable:

Substance.	Pounds.	Value.
Acetate of lead.....	1,206,991	\$73,199
Acetate of sodium.....	708,360	21,193
Acetate of calcium, crude.....	86,826,000	981,286
Aluminum chloride.....	903,118	12,724
Ammonia, aqua, 20%.....	28,282,700	1,258,233
Ammonium carbonate.....	1,351,389	97,808
Ammonium chloride.....	516,410	26,742
Ammonium nitrate.....	36,680	4,218
Ammonium sulphate.....	23,295,485	623,537
Antimony salts.....	211,956	22,778
Barium carbonate.....	2,400,000	24,800
Barium chloride.....	1,100,000	16,600
Barium sulphate (satin white).....	2,144,000	47,962
Calcium chloride.....	7,079,040	28,357
Carbon disulphide.....	773,800	31,392
Chrome products.....	15,407,882	1,130,527
Copperas.....	29,733,570	143,327
Epsom salt (magnesium sulphate).....	9,239,809	75,066
Fluorides of alkalis.....	480,000	40,000
Fluoride of calcium residues.....	9,906,900	7,000
Glauber's salt.....	31,314,225	160,065
Hydrogen dioxide.....	588,335	63,754
Magnesium salts (see also Epsom salt).....	26,312,000	134,700
Niter cake.....	26,506,818	37,360
Nitrite of sodium.....	709,170	67,194
Paris green.....	674,650	80,958
Phosphate of lime.....	2,510,694	95,307
Phosphate of soda.....	4,231,160	121,796
Potassium cyanide.....	2,317,280	601,491
Potassium ferrocyanide.....	6,165,407	994,014
Salt cake.....	81,191,424	345,277
Salt peter.....	13,088,680	482,580
Sodium silicate.....	65,302,901	416,005
Sulphur, refined.....	25,998,638	393,548
Sodium sulphate.....	6,467,744	29,659
Sodium bisulphate.....	6,156,742	27,103
Sodium sulphide.....	2,067,717	32,634
Sodium hyposulphite.....	10,469,744	144,868
Tin salts.....	6,247,205	603,937
Zinc salts.....	9,511,909	353,902

In transcribing the above table, we have entered only those chemicals which are of especial interest in the mineral industry. An omission has been made

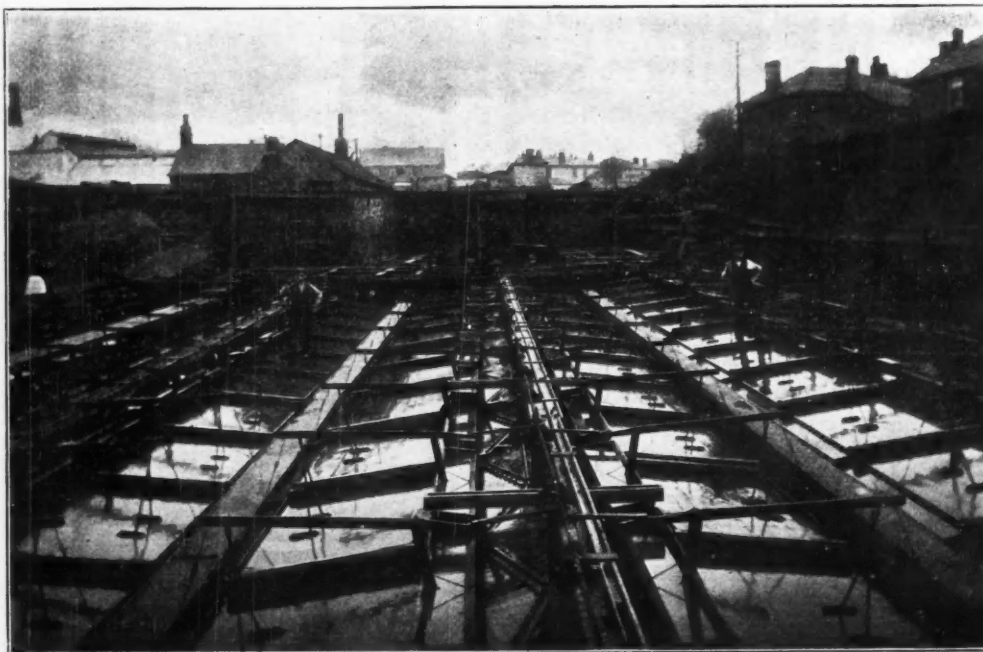


FIG. 6.—COAD'S DISTRIBUTOR, TUCKING MILL STREAM.

tion do not include the quantity of that vitriol which was calcined for the manufacture of Venetian red at the works where produced. In most other respects the figures given in the above table are probably quite closely representative of the actual production. The values are in all cases of the products at the works.

PHOSPHORUS.—According to the census report, the production of phosphorus in the United States in 1900 was 487,690 pounds, valued at \$150,000. Three concerns are engaged in the business. The electric furnace is employed, whereby a yield of 17 parts is obtained from 100 parts of calcium phosphate, the theoretical being 20. In the old process of reducing phosphoric acid by charcoal the maximum yield from the original phosphate was only 11 parts in 100.

as the Salmon River, about 35 miles distant."

Up to the present time no reports of any discoveries of coal in the section referred to by Dr. Dawson have been recorded; in fact, it is doubtful if any systematic prospecting has been done. Such work would require much time and labor on account of the generally thickly wooded and impassable nature of the country. The known productive measures are those in the vicinity of Union Bay, about 25 miles southeast from the mouth of Campbell River. The intervening country has not been thoroughly prospected, nor indeed has the narrow belt between Union Bay and the southeastern extremity of the Cretaceous area near Nanoose Harbor.

This entire coal-field is included in the land grant made to the Esquimalt and Nanaimo Railway. The northern boundary is a line drawn west from the

mouth of Campbell River for some little distance, thence northwest to Crown Mountain in the interior of the island, thence south crossing the Alberni Canal about 6 miles below the town of Alberni. As this grant includes all coal and base metals, prospectors who make discoveries have to settle with the railroad company as well as with the Government before titles can be secured.

In the report of Mr. Richardson referred to earlier in this article, he states that on Brown River nearly abreast of Cape Lazo he found the lower member of the Cretaceous series designated as the Productive Measures to have a thickness of 739 feet and to contain nine seams of coal, varying in thickness from six inches to seven feet.

Denman, Hornby and Sangster islands in the Strait of Georgia are included in the Cretaceous area, and small outliers are reported at Gillis Bay on the west coast of Texada Island, also on the north and south coasts of Lasqueti Island.

The Wellington Colliery Company, Limited, is the only operator in this field. Its productive mines are situated about 11 miles northwest by railway from Union Bay.

The output during 1901 was 265,160 long tons of coal and 18,725 tons of coke.

Mines Opened.—Four mines have been opened by this company. These are known as No. 2 Slope, No. 4 Slope, No. 5 Shaft and No. 6 Shaft. The two latter are connected by a heading 4,600 feet in length. No. 5 Shaft cuts two seams of coal, one at a vertical depth of 275 feet, the other at 590 feet. The long-wall and pillar-and-stall systems of mining are both adopted according to the prevailing conditions. The coal is a hard bituminous and well adapted for domestic, steaming and coking purposes.

Ventilation.—No. 5 Shaft is an "intake," as is also the heading. No. 6 Shaft is the "upcast." The workings from these shafts are ventilated by two 5 by 15 feet Guibal fans running 70 revolutions per minute. No. 4 Slope is ventilated by one 11 by 30 foot Guibal fan. No. 2 Slope has not been worked for some time past.

Haulage.—Rope haulage is employed. The winches are run by electricity, by which the pumps are also operated. The electric power house contains two dynamos, which in addition to generating the current for hoisting and haulage, lights various portions of the mines as well as the surface plants.

Surface Plants.—Each opening is furnished with modern appliances for hoisting, dumping and screening. Traveling picking tables are used for sorting out any slate or rock. The entire output is dumped into 25-ton hopper cars at the pit heads and hauled over a standard gauge railway to the wharves at Union Bay. These are constructed for loading the largest vessels at any stage of the tide.

This coaling station is a favorite with the vessels engaged in the Alaskan trade. The coal and coke output is all shipped by water, as there is at present no railroad communication with the southern portion of the island, but an extension of the Esquimalt and Nanaimo Railway to the north end via these mines is under consideration.

Coking Plant.—On the water front at Union Bay the company has in operation a coal breaker and Luhrig washer. All the small coal is washed as well as that portion of the larger sizes which is used for coke-making, and is put through the breaker. In the near vicinity of the washer there are 200 bee-hive coke ovens which are charged from cars hauled from the washer by the endless rope system. This coke is hard but rather high in ash. It is being used at present at the Everett Smelter in Washington, also at Van Anda, Texada Island.

Brick Kilns.—As the fire-clay which occurs in the mines is of such grade as to warrant its manufacture into fire brick, a plant has been erected for this purpose. All the bricks used in the construction of the coke ovens were made from this fire-clay.

QUATSINO COAL-FIELDS.

Besides the fields already described by the writer there also occur on Vancouver Island near the northern end and outside of the land grant of the Esquimalt and Nanaimo Railway Company three other

coal areas in the Cretaceous series. The easterly of these, in which is situated Suquash, may be designated as the Port McNiel field. In this field the first discovery of coal on the island was made and prospected by the Hudson's Bay Company. The center field is located between the Rupert and West Arms of Quatsino Sound, the westerly on the north shore of the main arm of this sound near the entrance and extending westward to Winter Harbor in Forward Inlet.

There are several small outliers to the north and northwest, but as no survey or systematic prospecting has been done in that portion of the island, except in the igneous and metamorphic rocks searching for copper bearing ores, it is impossible to form any idea of the future possibilities so far as the coal-field is concerned.

During 1898, 1899 and 1900 operations of an exploratory and prospecting nature were carried in the Quatsino fields by a San Francisco syndicate. A test of the coal for steaming purposes was made on the S. S. Queen City, of the Canadian Pacific Navigation Company's fleet, on a voyage when the writer was on board in 1899. The coal itself gave good satisfaction, but because sufficient care had not been exercised in screening there was so much dirt and slate shipped that the test was not sufficiently satisfactory to warrant its use unless the operators had erected modern screening and loading facilities. Owing to the death of Mr. Hallidie, of San Francisco, the head of the syndicate, the exploratory operations were discontinued and have not been resumed.

In the late Dr. Dawson's report of 1887, which is the only reliable literature on this portion of Vancouver Island, he says of the westerly field, which he designates as the "Koprino area," as follows:

"It appears quite probable that the Cretaceous basin here spoken of as the Koprino area may prove to be the most important from an economic point of view of those at Quatsino Sound. It is much larger than the others; the regularity of its beds to the east and north of Koprino Harbor is great, and it is more easy of access than the Coal Harbor (center field), to reach which the Quatsino Narrows must be passed, and this can only be done at favorable stages of the tide.

The center field is estimated by the same authority as covering an area of seven miles from east to west, about 2 miles in width, and containing an approximate probable area without including underwater extensions—about 5,630 acres.

Analyses of samples of coal from the eastern field made by Dr. G. C. Hoffman, chemist for the Canadian Geological Survey, gave the following results:

	Per cent.
Hydroscopic water.....	3.65
Volatile combustible matter.....	42.23
Fixed carbon.....	39.84
Ash.....	14.28
Total.....	100.00

This coal produced a coherent but tender coke, and is considerably acted on by a solution of caustic potash.

	Per cent.
Hydroscopic water.....	5.03
Volatile combustible matter.....	41.51
Fixed carbon.....	46.52
Ash.....	6.94
Total.....	100.00

This coal yields a moderately fine coke, and is also considerably affected by a solution of caustic potash.

	Per cent.
Hydroscopic water.....	3.68
Volatile combustible matter.....	39.29
Fixed carbon.....	47.03
Ash.....	10.00
Total.....	100.00

This coal yields a firm coherent coke and is scarcely affected by a solution of caustic potash.

So far as the Quatsino field is concerned the transportation facilities (one steamer each month) are unfavorable for promoting operations. The Port McNiel field being on the east coast of the island and on the direct route of northern travel is more favorably situated, but at present the conditions of

the coal markets are such that competition with the established collieries on Vancouver Island could hardly result satisfactorily.

The following table is taken from the Minister of Mine's report:

Coal and Coke Production of Vancouver Island, Per Year to Date.

Years.	COAL.	
	Tons (2,240 lbs.)	Value.
1836-52.....	10,000	\$40,000
1852-59.....	25,396	101,592
1859 (2 months).....	1,989	7,956
1860.....	14,246	56,988
1861.....	13,774	55,096
1862.....	18,118	72,472
1863.....	21,345	85,380
1864.....	28,632	115,528
1865.....	32,819	131,276
1866.....	25,115	100,460
1867.....	31,239	124,956
1868.....	44,005	176,020
1869.....	35,802	143,208
1870.....	29,843	119,372
1871-2-3.....	148,540	493,836
1874.....	81,547	244,641
1875.....	110,145	330,435
1876.....	139,192	417,576
1877.....	154,052	462,166
1878.....	173,846	512,538
1879.....	241,301	723,903
1880.....	267,595	802,785
1881.....	228,357	685,071
1882.....	282,139	846,417
1883.....	213,299	639,897
1884.....	394,079	1,182,210
1885.....	265,596	796,788
1886.....	326,636	979,908
1887.....	413,360	1,240,080
1888.....	489,301	1,467,903
1889.....	579,830	1,739,490
1890.....	678,140	2,034,420
1891.....	1,029,097	3,087,291
1892.....	826,335	2,479,005
1893.....	978,294	2,934,882
1894.....	1,012,953	3,038,859
1895.....	939,654	2,818,962
1896.....	896,222	2,688,666
1897.....	882,854	2,648,562
1898.....	1,135,865	3,407,595
1889.....	1,306,324	3,918,972
1900.....	1,232,792	3,698,376
1901 (estimated).....	1,252,569	3,757,707
Total.....	17,010,237	\$51,409,235

Years.	COKE.	
	Tons	Value.
1895-6.....	1,565	\$7,825
1897.....	17,831	89,155
1898 (estimated).....	35,000	175,000
1899.....	5,000	25,000
1900.....	12,000	60,000
1901.....	18,725	93,625
Total.....	90,121	\$450,605

A ROCK DRILL AS A BLACKSMITH'S HAMMER.—A correspondent writes to the *American Machinist* as follows:

"While visiting the Elkton Mine at Cripple Creek, Colo., last summer, I was interested in the ingenious way in which a rock drill had been rigged up to take the place of one or two blacksmith helpers in the blacksmith's shop. The drill, minus the tripod, was fastened to a vertical support. An ordinary anvil was fixed in a position under the ram, and the necessary air connections were made with the cylinder. When a blacksmith has some heavy hammering to do, he has some one, as usual, to manage this contrivance, while the smith takes care to have the blows struck in the proper place, as with a steam hammer, except that the blows are not as heavy, but a sight more numerous for a given space of time. At the time that I saw this improvised (?) steam hammer in operation the blacksmith was working down a piece of steel or wrought iron, about three inches wide at its widest part, one inch thick at its thickest part, 2½ feet long, tapering in both width and thickness, and the hammer appeared to be doing excellent service. It appeared to me a very simple, effective and quite inexpensive apparatus, especially considering the fact that it, excepting the hammer head, was rigged up from material to be found in any mining outfit, and that it could be very easily resolved into its original parts and their former duties resumed, since neither drill nor anvil suffers any from this somewhat unusual use."

COAL MINING IN SPAIN.—An important company, called the Sociedad General Espanola de Carbones, has been formed at Madrid to acquire and exploit the coal mines known as Quiros, in the province of the Asturias, Spain, with an estimated annual production of 200,000 tons of steam coal. The company also proposes to establish a number of depots at the principal ports for the supply of steamships and general sales purposes.

UNITED STATES MINERAL EXPORTS.

For the first six months of 1902, the value of mineral products and their manufactures exported from the United States amounted to \$132,610,465 as compared with \$133,485,875 for the corresponding period of 1901. The decrease of \$875,410 in 1902 is comparatively insignificant, representing a loss of only a little more than 0.6 per cent. Considering the continued extraordinary home demand for iron and steel products and the practical elimination of anthracite coal as a commodity for export, the decrease is notably small.

A glance at the accompanying table will show that in nearly all lines of iron and steel products the exports this year were less than last, the two principal exceptions being in steam engines and hardware. The exports of steel rails in the first six months of 1902 show a decrease of about 75 per cent from 199,902 tons worth \$5,351,006 in 1901 to 48,663 tons, valued at \$1,335,849. Copper exports, on the other hand, show increases in all lines, except copper sulphate. The shipments of copper ingots, etc., increased from 107,163,272 pounds to 201,634,099 pounds, a gain of 94,470,827 pounds or 88 per cent, but the value, owing to the lower prices ruling during 1902, shows an increase of only 43 per cent, from \$17,516,148 to \$25,014,204.

increased a little over 10 per cent in quantity and less than 2 per cent in value, while illuminating oils decreased 23 per cent in amount and less than 0.4 per cent in value.

The exports of anthracite coal, nearly all of which goes to Canada, have fallen off about 40 per cent as compared with last year, while the shipments of bituminous coal increased very slightly. The total exports of coal for the first six months of 1902 were 3,269,914 tons, which based upon the product for 1901 would represent about 2.5 per cent of our total output.

THE SULPHURIC ACID INDUSTRY OF THE UNITED STATES.

The production of sulphuric acid in the United States in 1900, as reported by Messrs. Charles E. Munroe and Thomas M. Chatard in *Bulletin No. 210* of the Twelfth Census, was as follows:

Grade.	Short tons.	Value.	Per ton.
50° B.....	953,439	\$7,965,832	\$8.35
60° B.....	17,011	246,284	14.47
66° B.....	377,279	6,035,069	16.00
Total	1,347,729	\$14,247,185	....

The above statement does not represent the actual make of acid of the various grades. The figures of

product of acid were reduced to 50° B. the quantity would have been 1,540,623 tons, equivalent to 1,232,500 tons of 60° B., or 1,027,080 tons of 66° B., or 955,184 tons of pure H₂SO₄. As compared with 1890, the production of acid was practically twice as great. The total number of works making acid in 1900 was 127, of which 31 burned brimstone, 79 pyrites, and 17 both brimstone and pyrites. It appears doubtful from this statement whether the Census statisticians included the acid made from blende and as a by-product in the treatment of gold and silver bearing pyrites at certain metallurgical works in the West, the quantity of which in 1900 was reported by *The Mineral Industry* as 85,000 tons, basis 66° B., equivalent to 127,500 tons of 50° B. According to the Census Report on the smelting industry, the acid product of zinc works in 1899 was 58,827 tons (grade of acid not stated, but probably of 50° and 60° B.).

Census Bulletin No. 210 gives some interesting technical details. Seven plants burning brimstone made 25,602 tons of 66° B. acid from 9,021 tons of brimstone, or 279 parts of acid to 100 of brimstone, the figures for each plant ranging from 308 : 100 to 260 : 100. Reckoning the brimstone as containing 98 per cent S and the acid as containing 93 per cent H₂SO₄, the average yield was 269 parts of pure acid per 100 parts of pure sulphur; the theoretical is 306.25 : 100. In the maximum case reported by the Census, the yield of real acid per unit of pure sulphur was 292 : 100. Thirteen plants made 70,267 tons of 50° B. acid out of 17,978 tons of brimstone, an average of 391 : 100, the figures ranging from 446 : 100 to 321 : 100. Reckoning 50° B. acid as containing 62 per cent H₂SO₄, and the brimstone as 98 per cent S, the average yield was 247 parts of real acid per 100 parts of pure sulphur. Two works which reported the low yields of 321 and 334 parts of 50° B. acid per 100 parts of brimstone, stated that they were using a very low grade of brimstone, obtained under advantageous conditions.

Nine plants burning pyrites made 155,962 tons of 66° B. acid from 124,013 tons of pyrites, an average of 133.8 parts of acid (equivalent to 200.7 of 50° B.) per 100 parts of pyrites. Thirty plants made 444,611 tons of 50° B. acid from 212,525 tons of pyrites, an average of 209 acid per 100 of pyrites, the figures ranging from 234 : 100 to 160 : 100. The minimum ratio, namely 160 : 100, was reported by three works burning low-grade domestic pyrites. The maximum, 234 : 100, was furnished by a new plant burning pyrites, with an average content of 50.05 per cent S and using 1.26 parts nitrate of soda per 100 parts of pyrites. Analysis of these figures shows that the yield was approximately 290 parts of real acid per 100 parts of sulphur in the ore; or, assuming that 49 units of the sulphur were burned, the yield was 296 : 100, indicating an efficiency of nearly 97 per cent in the chamber and tower process, while the consumption of nitrate of soda was only about 2.5 per cent of the weight of the sulphur. Other works reported 224 parts acid and 1.66 niter per 100 parts of pyrites; 213.4 parts acid and 2.13 niter; while a large combination stated that it allowed 2.5 parts of niter and expected a yield of 225 parts of 50° B. acid. The works using brimstone showed approximately a consumption of 4.29 parts of niter per 100 parts of brimstone. The authors of the *Bulletin* remark that the continued use of brimstone in the sulphuric acid industry of the United States is noteworthy, inasmuch as practically no brimstone acid is now made in England or on the continent of Europe. It is interesting to note that a trifle more than 51 per cent of all the acid produced in the United States, reduced to a common basis of 50° B., is consumed in the fertilizer industry, but if we assume that the Census statistics do not include 127,500 tons of by-product acid, the percentage would be rather less.

The Census statistics of acid production enable us to form some idea of the quantity of sulphur that is consumed in the United States for other purposes, especially in the manufacture of sulphite pulp for paper making, although the calculation involves so many general and uncertain assumptions that the result can only be approximately correct. The total

United States Exports of Domestic Mineral Products and Their Manufactures.

Articles.	Jan. to June, 1901.		Jan. to June, 1902.		Changes, 1902.	
	Quantities.	Value.	Quantities.	Value.	Quantity.	Value.
Aluminum, and manufactures of.....	.....	\$93,854	.....	\$28,542	..... D.	\$65,312
Brass, and manufactures of.....	.....	961,351	.....	813,664	..... D.	47,687
Bricks, building and fire.....	.....	288,526	.....	247,448	..... D.	41,078
Cement, bbls.....	159,488	304,886	178,016	277,116	I.	18,528
Chemicals: Acids.....	.....	98,920	.....	128,978	..... I.	30,058
Asbes, pot and pearl, lbs.....	680,716	34,907	966,466	44,634	I.	285,750
Copper sulphate, lbs.....	45,857,363	2,090,819	29,021,467	1,162,297	D.	16,835,596
Lime, acetate, lbs.....	30,122,992	558,247	31,027,119	490,882	I.	904,127
Coal, anthracite, tons.....	1,027,139	4,593,932	604,322	2,774,594	D.	422,817
bituminous, tons.....	2,654,984	6,364,203	2,665,592	6,926,092	I.	10,608
Coke, tons.....	200,010	865,640	218,375	964,179	I.	18,365
Copper ore, tons.....	5,689	871,336	11,152	846,484	I.	5,463
ingots, bars, plates and old, lbs.....	107,163,272	17,516,148	201,634,099	25,014,204	I.	94,470,827
manufactures of.....	.....	886,045	.....	1,071,463	..... I.	185,418
Gunpowder, lbs.....	716,207	283,662	864,935	1,174,451	I.	148,728
other explosives.....	.....	892,290	.....	999,472	..... I.	77,182
Instruments and apparatus for scientific purposes.....	.....	3,799,584	.....	2,771,101	..... D.	1,028,483
Iron and steel, and manufactures of:						
Iron ore, tons.....	12,889	32,280	16,451	46,922	I.	3,562
Pig iron, tons.....	43,253	649,642	16,740	289,791	D.	26,513
Bar iron, lbs.....	30,964,692	503,227	36,366,778	616,264	I.	5,396,086
Bars or Rods of steel, lbs.....	45,030,625	763,374	27,717,122	553,593	D.	17,313,483
Billets, ingots and blooms, tons.....	26,641	688,499	934	27,967	D.	25,707
Hoop, band, and scroll, lbs.....	2,149,657	46,109	2,571,633	57,562	I.	421,976
Iron rails, tons.....	437	12,235	176	3,350	D.	261
Steel rails, tons.....	199,902	5,351,006	48,663	1,335,849	D.	151,239
Iron sheets, lbs.....	9,943,930	283,662	3,994,092	121,106	D.	5,949,838
Steel sheets, lbs.....	42,789,881	747,993	17,703,393	381,699	D.	25,086,488
Tin and terne plates and taggers' tin, lbs.....	894,737	45,572	2,321,102	93,809	I.	1,426,365
Structural iron and steel, tons.....	29,682	1,646,233	36,817	1,816,392	I.	7,135
Wire, lbs.....	90,699,337	2,267,075	116,211,516	2,739,531	I.	25,512,179
Scrap and old, fit only for manufacture, tons.....	6,537	93,377	5,674	88,589	D.	863
Hardware.....	.....	3,504,163	.....	5,512,115	..... I.	2,007,952
Nails, cut, lbs.....	14,536,401	316,114	8,964,083	184,322	D.	5,572,318
Nails, wire, lbs.....	23,175,808	488,504	27,243,043	447,669	I.	4,567,235
Spikes and tacks, lbs.....	2,146,976	233,400	2,029,563	127,794	D.	117,413
Machinery, Electrical.....	.....	2,968,222	.....	2,824,230	..... D.	143,992
Metal-working.....	.....	1,523,816	.....	1,497,235	..... D.	26,581
Pumps and pumping.....	.....	1,010,557	.....	1,045,409	..... I.	34,852
Steam engines, and parts of.....	.....	13,636,363	.....	16,521,766	..... I.	2,885,404
All other machinery.....	.....	3,349,875	.....	2,202,917	..... D.	1,146,958
Pipes and fittings.....	.....	2,522,599	.....	2,556,972	..... I.	34,373
All other manufactures of iron and steel.....	.....	9,062,828	.....	7,087,020	..... D.	1,975,808
Lead, pig, bar, and old, lbs.....	4,641,286	209,180	6,326,872	276,043	I.	1,685,866
manufactures of.....	.....	184,745	.....	190,922	..... I.	6,247
Lime, bbls.....	14,430	14,625	22,829	27,368	I.	8,399
Marble and stone, unmanufactured.....	.....	43,325	.....	107,751	..... I.	64,426
Roofing slate.....	.....	373,733	.....	331,451	..... D.	42,282
All other manufactures.....	.....	367,376	.....	344,962	..... D.	22,414
Mineral oil, crude, gals.....	62,947,371	3,033,099	69,491,913	3,086,121	I.	6,544,542
Naphthas, gals.....	9,789,388	852,943	11,503,083	789,122	I.	1,713,695
Illuminating, gals.....	374,378,765	24,296,527	289,773,153	24,203,137	D.	84,605,612
Lubricating and Paraffin, gals.....	37,084,666	5,167,441	37,794,399	4,170,986	I.	709,733
Residuum, bbls.....	356,332	794,569	427,356	414,882	I.	71,024
Nickel, nickel-oxide and matte, lbs.....	2,871,164	742,139	1,420,000	411,454	D.	1,451,164
Paints, pigments, and colors:—Zinc oxide, lbs.....	3,313,741	684,690	2,599,592	412,991	D.	714,149
All other.....	.....	706,120	.....	761,939	..... I.	55,819
Phosphates, tons.....	339,165	2,764,812	357,318	2,810,834	I.	18,153
Quicksilver, lbs.....	429,419	244,533	335,076	194,648	D.	94,343
Salt, lbs.....	7,349,107	35,304	5,806,378	32,154	D.	1,542,729
Tin, manufactures of.....	.....	256,470	.....	278,193	..... I.	21,723
Zinc ore, tons.....	19,564	598,537	21,850	648,770	I.	2,286
pigs, bars, etc., lbs.....	4,523,086	191,759	5,186,048	231,017	I.	662,962
manufactures of.....	.....	38,003	.....	57,266	..... I.	19,263
Total value.....	.....	\$133,485,875	.....	\$132,610,465	..... D.	\$875,410

Of the 201,634,099 pounds of fine copper exported this year, 64,681,123 pounds, or 32 per cent, were sent to Great Britain; 33,842,272 pounds, or 16 per cent, were sent to Germany, and 29,536,868 pounds, or 14.5 per cent, were shipped to France; other European countries received 72,095,990 pounds, or 36 per cent, showing that about 99 per cent of our copper exports are consumed in Europe.

Mineral oils show increases in quantity in all lines except illuminating oils, and decreased values with the exception of crudes. The export of crude oils

quantity and value of the 50° acid include that which was made at certain works and consumed there in the manufacture of fertilizers. This was really acid of 50° strength. Its amount was 789,359 tons. In addition thereto a large quantity of acid of different grades consumed at works for various purposes has been included with the actual 50°, of course reduced to that grade. We infer that the quantities of 60° and 66° acid reported by the Census include only what was marketed as such. The values are determined on the basis of the output at the works. If the entire

production of acid reduced to a basis of 50° B., reported as 1,540,623 tons, was equivalent to 955,184 tons of pure H₂SO₄. Reckoning that the average yield was 270 parts acid per 100 parts of sulphur, the quantity of sulphur required would have been 353,772 tons. In *The Mineral Industry*, Vol. IX., page 615, it was estimated that the total consumption of sulphur in the United States in 1900 was 459,822 tons. It would appear, therefore, that about 106,050 tons of sulphur, or 23 per cent of the total consumption, were used for other purposes than sulphuric acid making. The *Mineral Industry* assumes that the brimstone consumed averages 98 per cent S, the foreign pyrites 47 per cent, and the domestic 44 per cent; and we assume that the Census report of acid produced does not include that which was obtained from blende.

IRON AND STEEL EXPORTS AND IMPORTS.

Exports of iron and steel from the United States in June were valued by the Bureau of Statistics of the Treasury Department at \$7,771,791, against \$7,835,493 in June, 1901, showing a decrease of \$63,702 this year. The comparison is with a month when exports were falling off as compared with the earlier part of 1901. The chief items of exports were as follows, in long tons:

	1901.	1902.	Changes.
Pig iron.....	2,616	2,085	D. 531
Iron and steel bars.....	1,942	6,192	I. 4,250
Rails	31,515	7,507	D. 24,008
Sheets and plates.....	1,980	2,120	I. 140
Structural steel.....	4,599	1,784	D. 2,815
Wire	6,496	8,961	I. 2,465
Nails	2,681	3,354	I. 673

Changes this year were not of much importance, with the exception of the heavy decrease in steel rails.

The total value of iron and steel imported in June was \$3,635,930, against \$1,807,827 in June, 1901, an increase of \$1,828,103 this year. Included in the imports this year were 32,458 tons of pig iron, against 6,113 tons in June, 1901, and 3,559 tons steel billets, against 746 tons last year.

Imports of iron ore for the month were 91,956 tons, against 92,924 tons in June, 1901. For the six months ending June 30 the imports were 581,360 tons, against 350,184 tons in the first half of 1901, an increase of 231,176 tons this year.

PRODUCTION OF SODA IN THE UNITED STATES.—According to the Census report, the production of soda salts in the United States in 1900 was as follows: Soda ash, 390,653 tons (\$4,859,656); sal soda, 63,249 tons (\$875,243); bicarbonate of soda, 68,856 tons (\$1,332,765); caustic soda, 116,783 tons (\$3,170,280). The tons are of 2,000 pounds, and the values are for the various products at the works where made. The total production of the above four salts was 639,541 tons, valued at \$10,237,944. The marvelous development of the American soda industry is shown by comparison with the statistics of 1890, in which year the output was only 166,562 tons, valued at \$5,432,400. This has made the United States almost independent of foreign soda, the importations having decreased from 206,430 tons in 1890 to 48,313 tons in 1900. There was a production of 10,210 tons (\$106,600) of natural soda in the West in 1900.

PHOSPHATE INDUSTRY OF THE UNITED STATES.—The production of acid phosphate of lime (acidulated phosphate rock) in the United States in 1900 was estimated by the census statisticians to amount to 1,480,414 tons. In making this there was consumed 815,855 tons of phosphate rock and 815,855 tons of chamber sulphuric acid. The general average of all the returns showed that for every 2,000 pounds of phosphate rock there was required 2,000 pounds of acid of 50° B., and the product was 3,600 pounds, about 400 pounds, or 10 per cent, of the weight of the ingredients being lost in the vapors given off in the process, which consist of steam and the volatile constituents of the phosphate rock, such as carbon dioxide, fluorine and chlorine.

SUNLIGHT IN A VERTICAL SHAFT.

By J. NELSON NEVIUS.

The accompanying photograph shows sunlight shining down a vertical shaft. It was taken 825 feet below the surface of the ground and could have been obtained at double that distance below the surface; but, being a first experiment and there being only three or four days in the year when it is possible to perform it, it was deemed advisable to use a station near the surface in order to be more certain of securing a photograph.

The photograph was taken in Los Tocayos shaft of the Sombrerete Mining Company, at Sombrerete, State of Zacatecas, Mexico. This town is situated almost exactly on the Tropic of Cancer, and at mid-day on June 21 the sun passes practically vertically over the earth at this point and illuminates the vertical shafts clear to their bottoms.

This shaft is downcast and free from smoke. In the lower stations falling water diffuses the direct sunlight and gives the shaft the appearance of having a brilliant phosphorescent glow, so intense that on the 1,100-foot station the three-deck cage was unloaded of empty cars and loaded with full ones with all station lights extinguished.

Owing to the light gaining admission only through a narrow opening at the top of the massive head-



SUNLIGHT IN A VERTICAL SHAFT.

frame, it appears in the shaft with startling suddenness; gains in intensity for about two minutes; culminates and fades again. From any of the upper stations it is possible to see the platform at the bottom of the timbering which protects the shaft sinkers. This vision of 1,000 feet or more of a vertical shaft, illuminated throughout the entire distance, is as curious as it is unusual. The slightest displacement of a wall-plate or a curve in a guide is readily noticeable.

When the photograph was taken the cage was above and the water tank was below the camera, consequently the tank compartment A is brilliantly illuminated and in great contrast to the dark cage compartment B. In the latter compartment two narrow streaks of light, one on the station still and the other on the opposite wall-plate, indicate where the light passes through the clearness between the cage and the shaft timbers. The cage bell rope and one of the tank guides are in strong relief against the light in the tank compartment. The sheet iron turn-plate, being wet, reflects the center post; and the guard gate shows strong illumination on its upper edge.

The plate used was Seed's No. 26 and the exposure was 3½ minutes with the lens wide open. The illumination was entirely that of the sun and the print was made from the plate exactly as it developed, no retouching of any kind being performed.

THE MANUFACTURE OF FERTILIZERS IN THE UNITED STATES.

A bulletin issued by the Census Bureau on June 25 contains some interesting data about the manufacture of fertilizers. This report is of particular value, as nothing of the kind relative to manufactured fertilizers has been issued for 10 years.

The total number of establishments classified as "fertilizer works" is 422. In addition there are 18 small establishments, each of which reported a value for all products of less than \$500. The 422 establishments produced "finished fertilizers," including 923,198 tons of superphosphate worth \$8,471,943, and 142,898 tons of ammoniated superphosphate, also 1,436,682 tons of "complete fertilizers," by which is meant a mixture of superphosphate with both potash and ammoniates, worth in this instance \$25,446,046, and finally, 291,917 tons of "other fertilizers" worth \$4,178,284, and including bone meal and similar substances.

Besides the 422 establishments classified as "fertilizer works" are ten establishments whose main product places them in some one of the groups of chemical "industries," but which made more or less fertilizers as a subordinate, though sometimes very important, part of the product. The product of this class amounted to 1,810 tons of superphosphate worth \$20,417, 17,707 tons of "complete fertilizers" worth \$350,077, and 7,983 tons of "other fertilizers" worth \$98,510.

A third class is arranged which includes 28 works, none of which belongs to "chemical industries," but each of which manufactures a certain amount of fertilizers. The establishments of this class produced 12,000 tons of superphosphate worth \$100,000, 750 tons of ammoniated superphosphate with a value of \$13,500, also 24,391 tons of "complete fertilizer" worth \$521,825, and 27,409 tons of "other fertilizers" valued at \$443,147. The total product of manufactured fertilizers from phosphate and other mineral is 2,887,004 tons, with a value of \$41,997,673. This was produced by 476 establishments, 86 more than contributed to the product of a decade ago, which amounted to 1,898,806 tons, valued at \$35,519,841.

The manufacture of chemical fertilizers in the United States began in Baltimore, and that city was not only the pioneer but the principal market for fertilizers until some time after the Civil War. "Fertilizers" appeared as a special item for the first time in the census report for 1860. Peruvian guano was at that time imported into the country in considerable quantities, and the Peruvian Government agent, who received and disposed of all importations, was located at Baltimore, and all other markets were supplied from there. No fertilizers were sold then west of Pennsylvania.

At present, owing to the exhaustion of the sources of supply, the importation of guano has almost ceased. In 1900 but 1,150 tons, valued at \$15,543, were imported from Peru, the total amount of guano imported being 4,756 tons, valued at \$56,956. Much of this is, however, practically phosphate rock, requiring chemical treatment before using. The original guano of Peru was produced from the excrements and remains of sea birds deposited upon islands in a very arid region, where, owing to the scarcity of rain, the ammoniacal salts developed in the deposits remained in the guano. Its agricultural value was well known to the ancient Peruvians, whose wise laws forbade the killing of birds.

The importation of phosphate rock for 1900 amounted to 110,065 tons, which came mainly from Germany and Spain, and had a value of \$504,092.

Of the 478 fertilizer works in the country, 79 made all or part of the sulphuric acid which they consumed in the manufacture of superphosphates; 76 made superphosphate, but purchased the needed acid, while 208 bought the superphosphate; in each case the final product sold was mixed fertilizers. The remaining works, 115 in number, as well as all which produced natural fertilizers as a by-product, produced the fertilizer materials characterized as "all other fertilizers." The census returns confirm the

current statement that, in making superphosphate from a standard phosphate, such as South Carolina rock, the practice is to mix equal weights of phosphate and chamber acid. Other phosphates, such as high-grade Florida rock, bones, etc., will require other proportions of acid and the volatilization loss will differ, but the general average of all returns shows that every ton, 2,000 pounds, of phosphatic material required 2,000 pounds of chamber acid, lost 10 per cent by volatilization, and yielded 3,600 pounds of superphosphate. The total quantity of phosphate rock and acid used is estimated to have been 815,855 tons of each.

In comparing the various States it will be noted that South Carolina leads in quantity of product, 388,572 tons, while Maryland leads in value, \$5,213,925. In the production of "complete fertilizers" South Carolina leads both in quantity and value, producing 207,875 tons, valued at \$3,147,202, but the value per ton of \$15.14 is low in comparison with that of \$16.21, the Maryland price per ton.

PRODUCTION OF MINERAL ACIDS IN THE UNITED STATES.

The most important mineral acids are sulphuric, nitric and muriatic, but of both nitric and muriatic, as well as in the case of many of the minor acids, sulphuric is the base; that is, it is the agent by means of which the others are set free from their salts. Similarly it is the agent employed for the liberation of acetic acid, a very important chemical, which, although an organic acid, is of great interest to the mineral industry, inasmuch as it is obtained chiefly as a by-product in the manufacture of charcoal, to a large extent in connection with iron making, is first recovered as calcium acetate, and is finally consumed extensively in the form of metallic acetates. The production of sulphuric acid in the United States in 1900, according to the Census report, was 1,540,623 tons (2,000 pounds), reduced to a basis of 50° B. (62 per cent H₂SO₄). The production of some other acids and the number of works engaged in their manufacture were as follows:

Kind.	Tons.	Value.	No. of Works.
Nitric	15,481	\$1,454,999	34
Mixed	21,184	1,111,258	9
Muriatic	58,424	1,020,574	31
Boric	1,192	198,212	3
Acetic	13,330	426,892	12

The above figures represent only the quantities and value of acids actually sold as such. The actual production, including what was consumed at the works where made, for the manufacture of other substances, was considerably greater. Thus the actual production reported was 31,236 tons of nitric acid and 31,635 tons of mixed acids, and even these figures are believed to understate the total make. It should be explained that by mixed acid is meant a mixture of nitric and sulphuric, which is employed in nitrating organic substances, such as glycerine, cellulose and carbolic acid, being employed extensively in the manufacture of explosives. Originally the users of mixed acid purchased the two ingredients and compounded them as desired, the two acids being transported in separate carboys. Breakage of the carboys led to many serious accidents, however, and it having been discovered that the mixed acids of the highest concentration did not act upon iron, for upward of 20 years the mixture has been prepared at the acid works and shipped in iron drums.

The sales of nitric acid reported in the above table include what was marketed as of 1.22, 1.36, 1.50 and 1.60 specific gravity, and no attempt was made to separate the various grades as to quantity or reduce them to a common basis. The Census statisticians estimate that the manufacture of nitric acid in the United States in 1900 required 43,841 tons of nitrate of soda and 47,348 tons of sulphuric acid, and resulted in the production of 52,609 tons of niter cake as a by-product. The production of muriatic acid required 37,000 tons of common salt and 39,000 tons of sulphuric acid of 60° B., and furnished 47,000 tons of salt cake as a by-product.

MINERAL PRODUCTION OF CALIFORNIA FOR 1901

State Mineralogist Lewis E. Aubury reports the yield and value of the mineral substances of California for 1901 as follows, as per returns received at the State Mining Bureau, San Francisco, in answer to inquiries sent to producers:

Antimony	50 tons.	\$8,350
Asbestos	110 tons.	4,400
Asphalt	21,364 tons.	312,219
Bituminous Rock	24,052 tons.	66,354
Borax (crude and refined)	22,221 tons.	982,380
Cement	71,800 tons.	159,842
Chrome	130 tons.	1,950
Clays:		
Brick	130,766 M.	860,488
Pottery	55,679 tons.	39,144
Coal	150,724 tons.	401,772
Copper	34,931,785 lbs.	5,501,782
Fullers' earth	1,000 tons.	19,500
Glass sand	4,500 tons.	15,750
Gold	....	16,989,044
Granite	214,943 cu. ft.	519,285
Graphite	64 tons.	4,480
Gypsum	3,875 tons.	38,750
Lead	720,500 lbs.	28,820
Lithia Mica	1,100 tons.	27,500
Lime	317,383 bbls.	334,688
Limestone	76,937 tons.	99,405
Macadam	360,883 tons.	313,974
Manganese	425 tons.	4,405
Magnetite	4,726 tons.	43,057
Marble	2,945 cu. ft.	4,630
Mineral Paint	325 tons.	875
Mineral Water	1,555,328 gals.	559,057
Natural Gas	....	92,034
Paving Blocks	1,920 M.	41,075
Petroleum	7,710,315 bbls.	2,961,102
Platinum	250 ozs.	3,200
Pyrites	4,578 tons.	18,429
Quartz Crystals	4,000 lbs.	17,500
Quartz Sand	500 tons.	500
Quicksilver	26,720 flasks.	1,285,014
Rubble	169,513 tons.	327,063
Salt	126,218 tons.	366,376
Sandstone	226,741 cu. ft.	192,132
Serpentine	89 cu. ft.	890
Soda	8,000 tons.	400,000
Silver	....	1,229,356
Slate	5,100 squares.	38,250
Soapstone	10 tons.	119
Tourmaline	500 lbs.	20,000
Turquoise	500 lbs.	20,000
Total	.....	\$34,355,981

In the previous year the total product was valued at \$32,622,945, so that the increase for 1901 is \$1,733,036.

The total value of metallic substances for 1901 was \$25,052,796, an increase of \$1,694,066. This includes gold, silver, mineral paint, quicksilver, antimony, copper, lead, manganese, platinum and chrome. Silver is given in coining value. The Bureau has never independently collected statistics of precious metal output, but has used totals and distribution by counties, as obtained at the United States Mint, San Francisco, where they have the advantages of verification by figures of receipts at United States Mint and assay offices, and private refineries and smelters throughout the United States.

The total value of non-metallic substances was \$2,923,201, an increase of \$746,044. This includes borax, coal, mineral waters, salt, asbestos, gypsum, magnetite, pyrites, lithia-mica, fullers earth, quartz crystals, soda, tourmaline and turquoise.

The total value of hydro-carbons and gases was \$3,432,709, a decrease of \$1,080,242, including asphalt, bituminous rock, natural gas and petroleum. The gas is given in value of that commercially utilized. The petroleum price is the average per barrel f. o. b. at the wells or stations in each county. The decrease is due to low prices for oil prevailing last year. The product was much larger, but prices much lower than previous year.

The total value of structural materials was \$2,947,275, an increase of \$373,202. This includes brick and pottery clays, hydraulic cement, lime and limestone, macadam, rubble and concrete rock, paving blocks, marble, granite, sandstone, serpentine, slate, quartz sand and glass sand.

The relative value of the principal mineral products of the State is as follows: 1. Gold; 2. copper; 3. petroleum; 4. quicksilver; 5. silver; 6. borax.

The relative rank of the counties of the State, in point of mineral production, is given in the following table. In each case the value given includes that of all the mineral substances combined produced in the respective counties for the year. Some counties produce in addition to gold and silver, five, six or seven other substances, while other counties which produce little or no gold or silver, produce in large quantities quicksilver, mineral oils, copper, lead, asphalt, struc-

tural materials, etc. The figures include aggregate value of all mineral products, including precious metals. These latter are based, as stated, upon United States Mint returns for the year. The term "unapportioned" includes total value of such substances as are grouped to avoid disclosing private business, as in the case of single operations in a single county. In the large and complete table just published in Bulletin No. 25 by the State Mining Bureau, from which these figures are taken, the amount and value of each substance in the respective counties is set forth. It is therefore necessary in some cases to place the figures in the "unapportioned" column.

RELATIVE RANK OF COUNTIES.

1. Shasta	\$6,737,571
2. Kern	2,423,918
3. Calaveras	2,355,372
4. Nevada	2,145,840
5. Amador	1,888,191
6. San Bernardino	1,844,239
7. Tuolumne	1,710,171
8. Los Angeles	1,642,591
9. Siskiyou	1,067,451
10. Placer	1,025,184
11. Butte	876,767
12. Alameda	785,366
13. Trinity	752,280
14. Inyo	668,618
15. Sierra	576,182
16. Mariposa	549,975
17. Mono	522,911
18. Napa	516,388
19. San Diego	514,522
20. Fresno	486,696
21. Santa Clara	421,150
22. Plumas	403,832
23. Madera	400,825
24. Ventura	350,570
25. El Dorado	347,263
26. Lake	331,684
27. Riverside	316,608
28. Sacramento	302,882
29. Santa Barbara	300,148
30. San Benito	255,219
31. Santa Cruz	195,779
32. Yuba	189,754
33. Orange	187,341
34. Sonoma	173,147
35. San Francisco	156,947
36. Marin	128,227
37. San Luis Obispo	116,083
38. Colusa	115,107
39. Humboldt	108,425
40. Contra Costa	101,900
41. San Joaquin	80,456
42. Tulare	69,526
43. Monterey	50,169
44. Stanislaus	29,169
45. Alpine	27,747
46. San Mateo	15,725
47. Solano	12,600
48. Merced	12,453
49. Mendocino	10,720
50. Del Norte	10,612
51. Lassen	6,100
52. Tehama	6,000
53. Kings	5,000
54. Yolo	2,300
55. Unapportioned	23,280
Total	\$34,355,981

All the asbestos produced in California in 1901 was from Riverside County, and all the antimony from Kern County. Asphalt was produced in the counties of Kern, Los Angeles, San Luis Obispo, San Mateo, Santa Clara, Santa Barbara and Ventura. Quite a quantity was derived from the refining of petroleum. Bituminous rock was quarried in San Benito, San Luis Obispo and Santa Cruz counties. The borax was produced in Inyo, San Bernardino and Ventura counties. Brick clays were utilized in the counties of Alameda, Amador, Butte, Colusa, Fresno, Humboldt, Kern, Inyo, Los Angeles, Riverside, Madera, Marin, Mendocino, Sacramento, San Bernardino, San Diego, San Luis Obispo, San Mateo, Santa Barbara, Santa Clara, Shasta, Sonoma, San Joaquin, Tehama and Tulare. Clay for pottery, etc., came from Amador, Los Angeles, Placer, Riverside and Santa Cruz. The hydraulic cement all came from San Bernardino County, and all the chrome from Shasta.

Coal was mined in Amador, Alameda, Contra Costa, Monterey, Orange and Riverside counties. Copper was produced in the counties of Alameda, Alpine, Amador, Calaveras, Fresno, Inyo, Kern, Mariposa, Madera, Merced, Mono, Nevada, Placer, San Bernardino, Sacramento, Shasta, Stanislaus and Trinity. While only eight counties produced copper in 1890, 18 counties made a product of this metal last year, showing the growth of this industry.

All the fullers earth came from Kern, and all the glass sand from Monterey County. Gold was mined in 35 counties of the State and silver was produced in 26 counties. Granite was quarried for building purposes, curbing, etc., in the counties of Madera, Placer, Riverside, Sacramento, San Bernardino, San

Diego, Shasta, Trinity, Tulare and Sacramento. Graphite was only mined in Sonoma County.

Gypsum was derived from the counties of Orange, Riverside and Los Angeles. Lithia-mica from San Diego, and lead from Inyo, Kern, Mariposa, Meno, San Bernardino and Tuolumne.

Lime was quarried and burned in the counties of Butte, El Dorado, Kern, Mono, Riverside, San Bernardino, Santa Cruz, Shasta and Solano, and limestone was quarried for beet sugar factories, fluxing, paving, etc., in Monterey, Napa, San Bernardino, Santa Cruz and Solano. Macadam was quarried in the counties of Alameda, Los Angeles, Marin, Monterey, Sacramento, San Benito, San Bernardino, San Francisco, San Mateo, Santa Clara, Solano and Sonoma.

Manganese came mainly from Alameda, with a small quantity from Plumas. Magnesite was mined in Alameda, Napa, Stanislaus, Sonoma, Santa Clara and Tulare counties. All the marble quarried was from Amador County, and all the mineral paint from Calaveras and Stanislaus counties.

Mineral waters were bottled and sold from springs in the counties of Butte, Colusa, Contra Costa, Fresno, Humboldt, Lake, Mendocino, Monterey, Napa, Santa Barbara, San Benito, San Luis Obispo, Santa Clara, Shasta, Siskiyou, Solano, Sonoma and Tehama.

Natural gas was commercially utilized in Los Angeles, Santa Barbara, San Joaquin and Sacramento counties. Paving blocks were quarried and made in San Bernardino, Solano and Sonoma counties.

Petroleum was derived from the counties of Fresno, Kern, Los Angeles, Orange, Santa Barbara and Ventura. Platinum was found in small quantities in several counties, the most of it in Trinity.

Pyrites came from Alameda and Nevada counties; quartz crystals from Calaveras, and quartz sand from Riverside.

Quicksilver was produced in the counties of Colusa, Lake, Napa, San Benito, San Luis Obispo, Santa Clara, Shasta, Sonoma and Trinity. Rubble was quarried in Alameda, Madera, Marin, Los Angeles, Monterey, Placer, Riverside, Sacramento, San Bernardino, San Diego, San Francisco, Santa Barbara and Ventura.

Salt came from Alameda, Colusa, Los Angeles, Riverside, San Mateo and San Diego counties. Sandstone was quarried in Colusa, Santa Barbara, Santa Clara, Ventura and Yolo counties. The serpentine all came from Los Angeles county, the soda from Inyo, slate from El Dorado, soapstone from Los Angeles, tourmaline from San Diego, and turquoise from San Bernardino County.

As far as the "banner" counties are concerned in the different mineral products, the following is the record for 1901, with the values of material for the county named.

Alameda leads in coal (\$262,272), manganese (\$423), pyrites (\$18,000), and salt (\$324,136). Amador leads in marble (\$4,630); Calaveras in quartz crystals (\$17,500); Colusa in sandstone (\$80,082), and El Dorado in slate (\$38,250). Inyo leads in lead (\$24,040), and soda (\$400,000). Kern leads in antimony (\$8,350), fullers earth (\$19,500), and petroleum (\$1,131,616). Los Angeles leads in brick clays (\$264,825), gypsum (\$35,500), serpentine (\$890), and soapstone (\$119). Monterey leads in glass sand (\$15,750); Madera in granite (\$294,799); Nevada in gold (\$2,121,054), and Napa in quicksilver (\$388,176). Riverside leads in asbestos (\$4,400), clays for pottery, etc. (\$16,624), and quartz sand (\$500). San Bernardino leads in borax (\$898,150), cement (\$159,842), limestone (\$76,710), rubble (\$151,447), and turquoise (\$20,000). San Diego leads in lithia mica (\$27,500), and tourmaline (\$20,000). San Francisco quarried the most macadam (\$142,500). San Joaquin utilized the most natural gas (\$60,456). San Luis Obispo produced most values in bituminous rock (\$33,070). The most asphalt came from Santa Barbara (\$55,800). The most lime was burned at Santa Cruz (\$161,500). Shasta County made the largest product of copper (\$4,481,048), silver (\$891,994), and chrome (\$1,950). The larg-

est values in mineral waters was from Siskiyou (\$175,000). Sonoma produced the most graphite (\$4,480), and paving blocks (\$32,575). The most mineral paint was from Stanislaus (\$375), and largest quantity of magnesite from Tulare County (\$28,212).

It will be noted that only one county leads in five substances, San Bernardino. Two counties lead in four articles, Alameda and Los Angeles. Those which lead in three are Kern, Riverside and Shasta. The counties of Inyo, San Diego and Sonoma lead in two products. The other counties named in the "banner" counties, only have the lead in one substance each.

THE MINES OF WESTERN AUSTRALIA IN 1901.

The report of the Department of Mines of Western Australia for the year 1901 gives the total value of mineral products at the mines at £7,445,772, against £6,179,802 in 1900, showing an increase of £1,265,970, or over 20 per cent. The report says:

"It is gratifying to be able to record a most successful year in almost all branches of the mineral industry. While the total mineral output for the year 1899 had not previously been exceeded, that for the year 1900 showed a falling off in value of £167,906, while the value of the output for 1901 exceeded by £1,098,064 that of the year 1899. Though the value of the gold output shows the largest increase, the value of all other minerals, except lead and tin, has substantially increased.

"Gold.—The output of 1,879,391 ounces for the year 1901 is the highest recorded, exceeding that for 1899, the highest previously recorded, by 235,514 ounces, and showing an increase of 298,441 ounces—nearly 19 per cent—as compared with 1900. Substantial increases appear in the outputs of the Murchison, East Murchison, Mount Margaret, North and East Coolgardie districts. On the other hand, many of the gold fields show a decreased output; this is especially noticeable on the fields from Peak Hill northward, but though the fact is regrettable, the total decrease only amounts to about 14,000 ounces. In some of the fields, such as the Ashburton, Goscoyne and Kimberley, where there is a total absence of effective reducing plants, the decrease is accounted for by the partial working out of the known shallow alluvial deposits, while in others, such as Pilbarra and West Pilbarra, many of the workings have reached water level, and the owners being without capital to provide machinery to sink deeper, have had to abandon their properties. The mines on the East Coolgardie gold fields still maintain their richness, and with improved reduction plants have raised the output from that field alone to over 1,000,000 ounces. In most of these mines development is well ahead of the reducing plants, especially in the Great Boulder Mine, where a crosscut has been made to the lode at the 1,400 foot level, which was found to carry satisfactory values. This lode has been proved by the diamond drill to exist at a depth of 1,500 feet. Outside the known mining centers no discoveries of note have been made. The Phillips River Gold field, which was declared during 1901, has developed but slowly, owing to the absence of crushing facilities, but as several batteries are in course of erection, it is hoped that the production for the coming year will show a substantial addition to the output of the State."

It must be noted that the gold production given above is in crude or bullion ounces. Taking the value given, the output for 1901 was equal to 1,703,605 ounces fine gold, or \$35,213,511, against 1,414,466 ounces fine gold, or \$29,237,014, in 1900.

Concerning other metals and minerals, the report gives the following statements and comments:

"Tin.—The output of black tin for the year was 734 tons, valued at £40,000, which shows a decrease as compared with the year 1900 of 89 tons, the decrease of the output from the Greenbushes Tin field being 114 tons, while the Pilbarra field shows a slight increase of 25 tons. In the former field the want of an adequate water supply still operates to retard the

progress of the district, and it cannot be said that any systematic effort on a sufficiently large scale has been made to work the many large but comparatively low-grade deposits which exist. The erection by the Government of a small tin-dressing plant was completed in December, but up to the end of the year no ore had been treated.

"Copper.—There has been some advance in copper mining during the year, the output of 10,157 tons of copper ore, showing an increase of 3,974 tons as compared with the previous year, the estimated value of the ore raised being £75,246. In only one district, the Mount Malcolm, do operations appear to be carried on systematically, and this is the only district in which the ore is reduced to matte, water-jacket furnaces being erected at the mines. The ore from the Murchison, Northampton, West Pilbarra, Phillips River and other producing districts is exported for treatment. In the latter district only the high-grade ore can be profitably exported, the cost of the carriage being heavy and the shipping facilities poor. There seems no doubt, however, that eminently payable copper lodes, carrying more or less gold, exist, and that the erection of local smelting works would result in the output of the field being largely increased. The unfortunate fall in the price of copper has had the effect of retarding the development of the copper fields of the State, making investors chary of investing capital in the development of the mines and the erection of reducing plants. A number of leases were taken up during the year in the Ashburton for copper as well as lead and silver mining, but little work has been done. The report of the geologist sent by the Department to examine the locality was highly favorable, and there can be little doubt that more will be heard of this district in the future.

"Coal.—The output of the only coal field, that at Collie, has remained practically stationary during the year, the output of 117,836 tons being 574 tons less than in 1900. Several causes have contributed to this result, one being a fire at one of the main producing collieries, the Wallsend, which materially reduced its output, while another was the non-production of coal from the West Collie Mine for the latter part of the year, the seam that was being mined proving unprofitable. Another reason for the want of progress during the year is to be found in the inadequate supply of trucks for coal carrying purposes, which has resulted in the companies being unable to supply small consumers in Perth and Fremantle. This drawback should shortly be removed, and, with the advent of coal-cutting machinery and the consequent cheapening of production, a prosperous future should await this industry.

"Ironstone and Limestone.—The output of ironstone is 20,569 tons, which has been used principally for fluxing purposes, and is greater by 8,318 tons than that for 1900. The output of limestone, 18,210 tons, is also greater by 2,283 tons than that of the previous year, but returns are available for only a small portion of the actual production of this mineral.

"Lead.—The production of this mineral has practically ceased. The Northampton mines, which for some time have been small producers, have practically closed, owing to the fall in the price of lead.

"Future Prospects.—The results of mining operations in the State for the year 1901 afford much encouragement for the future. It is evident that gold mining will be the most important of the mineral industries for some time to come, though from the wide distribution and frequent occurrence of other minerals it is evident that they will materially add to the wealth of the State in the future. The fact of the material increases in the output of almost all the gold fields in which capital has been systematically expended, in many cases under great disadvantages arising from the unfavorable local conditions and the want of railway communication, cannot but lead to the conclusion that, with the extension of the railway system many mines now unworked will become large producers. The completion of the gold fields water scheme, which is within measurable distance, cannot but add to the prosperity of the Coolgardie District, while to the Kalgoorlie mines the supply of fresh

water at a moderate price should lead to a very substantial reduction in the cost of treatment, which should result in increased dividends to the shareholders.

NEW REGULATIONS REGARDING GEOLOGICAL SURVEY PUBLICATIONS.

[SPECIAL CORRESPONDENCE.]

WASHINGTON, D. C., August 6, 1902.

A joint resolution, passed at the last session of Congress and approved by the President, will be of interest to the many mining men and scientists who have found the publications of the United States Geological Survey of value. Its radical features are three—a clause that restricts the annual report of the Director of the Survey to one volume of royal octavo size and establishes a new series called "professional papers;" a provision for the free distribution of bulletins and professional papers, and a provision permitting the Director and the Secretary of the Interior to exercise their discretion in respect to the size of the edition of any report except the annual, and to order additional copies printed when needed. The publications of the Survey will hereafter include the Director's annual report, monographs (still to be sold), professional papers, bulletins, mineral resources, water supply and irrigation papers, and such maps, folios and atlases as may be required by existing law.

Heretofore a nominal fee to cover the cost of printing the bulletins has been charged, but, observing the great demand for bulletins and professional papers, and appreciating the fact that these were only desired by people capable of making good use of them, the Director has thought a change of policy in regard to their distribution advisable. It is expected that, instead of costing the Government more, his arrangement will result in a considerable pecuniary saving, for the reason that it restricts the Director's annual report to one volume. Instead of publishing some 13,000 cloth-bound copies of a report consisting of six or seven volumes, the Survey will now be under the necessity of issuing only one cloth-bound volume, aside from the monographs. The professional papers, formerly included in the annual report, will be issued in paper covers, a saving that permits of their economic and gratuitous distribution.

The terms of this resolution limit the issue of any publication to 10,000 copies. It is provided that 1,000 copies of bulletins and professional papers shall be delivered to the Senate and 2,000 to the House of Representatives for distribution among the members' constituents. Besides these, about 2,500 are required for the Survey's exchange list. A possible issue of 4,500 is therefore available to those who apply. A law passed June 11, 1896, restricting the water supply papers to 100 pages and to editions of 5,000 copies is rescinded, with the object of allowing the circulation of these papers to be controlled, like the others, by the demand.

It is of interest to learn that no less than 62,000 applications for Survey publications were received last year by letter. These requests follow the press so closely that it is almost possible to predict from the Survey's mail what new mining districts are being opened up. There is a continually increasing demand for the more practical and economic publications, although the purely theoretical papers are widely appreciated. The Survey's regular exchange list is composed of 1,692 names, including the leading scientists of the country and the best scientific journals. It will probably be of interest to many publishers of scientific matter to know that the Survey will gladly exchange with them, even though their publications are of a very unpretentious order. All such material received in exchanged becomes a part of the library of the organization.

A few figures will serve to show the immense volume of manuscript and proof that goes through the editorial division of the Survey every year. During the last fiscal year 21,774 typewritten manuscript pages were edited, and 10,427 pages of proof read and corrected. The latter work required the handling of 4,133 galleys and 21,450 page proofs.

PRODUCTION OF SALT IN 1901.*

By JOSEPH STRUTHERS, PH.D.

The production of salt in the United States during 1900 and 1901 was the largest for any two individual years yet recorded.

The total production in 1901 was 20,566,661 barrels of 280 pounds each, a decrease of 302,681 barrels, or 1.5 per cent from the production of 20,869,342 barrels for 1900. The value of the salt produced in 1901 was \$6,617,449, a decrease of \$327,154 from the value of \$6,944,603 in 1900. The corresponding figures for 1899 were 9,768,614 barrels, valued at \$6,867,467.

Under the production of salt, this report includes salt in brine, which is used in very large quantities for the manufacture of soda ash, sodium bicarbonate, caustic soda, and other sodium salts. During 1901 the United States manufactured 529,104 short tons of sodium salts of all varieties, and the quantity of salt, chiefly in the form of brine, required to make this product was in excess of 1,000,000 short tons, equivalent to more than 4,000,000 barrels.

The rate of progress in the salt industry since 1880, when the production was 5,961,060 barrels, to 1901, with its production of 20,566,661 barrels, is very great, the increase being about 400 per cent. During the last 18 years, with the exception of 1889 and 1901, the yearly production has regularly increased; and yet, notwithstanding this rapid increase, possibly because of it, the business of the production of salt has not been a lucrative one. This condition of the industry was due in a great many cases to over production and keen competition for trade. As a result, combinations have been effected among the majority of producers in New York, Ohio, Michigan, Kansas, Utah, and California, which are among the most important of the salt-producing States.

Previous to 1893 Michigan was the chief salt-producing State, but in that year New York assumed the lead and maintained the foremost position until 1901, when Michigan again resumed the supremacy, with a production of 7,729,641 barrels, as compared with the production of 7,286,320 barrels in New York. The production of salt in Michigan in 1901 was increased by 519,020 barrels over that of the preceding year, while the output from New York was diminished by 610,751 barrels. Of the other two leading States, Kansas produced 2,087,791 barrels, and Ohio 1,153,535 barrels. These four States contributed 88.8 per cent of the total quantity of salt produced in the United States during the year, the percentage of production being respectively, Michigan 37.6 per cent, New York 35.4 per cent, Kansas 10.2 per cent, and Ohio 5.6 per cent. Of the total consumption of salt in the United States, the quantity of salt of domestic production used increased from 63.5 per cent in 1880 to 93.45 per cent in 1901, while the consumption of salt imported into the United States decreased from 36.5 per cent of the total in 1880 to 6.55 per cent in 1901. The actual consumption in 1901 was 21,940,235 barrels, or more than 2.3 times that of 1880. In 1880 the imports of salt amounted to 3,427,639 barrels; in 1901 the imports were 1,440,950 barrels. The chief sources of the importation of salt into the United States are: The United Kingdom, the West Indian islands (chiefly British), and Italy. About 40 per cent of our imports are drawn from the United Kingdom.

The principal exports of salt are from the port of San Francisco, and they go to the Central American States, Mexico, the Hawaiian Islands, Japan and Asiatic Russia. About 25 per cent of the exports are shipped across the Great Lakes to the Dominion of Canada. The total exports for the fiscal year ended June 30, 1901, were 14,183,167 pounds.

The statistics for the year 1900 are the latest available for the world's production of salt. Previous statistics show that the United States, which, since 1892, has held second place among the countries of the world, became the leader in 1897, ranking Great Britain by about 5 per cent. This advantage was increased in 1898 by a gain in the production of the

*United States Geological Survey, *Mineral Resources of the United States*, now in press.

United States and a decrease in the output of Great Britain, and was further augmented in 1899 by an increase in production by the United States nearly eight times as large as that of Great Britain for that year. In 1900 the United States reported an increase in production of approximately 160,000 short tons, whereas the output of Great Britain was 60,000 short tons less than in 1899. It thus appears that the United States has not only maintained, but has materially increased the lead over her principal rival in recent years. The total production of salt in the United States during 1900 was 40 per cent greater than that of Great Britain in the same year. The total world's production of salt in 1900 was 12,551,043 short tons, valued at \$41,396,093, of which total the United States produced 2,921,708 short tons, a little over 23 per cent of the total, and Great Britain produced 2,084,709 short tons, or 16.6 per cent. Austria-Hungary produced 572,642 short tons, somewhat less than 5 per cent of the total world's output in 1900, but this product was valued at \$19,267,216, or nearly 47 per cent of the total value of the world's salt product, nearly three times the value of the salt product of the United States, and more than six times the value of the salt product of Great Britain. This is due to the fact that the salt-producing industry of Austria-Hungary is a Government monopoly, and one of its principal sources of revenue. The first cost of salt to the consumer in the United States is a little over \$2 per ton; in Austria-Hungary it is nearly \$34 per ton. The mere fact that salt is so cheaply produced in Great Britain and the United States has increased its consumption and has had no little influence in the development of the packing industry, the manufacture of hydrochloric acid, chlorine, sodium salts, and also in the development of the chlorination process for the extraction of gold from its ores, and of the wet process for the treatment of silver ores.

MINING DEVELOPMENTS IN EASTERN ONTARIO.

By KIRBY THOMAS.

There are few large sections in Western United States which are as little explored and as wholly unknown as to their mineral resources as is Eastern Ontario. One reason for this is that the people of that section are not mining people, and another is that the formation and ore deposits have been in some respects somewhat out of the ordinary. The prominence of the Sudbury nickel and copper mines and the general stimulation to mining which resulted from the late boom in copper has been the cause of an awakening on the part of the Ontario people to the mineral resources of that province, and particularly of Eastern Ontario. About three years ago some Duluth mining men became interested in the mineral deposits at Parry Sound, Ontario, and as a result there has been considerable activity in this section, and there is a prospect of extensive and active operations from now on.

The Parry Sound District is located on the eastern centre of Georgian Bay and along Parry Sound. The city of Parry Sound is the base of the operations in this district, and is reached by deep water navigation from the Great Lakes by Georgian Bay. It is the terminus of the Canada-Atlantic Railroad, an important link in the commerce to the Atlantic seaboard. Another road, subsidized by the Ontario government, is building northward from Parry Sound to Sudbury.

The rocks of the Parry Sound District are of the older geological series. The Canadian geologists seem to have considerable trouble in placing them. In the report of the Bureau of Mines for 1899 Dr. A. P. Coleman says: "It is often stated that the rocks of the Parry Sound region are Laurentian, and hence not likely to contain valuable ore deposits. In reality its geology has never been worked out in detail, and it is probable, if not certain, that much of the region corresponds to the Grenville series or Upper Laurentian of Eastern Ontario and Quebec, or to the Keewatin (Huronian?) rocks of Western Ontario."

The prevailing rocks in the district are gneisses and schists. A peculiar and prevailing rock about Parry Sound is a garnetiferous gneiss. The rocks are all very much disturbed and contorted, but particularly at Parry Sound the rock shows extreme flexions. In general the prevailing rock is intersected with numerous small quartz veins and frequently with large pegmatite dikes. In some cases these dikes may be traced for miles across the country, and the prevailing crystals of feldspar and mica, with some uncrystallized quartz and hornblend, are massive. In the Valentyne location, in Loring Township, about twelve miles north of Parry Sound, one of these pegmatite veins is mined for mica and feldspar.

The country is exceedingly rough, being a series of rocky hills smoothed and polished by glacial action, and in most cases absolutely bare of any earth or vegetation. For large areas about Parry Sound probably 50 per cent of the surface is glistening with uncovered rock. The depressions are marshy and are frequently the location of lakes and ponds.

The principal mineral zone appears to lie parallel to Parry Sound and extend for a good many miles either way in a northeasterly and southwesterly direction. Beginning on the southwest, the first property in this zone is the Blanche B. Mine, owned by the Anglo-American Company of Chicago. The next in order is the Wilcox Mine, owned by the Parry Sound Company, and then the Spider Lake locations and the Lafex property, owned by the Consolidated Company, and then the McGowan location, which is owned by the Parry Sound Company. Numerous individual holdings are also along this belt. The district from the Blanche B. to the McGowan property is about 12 miles.

In general the mineralized zone is from 1,000 to 1,400 feet wide, and the mineral veins or beds occur as extended and more or less parallel lenses, having the general direction of the mineral belt and generally dipping at a high angle or almost vertical. At several points the mineralized beds have been shown to aggregate from 300 to 400 feet wide. The mineral beds are from a few feet to 30 or 40 feet thick and generally indicated on the surface by an iron-stained capping, which is known locally as a "burn." The ore appears to be in the zones or fractures along what is probably the line of an upraise, and there is every geological indication of going to depth.

The ore varies at different points, but generally contains iron pyrites and chalcopyrite. At some points the copper occurs as calcocite and bornite. In the Wilcox and Blanche B. locations a considerable amount of zinc in the form of sphalerite occurs in the ore, running as high as 15 per cent in the Blanche B. location. Some gold is found with nearly all of the ores, the values running from \$3 to \$10 a ton in numerous assays. Nickel occurs with the ore in many cases, particularly in the Lafex property, where an assay of 2½ per cent nickel was shown. The copper values vary. The Wilcox, at a depth of 80 feet, gave a value of 9½ per cent across a 30-foot vein. It was estimated by the operators that this property beyond this depth will average from 10 to 12 per cent in copper. The somewhat differing character of the ore and other variations would indicate that the various veins or ore beds are not necessarily continuous but are related in character and in origin.

At the McGowan location, about 2½ miles northeast of Parry Sound, there appears to be a considerable change in the formation. The rock is much disturbed, and it appears that the vein matter has been thrown over. Here masses of bornite weighing several tons, running as high as 54 per cent in copper, were taken out at or near the surface in open cuts. Seven carloads of this ore were shipped to New Jersey giving an average value of 16 per cent in copper. The McGowan location gives large but somewhat uncertain gold values. It is claimed that the McGowan ore has been thrown up from below and is an indication of what will be found at depth in other parts of the mineral zone. The fact that in the Wilcox location at a depth of 100 feet the character of the ore appears to be changing to bornite, and the discovery of a change in the McGowan formation at a considerable

depth into the prevailing chalcopyrite of the main surface exposures of the zone is the basis for this contention. The Loring location, about 12 miles northeast of the McGowan, and which belongs to the Consolidated Copper Company, has the same general character as the other properties above mentioned. The ore here runs as high as 5 per cent in nickel on test assays. The average of numerous assays on this ore body gives 6 per cent in copper and 3 to 4 per cent in nickel, with zinc about 5 per cent.

The work done on the various properties has been exploratory in character, but it has been done in a practical and scientific manner. A 10-stamp mill has been erected on the McGowan property and one inclined shaft 140 feet and a vertical shaft 80 feet, with cross cut 100 feet, has been driven. The general situation now is suspended awaiting further arrangements for the smelting of the ore at these points. At present the ore can be shipped by deep water over to the Canadian Soo or to Hamilton, Ontario. The McGowan stamp mill has made a run of some of the Wilcox ore, and has been used in concentrating the McGowan ores. The interested parties are planning the erection of a smelter at Parry Sound, and the Hatch Electric Smelting Company has under way a proposition to establish an electrical smelter there. As soon as the problem of smelting the ore is solved active mining will certainly be pursued in this section at several points.

The Parry Sound District promises to become primarily a producer of copper and incidentally of nickel, zinc and gold.

COLORING GLASS WITH METALLIC SALTS.—A Frenchman named Léal proposes to color glass by penetration. Silver salt is put on the surface of the glass, which is then heated to 500° C. The excess of salt having been removed, the surface appears yellow, the color penetrating to a depth of 0.17 millimeters when the baking has lasted for about 5 minutes. After an hour, a layer of double that thickness would be colored; after 18 hours the color would have penetrated through a glass plate 1-6 millimeter in thickness. In reflected light this yellow displays a beautiful greenish or blueish fluorescence. Silver and copper give a red. Gold and iron salts have also been used. When the baking is continued for a long period, the coloring matter is renewed from time to time—say every six hours.

RECENT DECISIONS AFFECTING THE MINING INDUSTRY.

SPECIALLY REPORTED.

DUTY ON BRECCIA MARBLE.—A variety of marble known as breccia, which consists of consolidated fragments of an angular character, being micaceous in appearance and crystallized, is properly subject to classification as "breccia" under paragraph 508 of the free list, tariff act of 1897, and not as marble under paragraph 114.—Appeal of Jackson & Co. from Collector of Customs at New York; Board of General Appraisers.

DUTY ON LEAD BULLION.—Relative to the practice, under articles 1074 and 1089 of the Customs Regulations of 1899, of assaying imported lead bullion for the purpose of determining the quantity of dutiable metal contained therein, pursuant to the opinion of the Attorney-General, said regulations are hereby amended by restricting the provisions with regard to assay so as not to apply to lead bullion, which will be assessed with duty on the gross weight under paragraph 182 of the act of July 24, 1897.—Circular of Treasury Department.

DUTY ON FERRO-CHROME.—Ferro-chrome is dutiable at the rate of \$4 per ton under the provisions of paragraph 122, Act of July 24, 1897, by similitude to ferro-manganese, and is not dutiable as a metal unwrought. (Dana & Co. v. United States, not yet reported, followed.)

The similitude clause need not be claimed in a protest if the proper paragraph under which the mer-

chandise is dutiable by similitude be pointed out.—Appeal of Feuchtwanger & Co. from Collector of Customs at New York; Board of General Appraisers.

ABSTRACTS OF OFFICIAL REPORTS.

Wolverine Copper Mining Company, Michigan.

This company owns a copper mine in the Lake Superior region. Its report covers the year ending June 30, 1902. The development work done during the year included 532 feet shaft sinking and 7,772 feet drifting and cross-cutting, total 8,304 feet. The details of work given show 213,650 tons rock hoisted, 187,482 tons stamped; product of mineral, 6,232,800 pounds; refined copper, 4,984,367 pounds. The yield of the rock treated was 26.59 pounds per ton, or 1.33 per cent. The cost per ton of rock hoisted was \$1.70; per ton stamped, \$1.94. The percentage of refined copper in mineral showed a considerable decrease, owing to an increased saving of the finer and lower grade of mineral.

The earnings and expenditures, with the averages per pound of refined copper, in cents, were as follows:

	Amount.	Per pound.
Copper sold.....	\$658,602	13.21
Interest received.....	6,731	0.13
Total receipts.....	\$665,333	13.34
Working expenses at mine.....	\$364,093	7.30
Smelting, freight and marketing copper..	60,236	1.21
Total	\$424,329	8.51
Mining profit.....	\$241,004	4.83
Construction expenditures.....	264,678	5.31
Deficit	\$23,674	0.48
Balance from previous year.....	549,142	....
Surplus, June 30, 1902.....	\$516,468	....

From this surplus two dividends of \$2 per share each were paid, amounting to \$240,000 in all, and leaving a balance of \$276,468. The capital stock is \$1,500,000 in 60,000 shares of \$25 each.

President John Stanton's report says: "It will be noted that the average price obtained for our copper was 3.53 cents per pound less than in the previous year, causing a reduction in the value of the year's product of \$163,000. The cost of production has been increased by the expenditure made in preparing to handle a larger output. The openings have been largely increased, and the shafts equipped with heavier rails and larger skips, and put in condition to handle heavier loads, all of these expenditures being included in the working expenses.

"The amount expended in construction includes only the payments made on account of the new stamp-mill and appurtenances, a new shaft house, an additional compressor, new dwellings, etc., details of which are shown in the mine accounts submitted with the report.

"The rock stamped during the year averaged a little more than 600 tons per working day. The estimated capacity of the new mill is from 900 to 1,000 tons daily. A considerable increase in production may therefore be expected when the mill goes into commission, and it is believed that thereafter the cost of production of our copper will be in the neighborhood of 8 cents per pound.

"The great delay by contractors in furnishing machinery for the new mill has been very annoying, and has materially retarded operations. It is, however, expected that stamping will be transferred to the new mill very soon."

Mesquital Mines, Limited, Mexico.

The report of this English company, owning the Mesquital Mine in Mexico, covers the year ending December 31, 1901. The receipts, as reported from the London office were: Bullion produced, £19,240; interest, etc., £147; total, £19,387. The expenditures were: Expenses in Mexico, £11,753; London office, £1,504; taxes, exchange, etc., £1,186; royalty, 5 per cent of production, £962; total, £15,405, leaving a net balance of £3,982.

The directors' report says: "The net profit for the year amounted to £3,982, which, with the amount of £3,391 brought forward from the preceding year,

made the divisible profits £7,373. Out of this, the directors have paid two dividends of 12½ per cent, and 16 2-3 per cent, free of income tax, absorbing \$7,292 and leaving a balance of £81 to be carried forward to the current year's account.

"During the latter part of the year the manager found it necessary to constantly keep repairing the 50-stamp battery; the whole mill is, however, now undergoing complete remodelling, and is being fitted with heavier stamps, which will add greatly to its profit-earning capacity. In consequence of this, only 30 stamps, on an average, have been in operation during the last few months. The first complete half of the cyanide plant commenced operations on May 26 after considerable delay had occurred in its erection, and the second half will be in operation next month. The capacity of the entire cyanide plant will be 2,400 tons per month, and a most important addition to the profits will result from the treatment of the new tailings as well as of the 10,000 tons of valuable tailings which are already available for immediate treatment.

"Considerable expenditure has been incurred in connection with the purchase and erection of the cyanide plant, and the alterations and additions to the mill, and a large portion of this has been met from revenue account. The directors therefore recommend that the capital of the company be increased from £25,000 to £30,000, and propose to issue the additional 50,000 shares at 4 shillings per share, a premium of 100 per cent, the present shareholders to have a preferential right to apply for these shares *pro rata* with their present holdings. The £10,000 of additional capital which will thus be provided will place the company on a sound financial basis, and be ample for any further extension of the plant which may become necessary in order to deal with the large bodies of ore awaiting treatment. A considerable amount of capital has also been expended in connection with the development of the San Carlos Mine, which has now been connected with the main workings, and a large additional quantity of high grade ore has thus been made available for milling. Developments in every other direction also continue satisfactory."

BOOKS RECEIVED.

In sending books for notices, will publishers, for their own sake and for that of book buyers, give the retail prices. These notices do not supersede review in a subsequent issue of the ENGINEERING AND MINING JOURNAL.

Statistik des Auswärtigen Handels des Oesterreich-Ungarischen Zollgebiets im Jahre, 1901. Prepared in the Statistical Department of the Ministry of Commerce. Vienna, Austria: Royal-Imperial Printing Office. Pages, 560.

A Graphic Method for Solving Certain Questions in Arithmetic or Algebra. Second Edition, 1902. By Prof. George L. Vose. New York: The D. Van Nostrand Company. Pages, 64; with diagrams. Price, 50 cents.

Silver Plume Mines and Scenery. Prepared and issued by the Board of Mines and Trade of Silver Plume, Clear Creek County, Colorado. Pages, 32; illustrated.

American Electrochemical Society. Transactions of Inaugural Meeting, 1902. Charles J. Reed, Secretary. Philadelphia: Published by the Society. Pages, 252; illustrated.

Boletín Demográfico de la República Mexicana, 1900. Prepared for the General Statistical Office by Dr. Antonio Penafiel. Mexico: Printing Office of the Secretaria del Fomento. Pages, 428.

Mexico. Censo y Division Territorial del Distrito Federal, 1900. Prepared under Direction of Dr. Antonio Penafiel. Mexico: Printing Office of the Secretaria del Fomento. Pages, 240.

Prices and the Cost of Living, 1872-1902. By Horace G. Wadlin, Chief of Bureau of Statistics of Labor of Massachusetts. Boston: State Printers. Pages, 76.

United States Geological Survey: Mineral Resources

of the United States, 1901. Bulletin Asphaltum and Bituminous Rock. By Joseph Struthers. Pages, 14. *Quicksilver.* By Joseph Struthers. Pages, 8. *Salt.* By Joseph Struthers. Pages, 16. *Sulphur and Pyrites.* By Joseph Struthers. Pages, 18. Washington: Government Printing Office.

BOOKS REVIEWED.

Memoirs of the Geological Survey of India. The Goldfields of Wainad. By H. H. Hayden and F. H. Hatch. Calcutta, India; published by the Survey. Pages, 72; with maps and illustrations.

While the early history of the goldfields of Wainad, in the Malabar District of India, is largely traditional, it is probable that the auriferous veins were known to and worked by the natives more than 200 years ago. After the region passed into British possession, some attempts at exploration were made in 1798 and again in 1828, but with no permanent result. In 1880 a boom was started in London, a number of companies were organized and a large amount of money expended in opening mines, erecting mills, etc. None of these companies succeeded, and the district contains many abandoned plants, which have not been used for years. Recently there has been some talk of reopening two or three of the mines, in the hope that improved methods might make them pay. In view of this a careful examination of the region has been made by the authors of this memoir, whose work in other gold mining countries is well known. They have given in their report a brief historical sketch, followed by a study of the geological features of the region, and in conclusion a description of the gold-bearing reefs so far as they have been opened by actual exploration. The results, after a careful study, are not encouraging, and the conclusion reached is that, while gold is found at many points, the ores are of too low grade to warrant any belief that mining can be profitably carried on. The report is a very good piece of work, and there is no reason to doubt that their conclusions are based on the best attainable information.

Washington Geological Survey. Volume I. Annual Report for 1901. Henry Landes, State Geologist. Olympia, Wash.; State Printers. Pages, 344; illustrated.

This first report of the Geological Survey of the State of Washington is necessarily a preliminary one. The field which the Survey has to cover is a very large one, and there is a great amount of work to be done, on which only a beginning has been made. It has been thought best in this first report to give a general account of what is known as to the geology and mineral resources of the State, which will serve as a basis for the detailed accounts to be issued later, as the work is carried on. This decision seems a wise one, and the result has been a valuable and interesting volume.

It is divided into six parts, the first beginning with a brief account of the establishment of the Survey, the work of its first year and an outline of its plans for the future. This is followed by a general outline of the Geology of the State, by Mr. Landes. This is necessarily a brief sketch only, but gives an excellent summary of what is known of the subject. Part 2, by Messrs. Landes, W. S. Thyng, D. A. Lyon and Milnor Roberts, describes the metalliferous resources of the State, its mines and reduction works. Part 3, by Mr. Landes, treats of the non-metallic resources, with the exception of coal. This describes the building stones and clays, road-making materials and petroleum; and also refers to the soils of the different sections. Part 4 includes a paper on the iron ores of Washington, by S. Shedd, and one on the coal deposits, by Henry Landes. Part 5 is on water resources, covering the water supplies of the State, and including a chapter on the rivers and the water-powers. Part 6, by Ralph Arnold, is a bibliography of the literature referring to the geology of Washington.

This summary shows that the field has been

pretty well covered, so far as the general and preliminary account is concerned. Of course there will be a great deal to be added hereafter, as the work proceeds, and detailed information is gathered. The present volume, however, will be of much service to the people of the State and to all who are interested in it.

CORRESPONDENCE.

We invite correspondence upon matters of interest to the industries of mining and metallurgy. Communications should invariably be accompanied with the name and address of the writer. Initials only will be published when so requested. Letters should be addressed to the MANAGING EDITOR. We do not hold ourselves responsible for the opinions expressed by correspondents.

Concentrating Molybdenite.

SIR: We note the query by D. F. H., in your issue of July 5, in reference to the concentration of molybdenite. We would like to intimate to your correspondent that the Elmore process has been found upon trial to be particularly adapted to the treatment of molybdenite ores. A high-grade concentrate is produced, and a very high rate of recovery.

We understand that water concentration appliances have been tried on different occasions for the treatment of molybdenite ores, but always without success, owing to the molybdenite being very soft and breaking in laminated scales, which seemed to be practically impossible to recover by usual methods.

THE ORE CONCENTRATION SYNDICATE, LIMITED.
London, July 19, 1902.

Centrat Idaho Mines.

Sir.—A little plain talk about Central Idaho, otherwise Thunder Mountain, may be interesting to your readers, even from one who has not seen it. I have made several trips to this State heretofore and am well acquainted with the country nearly to Thunder Mountain. I have received letters from, and have talked with, quite a number of miners, whom I know well, they having worked for me at different times and places. I have handled many samples of the ore and know the results of many assays that have been made here and in Baker City.

The "snow boom" of last winter is only a memory; the tenderfoot prospectors are rapidly getting out, "knocking" as they go. But the miner is at work, several companies who have paid good money for their properties are developing those claims and have good, reliable mining engineers in charge. And although they are saying very little about their development work, they are ordering large mills.

When Mr. Frederick Irwin, whose record for the past eight years here in Idaho, at the Black Jack Mine and the War Eagle Tunnel, speaks for itself, leaves the greatest tunnel proposition in the State to take charge of a Thunder Mountain mine the evidence is favorable, and then when a 100-stamp mill is hurried along as fast as possible there is but one conclusion.

That there are immense ore bodies I have no doubt; that the ore is low grade is also certain. One lot of 19 samples brought out from different prospects around Thunder Mountain showed an average assay value of \$3.28 per ton. One assayer from over 250 samples obtained an average of \$6.11 per ton. The \$1,000 assays are about as common as the \$1,000 nuggets in the Yukon. I have seen one or two of each.

There seems to be good reason to believe that this camp will eventually become a large producer, but it will require time; the lack of transportation facilities is a drawback. The Boise citizens are pushing a road from Garden Valley to Pen Basin, and several other roads are talked of, but it is evident that none will be finished to Thunder Mountain this season. With a road to Pen Basin it might be possible to sled freight the rest of the way next winter.

There is a large extent of country near there that has not been prospected, and there are several other good camps near by that have been overlooked in the rush. Among them are Sea Foam, Sheep Mountain and Sulphur Creek, to the south, and Warren, Marshall Lake, Buffalo Hump and Dixie, to the northwest. Buffalo Hump is quietly building up a record

as a producer, the Big Buffalo 10-stamp mill is running again after two years of legal squabbling, the 4-stamp mill of the Jumbo produces \$5,000 monthly, the Cracker Jack has just started its new 10-stamp mill and claims to have \$100,000 worth of ore shown up in the mine with 150 feet of development, the Wise Boy is just putting in a 10-stamp plant.

WINTHROP W. FISK.

Boise, Idaho, July 24, 1902.

Nearing the End.

SIR: A just and sensible view of the situation in the anthracite coal regions at the present moment indicates that the miners have lost; that if they desire to preserve their organization intact they will return to work at once, and that if the strike is declared off soon, recuperation will be rapid. The officers of the miners' union have exhausted all the resources that usually win a strike or force a compromise. The distribution of the strike fund will add immeasurably to their difficulties, and ultimately discredit their executive capacity. They feel this, but cannot, to be sure, acknowledge it. The miners are not only uneasy as it is, but they are becoming restive under what they regard, and I am afraid rightly, as the incomprehensible fatuity of their leaders in trying to encourage them "in fighting to a finish" by declaring that "there is no change in the situation;" that "the miners will hold out all winter if necessary;" "that the operators are using underhand methods to disorganize their ranks," and "wreck the strike fund." The miners of course know very well that these things are not so. They are well aware that, so far as it affects them, there is no change in the situation. They see that, so far from the operators having lost ground since President Mitchell issued his ultimatum, they have in every respect bettered their position. In one of the wettest summers in 20 years the mines are as dry as can reasonably be expected. The inside workmen have kept them in good condition. I accompanied a fire boss into one of the mines around here a few days ago, and I was very much surprised indeed at the relatively small damage that has been done from falls of roof and such accidents as necessarily take place in the chambers, gangways and general workings of an idle mine.

The miners cannot and will not hold out all winter. They may hold out a few weeks longer, if the strike fund is distributed satisfactorily, which is a matter of much more importance than the actual amount paid out in money or in kind. It is too soon to speculate upon the probable effect of the distribution of the strike fund upon the spirit and temper of the coal workers. "War cannot be fed at so much a day" is a saying quoted by Plutarch, one which evidently had that wise man's approval, for he quotes it no less than three times. The apothegm is ascribed to Archidemus, who commanded the Spartans in the first campaigns of the Peloponnesian war, and is as true to-day as in the days of Archidemus. Now, it is evident that President Mitchell and his cabinet do not realize the logical philosophy of this observation, which Napoleon paraphrased in his own perspicuous way when he said that an army fights on its belly, or they would not have undertaken to feed "at so much a day" 147,000 men and those dependent upon them. I am not a miner, but I have lived among them all my life, and have sympathized with every effort made or advocated for their betterment. I have nothing to gain or hope from that class designated by Mr. Bryan the other day as the American plutocracy. Yet it is my conviction that the greatest blunder which Mr. Mitchell made—and his direction of the strike from the outset has been an irreparable series of blunders—was the inauguration of the strike fund. He cannot feed at so much a day nearly three-quarters of a million people of diversified nationality, unstable temperament and racial idiosyncrasy by drawing assignats on the bounty of organized or sympathetically inclined labor throughout the country. Mr. Mitchell seems so far disinclined to have a determining voice in the form which the distribution will take. He is leaving that to the "locals." But that will never do. If a suspicion of favoritism,

maladministration or malversation of the local fund gains currency, true or false, it will be all up with that local, at any rate, until the strike is over. Mr. Mitchell is demanding too much of human nature, and is making no nice calculation for the eccentricity of its orbit.

Mr. Mitchell said at the Indianapolis convention that the anthracite coal regions were the scene of immense industrial activity, apart from mining. That is true. But it does not make the situation any easier from his standpoint. It is estimated that 50,000 miners left the coal regions since the strike. The estimate is altogether too high. Twenty thousand would be nearer the mark. Miners marry young, and comparatively few married miners have left their homes. Comparatively few of those who have remained have found steady employment. The truth seems to be that the miners have lived on their savings and their credit, and although District President Nicholls is confident that those of them who can will continue to do so, that is far from the sentiment felt or expressed by the miners themselves.

There is another matter which will call for exceptional treatment from the officers of the Mine Workers' Union. They have determined, they say, as far as possible to prohibit the exportation of bituminous coal to the anthracite districts. I am not concerned with the disastrous effect that embargo would have on the children of mine workers engaged, say in silk, woolen, thread and lace factories, who are employed by the thousand in these industries. It would add considerably to the demands upon the strike fund if they are thrown idle. But what are the miners themselves to do for fuel, if they are haply to cook their food? The miners' coal bins are empty or nearly so, and there is not a pound of coal of any kind in sight. It is true that the operators, heartless though they are, have permitted the miners and their children to rummage freely in the culm dumps and take what coal they could find. Curiously enough, the miners have largely taken advantage of this privilege to market on their own account considerable quantities of this refuse locally, and which has found its way even to New York, it is said. But if the blockade is effective, the operators will undoubtedly prevent their culm dumps being ransacked for coal for sale or consumption.

The operators, so far as any one who has not the penetration of President Nicholls can see, have neither directly nor indirectly employed counter tactics in this devastating coal war. They are lying quietly behind their fortifications and awaiting the raising of the siege with that confidence which comes only from knowledge of their position. It is a matter of indifference to them how the strike fund is issued or distributed. If a "rush" comes, it will not be necessary for them to instigate it. I have not said one word in this letter which any intelligent miner will not readily acknowledge in private, and which not a few of them are beginning to declaim in public. If, I repeat, the Union is to be preserved, the miners must give in, and give in soon. It may be my lack of insight or want of appreciation of his organizing genius, but I always felt and feel now that President Mitchell lacked all the qualifications of a great industrial leader. He could have prevented this strike, or, at any rate, the causes which led to it. He left his subordinates in the anthracite coal regions to do very much as they pleased, and these permitted the miners to do very much as they thought fit. If he knew anything of industrial history, Mr. Mitchell would have realized that strikes of the magnitude of that in which he is presently engaged never yet won a tangible victory. They are anti-social and opposed to the economic oneness of progressive civilization. He should have remembered, if he ever knew, that great strikes in European coal regions are never organized for a raise in wages, but to prevent a decrease, and that the most the miners ever gain in such struggles is a more or less prolonged spell of what English coal workers call "play"—pure idleness and incidental suffering. He should have realized the position of the operators and tried to put himself in their place. He should

have calculated upon the forces arrayed against him, not relying upon the enemy's weakness, but upon his own strength. Mr. Mitchell was, it is thought, honestly antagonistic to a strike. He did much to discourage the notion of it in a casuistical sort of way, and made a faint-hearted effort to oppose it. But he could have done more; he could have absolutely forbidden it. What did he do? Believing that the Civic Federation—an Areopagus which would have won the heart of Rousseau—had an influence which it never possessed, he cheerfully sought to bring the operators to the bar of an altruistic supreme court and plead guilty to oppression which they never inflicted; to admit an injustice of which they were not conscious, and to grant concessions which would bring the anthracite coal trade within measurable distance of competitive ruin. The operators repudiated the self-constituted tribunal and its judges. Now was Mitchell's chance. He was in a quandary, to be sure, but if he were equal to the occasion and had the firmness of his conviction and the courage, if he had any prescience at all, of running counter to Nicholls and his intransigent followers, there need not be and there would not have been a strike with its incalculable financial loss and actual and prospective suffering. It was here he showed himself a lath, and an unpainted one. The annual convention was over. It did not settle the wage scale or other impending difficulties. Mr. Mitchell practically took their adjudication out of the hands of the Shamokin delegates and passed them over to a body of enthusiasts, who had the experience and ought to have had the sense to be practical men and mind their own business. It is very certain that the Shamokin convention would not have declared for a strike, or would not have done so if Mr. Mitchell opposed one. But the Civic Federation upset the apple cart. The miners naturally resented the refusal of the operators to be guided by a body which had prejudged against their interests and in favor of those whom they employed.

Even then President Mitchell could have avoided the strike if his action conformed to his expressed desires. Mr. Mitchell was in the position of a general leading an army unhampered in any way except by the vacillation of his own judgment. He did not want a strike, and he did not oppose one before the Hazleton convention. He let that be seen in the only way it could become known to the miners—through the newspapers. But he did oppose the strike at Hazleton, and opposed it with energy; but it was then too late. Nicholls was there in the saddle; the young bloods were at his stirrups, and Mitchell and the veteran miners were left behind by a small majority, just enough to emphasize how easy it would have been to have avoided a strike, or rather circumvented the mischievous machinations of the president of District No. 1, if he was as wise a man and as courageous as his adulators and idolators credited him with being.

The strike is now in its thirteenth week. It has reached the crisis. I do not believe it can outlast another month, even if the most sanguine expectations of the executive of the Miners' Union are realized to the utmost dollar, and for the miners' sake I am glad of it.

"War cannot be fed at so much a day," nor can a strike, which is a cutthroat kind of war, having none of the glory or enthusiasm of war, but much of its privation and industrial dislocation. If Mr. Mitchell is wise he will call the strike off, or if he does not like to do so on his own responsibility, let him call another convention at Hazleton, Wilkesbarre or Scranton, and no one can doubt the issue. This is a practical suggestion. The miners, according to their generalissimo, are underpaid. Why then tax men theoretically so little able to endure it as the soft coal men are a dollar a week to support in idleness hosts of their fellows willing and able to work. It is sheer pauperization, and no amount of sophistry can rid it of the taint. The miners have acted so far admirably. There have been some few regrettable outbursts of violence, but never in the history of the world have so many thousands of men been led astray for so selfish a purpose with such little disrup-

tion of the public peace, however detrimental their folly may be to themselves and the public weal. I am well aware that I am about to give expression to an anathematized heresy in the labor world. Apart from the interests of operators or those of the public, if the strike ends within the next few weeks, as I anticipate, it will be an immense and intense educational blessing to the miners. It will teach them that while union is strength, the exercise or application of brute force is the preliminary symptom of decadence, despair and ultimate dissolution. It will bring home to the younger generation of mine workers in particular the futility of seeking by their volition in a vast organization to subvert the primary lines upon which society has developed and along which alone it can continue to exist.

HISTORICUS.

Scranton, August 5, 1901.

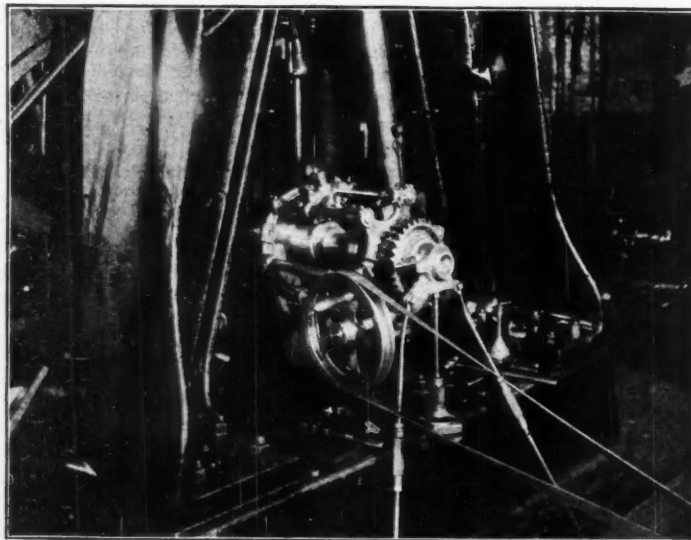
QUESTIONS AND ANSWERS.

(Queries should relate to matters within our special province, such as mining, metallurgy, chemistry, geology, etc.; preference will be given to topics which seem to be of interest to others besides the inquirer. We cannot give professional advice, which should be obtained from a consulting expert, nor can we give advice about mining companies or mining stock. Brief replies to questions will be welcomed from correspondents. While names will not be published, all inquirers must send their names and addresses. Preference will, of course, always be given to questions submitted by subscribers.)

Price of Silver in 1890.—Can you give me the highest price reached by bar silver in New York in 1890? My impression is that it was \$1.20 per ounce or over.—L. L. B.

Answer.—The highest price paid for bar silver in New York in 1890 was \$1.20 per ounce; the lowest 95.5 cents, the average for the year being \$1.046. This is for fine silver. The corresponding prices in London, for standard silver, .925 fine, were: Highest, 54.625 pence; lowest, 43.625 pence; average, 47.75 pence. We have not the exact date of the highest price, but it was in the earlier part of the year.

Witwatersrand Mines and Machinery.—I have made the statement that there are at least 50 inde-



CLOVER CRANK PIN MACHINE.

pendent companies, in which the late Cecil Rhodes had no voice, working on the Rand. I also stated that the greatest part of the mining machinery on that same Rand was put in by American firms, principally Fraser & Chalmers; meaning the stamp mills and hoists. Will you kindly inform me if I am not correct in this matter.—H. C. C.

Answer.—Without going into exact figures, there are certainly over 50 companies operating on the Witwatersrand in which the late Cecil Rhodes had no interest. The Rand companies are largely controlled in groups by firms and capitalists. Thus there is the Robinson group, the Wernber, Bist & Co. group, the Goerz & Co. group, the group owned

by the Barnato estate, and so on.—It is not always possible to tell who is interested in each group.

As to machinery it is impossible to give any exact figures. There is a great deal of American built machinery on the Rand, but just how much it would be hard to say without asking questions of each company; to which answers could hardly be expected. Fraser & Chalmers probably have furnished more machinery than any other firm; but part of this was built by the English branch of the company.

THE CLOVER CRANK PIN MACHINE.

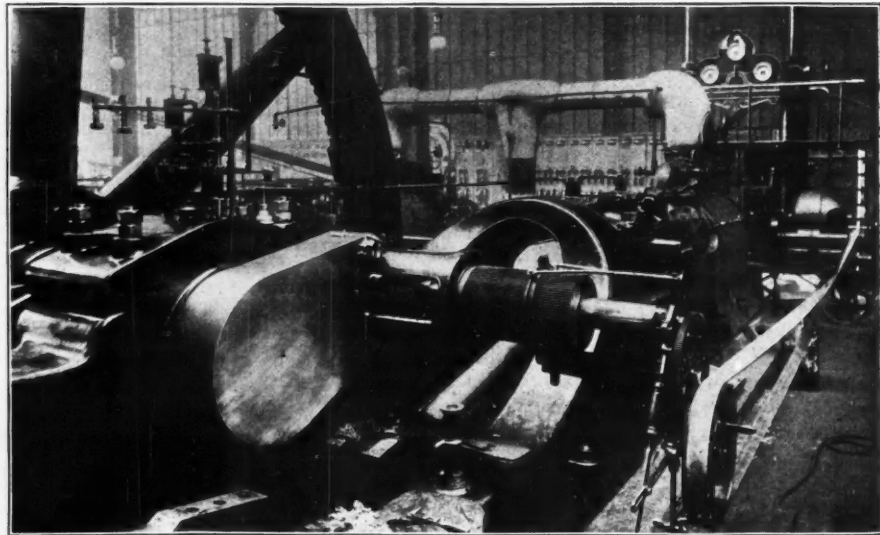
The Clover crank pin machine, lately placed on the market, is a tool designed for the purpose of turning off crank pins of either stationary or locomotive engines that have been cut or scored. It is claimed that

mandrel attached to the end of the pin by a three-quarter inch collar bolt tapped into the head of the pin; this collar bolt is reached by a socket wrench inserted through the hollow mandrel.

The centering device consists of four screws through front collar on the hollow mandrel which reach to and bear on the collar bolt; the centering is done by slacking and tightening these screws.

The hole in the collar at the front end of the hollow mandrel is bored enough larger than the collar bolt to permit of all necessary adjustment.

A long adjustable taper sleeve is provided between the hollow mandrel and main revolving head to take up wear. The main revolving head is revolved on the hollow mandrel by a worm gear either by hand or power.



CLOVER CRANK PIN MACHINE.

The machines are adjusted to different lengths of pin; it is only necessary to know in filling an order the largest and smallest diameters and the greatest length of pin.

Where locknuts are used on the end of pin the makers furnish a nut that screws on in place of locknut tapped for collar bolt. This saves tapping end of pin. These machines are guaranteed to do the work as well as a lathe.

The illustrations herewith presented show the tool in actual operation turning off crank pins on large engines. The manufacturers, the Clyde Machine Works, Chicago, Ill., invite correspondence, and will furnish descriptive booklets and blue-prints on request.

CEMENT IMPORTS.—Imports of cement of all kinds into the United States for the fiscal year ending June 30 are reported by the Bureau of Statistics as follows, in short tons of 2,000 pounds:

	1901.	1902.	Changes.
Great Britain.....	30,212	9,716	D. 20,496
Belgium.....	101,589	82,953	D. 18,636
France.....	6,348	2,391	D. 3,957
Germany.....	164,820	113,528	D. 51,292
Other European countries..	11,968	1,626	D. 10,342
Canada.....	1,107	774	D. 333
Other countries.....	3,341	934	D. 2,407
Totals.....	319,385	211,922	D. 107,463

A decrease was shown in every case. This illustrates the extent to which cement made in the United States is replacing the imported descriptions.

ANALYSES OF TEBESSA PHOSPHATES.—Recent analyses of phosphates from the Dibba Mine of the Societe Francaise de Phosphates de Tebessa show: Moisture, 2.52; phosphoric acid, 31.30, or tribasic phosphate, 68.27; carbonate of lime, 17.34, or carbonic acid, 7.63. Second quality from the same mine showed 62.04 per cent tribasic phosphate (28.42 phosphoric acid, 19.98 carbonate of lime, 3.39 moisture).

Samples from a cargo from the Kouif Mine of the

by the use of this machine the work can be done as accurately as it could be by a lathe.

The simplicity of application of this portable tool is one of its chief claims for merit in the equipment of large operating mines, steam plants, railroads and trans-Atlantic steamers. It is briefly described as follows:

The machine consists of a main revolving head, with tool carrying arms extending out so as to enclose the pin, and having a ring with adjustable steady-rest jaws on the outer ends. Two of the arms carry the tool head; the feed is operated by feed screw and star.

The main revolving head is carried on a hollow

Constantine Phosphate Company showed 68.71 per cent phosphate, 4.73 sulphate of lime, 17.77 carbonate of lime and 1.30 carbonate of magnesia, the full analysis being as follows: Phosphoric acid P_2O_5 , 31.52; Carbonic acid, 8.50; sulphuric acid SO_3 , 2.78; total lime, 50.77; magnesia, 0.62; alumina and iron oxide, 0.85; silica, 0.38; combined water, 2.35; fluoride of calcium and organic matter, 2.33 per cent.

PATENTS RELATING TO MINING AND METALLURGY

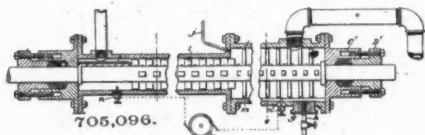
UNITED STATES.

The following is a list of patents relating to mining and metallurgy and kindred subjects, issued by the United States Patent Office. A copy of the specifications of any of these will be mailed by the ENGINEERING AND MINING JOURNAL upon receipt of 25 cents.

Week ending July 22, 1902.

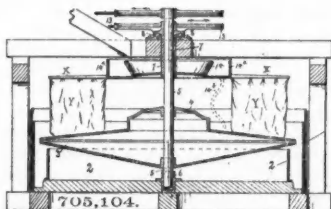
705,076. **MANUFACTURE OF CARBON ELECTRODES.**—Charles M. Hall, Niagara Falls, N. Y. A method of baking carbon articles, which consists in placing them in proximity to a conducting path or core, insulating the articles or groups of articles, and passing a current through the core.

705,095 and 705,096. **METHOD OF AMALGAMATING METALS.**—Paul A. Knappe, Grantville, Ga., assignor by mesne assignments to American Amalgamating Company, a corporation of Georgia. A method for amalgamating metals, which consists in producing a pulp, bringing the same into contact with mercury, enforcing an inter-



mingling of the mercury and the pulp, confining the mixed pulp and mercury within a restricted space during such intermingling, thereafter freeing the intermingling pulp and mercury from said restricted space, separating the heavier particles from the lighter by gravitation in a space less restricted for the circulation of the pulp particles, and preventing further intermingling.

705,104. **ORE WASHER AND SEPARATOR.**—James M. Longe, Empire City, Kan., assignor of nine-tenths to E. V. Wyssbrod, Joplin, Mo. In an ore washer and separa-



tor, the combination of a tank, a revoluble vertically-movable float-table therein, a drum on said table, and means to discharge sludge onto said drum.

705,109. **METHOD OF REDUCING COPPER MATTE TO REFINED COPPER.**—George Mitchell, Naco, Ariz. A method of reducing copper matte to refined copper consisting in charging molten copper matte into a converter and blowing air through the charge until practically all of the iron in the charge has been converted into slag, removing the slag, then reblowing the charge and reducing it to metallic copper and continuing the blowing operation until the charge has been overblown sufficiently to produce a small percentage of suboxide of copper and approximating as nearly as possible the amount required to prepare the copper for poling, then charging the molten contents of the converter into a reverberatory furnace and submitting it to the poling process.

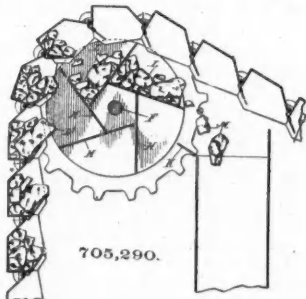
705,152. **METHOD OF MAKING SULPHOCYANIDES FROM COAL GAS.**—Harry W. Smith, Sutton Coldfield, Wm. T. Gidden, Langley Green, near Birmingham, and Alfred G. Salamon, London, England, assignors to the British Cyanides Company, Limited, Oldbury, England. The manufacture of ammonium sulphocyanide from coal gas containing ammonia and cyanide compounds by washing the gas with water in the presence of sulphur and continuing the process with the same water after the said water has become fully saturated with ammonia.

705,168. **PROCESS OF PURIFYING HYDROCARBON OILS.**—John W. Warren, Omaha, Neb. A method of clarifying the hydrocarbon oils, which consists in treating the same with a solution of sugar of lead; absorbing the water and any foreign substances resulting from such latter operation by an addition of clay of Wyoming-rock-clay constitution; drawing off the distillate; treating it with sulphuric acid; neutralizing the same by an addition of said clay; drawing off the distillate; treating it with caustic potash; allowing it to stand; re-treating the distillate with said clay; and, finally, when clear, drawing off the distillate.

705,216. **ARTIFICIAL FUEL.**—John T. Davis, San Francisco, Cal. An artificial fuel composed of pitch hardened and toughened by free carbonic-acid gas, and carboniferous material in a divided condition, all mixed and incorporated.

705,264. **ELECTROLYTIC APPARATUS FOR THE PRODUCTION OF CHLORINE AND ALKALI.**—James Mac-tear, Westminster, England. In an electrolytic apparatus, a cathode-cell having a plate arranged therein to form a space between the same and the walls of said cell, said plate provided with a recess, a well, and a series of ducts for establishing communication between the said space and well, an anode-cell mounted upon said plate and engaging in said recess, a supply and overflow pipe for the anode-cell, a propeller mounted in said well and having a spindle extending through the anode-cell, a seal for the said spindle, a cathode for said cathode-cell, and an anode for said anode-cell.

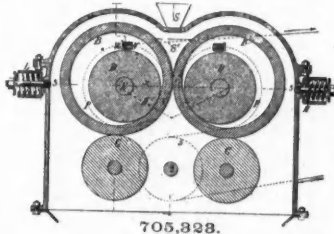
705,290. **ELEVATOR.**—Staunton B. Peck, Chicago, Ill., assignor to the Link Belt Machinery Company, Chicago, Ill., a corporation of Illinois. In an elevator, the combination of a series of buckets, each opening inwardly and traveling



about a certain axis of rotation, with a series of receiving-pockets rotating about said axis of rotation and formed by side flanges and two substantially flat plates set each at a tangent to an inner circle about the axis of rotation.

705,312. **FURNACE OR FORGE.**—John Armstrong, London, England. Apparatus for heating metallic objects, consisting of a deep firebox having a grate; a closed chamber below the grate; a device for passing a blast of air into said chamber below said grate; working or heating hearths very considerably above the grate having openings thereto just big enough to comfortably admit the articles to be heated; and means for supplying fuel to the fuel-chamber without admitting air to the working chamber, whereby a deep layer of fuel can be used and there is always a pressure above that of the atmosphere in the furnace.

705,323. **PULVERIZER.**—Robert Creuzbaur, Brooklyn, N. Y. In a pulverizer, a crushing-ring and a crushing-roll within the ring adapted to revolve in touch with each other as described; yielding bearings for the shaft of said roll, a spring adapted to hold said roll in contact with said ring,



suitable supporting means adapted to support said ring in the plane of its rotation, but leaving it free to move laterally, a casing including the said roll and ring, and guide-rollers arranged to act solely against the flanks of said ring upon opposite sides thereof, to limit the lateral displacement of the ring, and return it in correct relation to the casing.

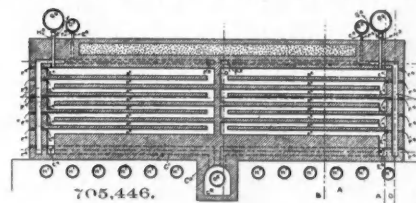
705,330. **TREATMENT OF STEEL INGOTS FOR FORGING.**—Charles T. Dudley, Golden, Colo., assignor of one-fourth to William W. Dudley, Frank L. Browne, and Wm. T. Norton, Washington, D. C. A process of treating cast-steel ingots and the like previous to forging, which consists in cooling the cast ingot to a temperature below 550 deg. C., reheating the cooled ingot to a temperature between 750 and 850 deg. C., maintaining said reheating temperature for a period of from 30 to 45 hours, and finally heating the ingot to forging temperature.

705,364. **STRAINER FOR MINE-PUMPS.**—Jacob Kurtz, Greensburg, Pa. A device comprising a perforated box or casing having guideways formed in the ends thereof, a sliding door arranged in one end thereof and having a series of apertures produced therein, a strainer arranged within the casing, a hose or pipe connected to the strainer, and means arranged in the forward end of the box or casing for firmly clamping the hose in position.

705,418. **BURNER FOR THE REMOVAL OF HARDENED MASSES IN FURNACES OR THE LIKE.**—Hermann A. E. Menne, Creuzthal, Germany, assignor to Coln-Muse-ner Bergwerks Actien Verein, Creuzthal, Westphalia, Germany. In a burner, the combination of concentric pipes for conveying fuel and oxygen, yielding material surrounding the outer pipe at its delivery end, and a covering of hard refractory non-conducting material surrounding said yielding material.

705,443. **SUCKER-ROD STUB.**—Isaac Rallston, New Bethlehem, Pa., assignor of one-half to Thomas Spillane, New Bethlehem, Pa. A sucker-rod stub having a ring or collar portion with a cylindrical portion below it, and a squared wrench portion below the cylindrical portion.

705,446. **COKE-OVEN.**—Mathew E. Rothberg, Lebanon, Pa. In adjacent coking-ovens, a hollow longitudinal wall separating the oven-chambers, and longitudinal deflecting-partitions forming heating or combustion flues in the cavity



or chamber of said wall, and a vertical hot-air flue at the outer ends of said combustion flues, the inner wall of which air-flue is pierced for passage of air to the combustion-flues.

705,456. **IRIDESCENT COATING OF COPPER, BRONZE OR LIKE SURFACES.**—Duncan Sinclair, Coalbrookdale, England. An article having a metallic surface of copper, bronze, or brass, coated with an iridescent layer of oxide of lead containing copper.

705,474. **CONVEYER.**—Henry L. St. James, Marshall, Tex. In a conveyer the combination with the body and chain-sprockets, of a conveyer-chain, conveyer-slats adapted to be carried thereon, threaded bolts passing through the horizontal links of said chain and passing through and secured to said slats.

705,526. **SAFETY HOISTING-HOOK FOR ORE-BUCKETS, ETC.**—Hiram B. Gray, Conneaut, O., assignor of one-half to V. J. Craytor, Conneaut, O. A hook provided with



a safety guard adapted to move to and from the point of the hook, and a pawl and ratchet, arranged to lock the said safety-guard in contact with the said hook.

705,542. **PLASTER COMPOSITION.**—Milton T. J. Ochs, Allentown, Pa.—A plaster, comprising powdered hydraulic cement 2 parts, powdered silicate of aluminum 1 part, and powdered carbonate of lime 1 part, said silicate of aluminum and carbonate of lime being in a raw state saturated with water, and all of said powdered substances being admixed together.

GREAT BRITAIN.

The following is a list of patents published by the British Patent Office on subjects connected with mining and metallurgy.

Week Ending June 26, 1902.

4,713 of 1901. **ALUMINUM SOLDER.**—E. E. Nield, and F. Campbell, London. An aluminum solder consisting of 90 per cent of zinc and 5 per cent each of antimony and aluminum.

12,500 of 1901. **GOLD PRECIPITANT.**—F. W. Martino, Sheffield. Manufacture of a barium sulpho-carbide for use as a precipitant of gold from cyanide solutions.

14,825 of 1901. **ELECTROLYSIS OF ZINC SALTS.**—C. J. Tossizza, Paris, France. A method for the electrolysis of zinc salts, to prevent the evolution of hydrogen and the consequent production of spongy zinc.

15,124 of 1901. **MINE GATE.**—N. K. Bowman, North Lawrence, Ohio, U. S. A. An improved mine gate that opens and closes quicker on the passage of cars.

21,940 of 1901. **OPEN-HEARTH STEEL FURNACE.**—D. Reynolds, Albany, N. Y., U. S. A. An open-hearth furnace for producing steel ingots direct from the ore, mining just sufficient carbon for the reduction of the iron and grinding the ore finer to give larger surfaces of reaction.

4,094 of 1902. **CAR WHEEL FURNACE.**—Standard Steel Car Company, Springfield, Mass., U. S. A. A furnace for converting the surfaces of cast iron car wheels into steel.

4,621 of 1902. **SODIUM-BRONZE.**—G. Lieussou, Paris, France. A bronze containing a small proportion of sodium, which is much more liquid and capable of being cast in metal moulds.

6,095 of 1902. **REFINING STEEL.**—C. Urlotte and M. Goddyn, Paris, France. Using steam at 1,200 deg. C., at which temperature it is practically dissociated, for refining steel.

8,666 of 1902. **DRIVING VANNERS.**—Frue Vanning Company, Detroit, Mich., U. S. A. Detailed improvements in the driving gear of frue vanners.

PERSONAL.

Mr. John B. Farish was in New York City last week.

Mr. Ben B. Lawrence and Mr. T. A. Rickard left New York City on August 5 for Denver, Colo.

Mr. Wm. Webber, of Sacramento, Cal., has gone to superintend his mining interests in South Africa.

Mr. John H. Mackenzie, it is stated, will remain as manager of the Rossland Mine at Rossland, B. C.

Mr. J. A. Underwood has resigned as superintendent of the Carisa and Spy mines, at Mammoth, Utah.

Mr. H. L. Frank has returned to Butte, Mont., from a visit to his coal mines at Frank, Alberta, N. W. T.

Mr. J. E. Spurr, of the United States Geological Survey, who is down with typhoid fever, is doing well.

Mr. Newton Dunyon has been appointed assistant superintendent of the Daly West Mine at Park City, Utah.

Mr. Theodore Dwight, of New York City, is in the Catskill Mountains convalescing from typhoid fever.

Mr. R. A. Daly, geologist with the Dominion International Boundary Survey, is now working near Trail, B. C.

Mr. Edgar Rickard arrived at Cape Nome, Alaska, on July 16. Mr. W. H. Wiley, of Colorado Springs, Colo., is with Mr. Rickard.

Mr. Lewis T. Wright, general manager of the Mountain Copper Company at Keswick, Cal., is going to Europe for a 2 months' trip.

Mr. J. T. Simmonds, for a long time shift boss at the Bunker Hill Mine, Wardner, Idaho, has gone to Johannesburg, South Africa.

Mr. Franz Cazin, mechanical engineer of Denver, Colo., has gone to Deadwood, S. Dak., and Rossland, B. C., on professional business.

Prof. Charles W. Comstock has resigned from the faculty of the Colorado State School of Mines, vacating the chair of mining engineering.

Mr. F. W. Bradley is now at Douglas Island, Alaska, on one of his visits as consulting engineer to the famous Alaska Treadwell Mine.

Mr. E. G. Williams, engineer and superintendent of the Caribbean Manganese Company, of Colon, Colombia, is visiting at Auburndale, Mass.

Mr. P. J. Nevins has resigned as manager of the French Gulch Mining Company, Breckenridge, Colo., and is succeeded by Mr. J. C. Whisler.

Mr. A. F. Holden, managing director of the United States Mining Company, has returned from his extended Eastern trip to Salt Lake, Utah.

Mr. Horace S. Brown, the veteran Montana smelter man, who invented the Brown roasting furnace, has been in Salt Lake, Utah, on a short business trip.

Mr. B. Matsuda, of Moji, Japan, is now in the United States examining American steel manufacturing methods. He has been stopping at Pittsburg, Pa.

Mr. J. M. Hyde has resigned as curator of the museum of the California State Mining Bureau and will practice as a mineralogist and mining engineer at San Francisco.

Mr. Charles Wier has been elected general manager of the Yellow Aster Mining and Milling Company, Randsburg, Cal. Mr. E. H. Barton continues as superintendent.

Messrs. John L. and Witcher Jones, who negotiated the sale of the iron lands in Iron County, Utah, to Messrs. P. L. Kimberley and Frank H. Buhl, have been looking over the lands.

Mr. Benjamin Parrett, assistant chemist with the Columbus (O.) Steel and Iron Company, has secured a similar position with the Lake Superior Power Company, of Sault Ste. Marie, Mich.

Mr. F. A. Jones, retiring director of the New Mexico School of Mines, has gone from Socorro to Albuquerque and taken a position as field assistant with the United States Geological Survey.

Mr. Sig. Freiberg, of Cincinnati, O., interested in the Daly-West, United Bingham and other Utah properties, has been in Salt Lake for a short visit to various camps in which he has holdings.

Mr. E. McCormick recently passed through Denver, Colo., on his way to examine mining property in the San Juan District. From there he goes to the States of Chihuahua and Durango, Mexico.

Mr. Ph. Reardon, late superintendent of the Kurtz-Chatterton mines and mill at Encampment, Wyo., has been appointed superintendent of the Coldwater & Kalamazoo Company's mines at Pearl, Colo.

Mr. A. L. White, of Greenwood, B. C., secretary of the Granby Company, and Mr. Clyde M. Graves, son of General Manager Graves, have been in Republic, Wash., to inspect the mines of that camp.

Mr. Richard A. Parker, consulting engineer of the United States Mining Company, of Utah, is slowly recovering from an attack of pleuro-pneumonia at

Newlands Ranch, Fort Churchill, Lyon County, Nevada.

Mr. T. H. Oxnam, mining engineer, who recently resigned as general manager of the Palmarejo & Mexican Gold Fields Company, Chihuahua, Mex., has been appointed consulting engineer of the same company.

Mr. James M. Moyer, formerly with the Youngstown (O.) Steel Company, and the Republic Iron and Steel Company, has been made general superintendent of 3 furnaces of the Corrigan-McKinney Company, of Cleveland, O.

Mr. Ernest E. Sawyer, the representative of the Canadian Ore Concentration, Limited, the company holding the Canadian rights for the Elmore process, has been in Rossland, B. C., investigating the ores of different mines.

Mr. J. P. Johnson, of Detroit, Mich.; Dr. W. E. Clarke, of Three Rivers, Mich.; Dr. C. W. Clarke, of Winnipeg; C. C. St. Clare, of Winnipeg, and Mr. Fred Smith, of Nova Scotia, are at Rat Portage, Ont., inspecting gold mines.

Mr. W. G. Hartshorn, of Danville, Ill., one of the operators of Hartshorn Brothers' Economy Mine, has been appointed temporary commissioner of the Danville District Coal Operators' Association, vice Mr. Chas. Swan, resigned.

Capt. J. W. Johnston and Mr. R. M. Sayre, one of the vice-presidents of the Lehigh valley Railroad, of Washington, N. J., have gone to Nevada, to inspect a gold mine. Capt. Johnston is superintendent of a gold mine in North Carolina.

Capt. C. H. Palmer, of Boston, Mass., who was at one time general manager of the Butte & Boston properties, is examining the Copper Queen group of mines in Idaho, owned by Butte men. It is near the Montana line adjoining Beaverhead County.

Mr. Frank Klepetko, who has formally resigned as superintendent of the Washoe Smelter of the Amalgamated Copper Company, was tendered a banquet by President Scallen, of the Amalgamated, in Anaconda, July 28, at the Montana House. Fully 200 guests were present.

Mr. J. W. Duntley, president of the Chicago Pneumatic Tool Company, sails for London, Eng., on August 12 to arrange for pushing trade in Great Britain and on the Continent in connection with the recent acquisition of the International Pneumatic Tool Company, of London.

Mr. Theodore J. Hoover, who has been assayer at the Keystone Mine, Amador County, Cal., has begun the practice of his profession as a mining engineer with headquarters at San Francisco. He is a brother of Mr. H. C. Hoover, who is now consulting engineer for Bewick, Moreing & Co., of London.

Mr. F. C. Roberts, of Philadelphia, Pa., has taken offices in London, Eng., and has engaged several American engineers on this side to aid him in the construction of the 10 blast furnace plants which he has undertaken on behalf of English and Welsh concerns. These contracts, it is anticipated, will not be all completed for at least 5 years.

Mr. George D. B. Bonbright, junior member of the firm of Wm. P. Bonbright & Company, Denver and New York, has severed his connections with the firm, owing to the illness of his wife. Mr. Irving Bonbright will be in charge of the Colorado Springs department. The company has opened a branch office in New York City, in personal charge of Mr. William P. Bonbright.

Mr. I. E. Young, who has been doing special work at the Michigan College of Mines, has accepted a position as assistant professor of mining engineering in the University of Iowa, at Iowa City. Mr. Young is a graduate of the University of Pennsylvania and went to the University of Iowa as a tutor. He went to Houghton, Mich., several months ago to do some advanced work and now goes back to the University of Iowa as a member of the faculty.

Mr. Julian Kennedy, of Pittsburg, Pa., formerly general superintendent of the Carnegie Steel Company's Homestead works, and Mr. Axel Sahlin, now manager of the blast furnaces of the Millom & Askham Iron Company, in Cumberland, Eng., late special commissioner of the British Iron Traders' Association, have arranged a partnership as consulting engineers for the construction of British iron and steel plants on American lines. The style of the new firm will be Julian Kennedy, Sahlin & Company, Limited. Offices have been taken in the Westinghouse Building, 2 Norfolk street, Strand, London.

Mr. J. H. Ferguson, of Ohio, has been made superintendent of the Ensley division coal mines and coke ovens of the Tennessee Coal, Iron and Railroad Company's properties heretofore covered by Mr. P. J. Rogers, who has been in charge of both the Ensley and Pratt City mines. Superintendent Ferguson will have charge of everything about the mines west of Village Creek, including mines Nos. 3, 4, 5, 8, and 9 and the coke ovens at Nos. 3, 4, and 5. Mr. Rogers will control the drifts, shaft No. 1, slopes Nos. 4,

7, 10 and 11, and the ovens at Pratt City and Shaft No. 1. The convicts will be under the management of Mr. Rogers, as heretofore.

Governor James B. Orman, of Colorado, has appointed the following delegates to the International Mining Congress: H. M. Teller, T. M. Patterson, John F. Shafroth, Charles C. Thomas, Clay B. Whitford, Mrs. John D. MacCarthy, Denver; John C. Bell, Montrose; B. F. Montgomery, F. J. Hangs, Cripple Creek; T. J. Ehrhart, Centerville; J. G. Schweigert, West Cliff; H. L. Lumers, Las Animas; W. L. Seely, Boulder; Thomas Annear, Silverton; John Kennedy, Ouray; A. Mulqueen, Aspen; Frank J. Annis, Fort Collins; Wm. E. Renshaw, Idaho Springs; H. C. Blossinger, Central City; Frank E. Wheeler, Creede; D. W. Shores, Carbondale; Theron Stevens, Ouray; I. N. Bunting, Grand Junction; R. S. Ball, Meeker; Robert E. Foote, Breckenridge; Everett Bell, Trinidad; Charles McConnell, Durango; John W. Finch, F. M. Woods, Victor; W. S. Buckley, S. R. Fitzgerald, Telluride; A. V. Hunter, Patrick Mulrooney, Leadville; P. J. O'Connell, Georgetown; F. H. Frankenburg, Samuel D. Trimble, Pueblo.

OBITUARY.

L. Cronin, superintendent of the Camp Bird Mine, at Ouray, Colo., who had tendered his resignation, to take effect August 1, was killed on July 24, by falling 120 ft. through a manhole in the mine.

Dr. Charles Kendall Adams, president of the University of Wisconsin, died at Redlands, Cal., on July 27. He was president of Cornell University from 1885 to 1892, when he became president at Madison. This post he held actively until 1901, when he retired on account of ill health. Since then he had lived in Southern California, but the University had not accepted his resignation, and he remained president until he died. He was born at Derby, Vt., January 24, 1835, and graduated from the University of Michigan in 1861. Dr. Adams was the author of many works on historical and educational subjects.

Louis A. Dunkle, general superintendent of the Le Roi Mine, at Rossland, B. C., was instantly killed by being caught in a slide of rock from the caving of old workings on the 600-ft. of the mine on July 27. Mr. Dunkle with 2 miners was putting in a shot to bring down the rock when the ground fell. The miners were caught by the fall but rescued.

Mr. Dunkle was 40 years of age and a native of Ohio. In 1879 he left his Ohio home and went west to Eureka, Nev. He secured employment in the Richmond Mine, as an inexperienced boy 17 years old and remained in the employ of the company for 7 years. At the end of this time he was foreman with complete charge of the mine crews. His next move was to California, and thence to Grant's Pass, Ore., where he worked a property under bond for a time. In 1894 Mr. Dunkle returned to California, locating at Angels, where he was employed as shift boss in the Lightner Mine. In 1899 he went to Mariposa County to take charge of the Pine Tree and Josephine Mines under the management of John H. Mackenzie. When the Pine Tree and Josephine closed down Mr. Dunkle took charge of the Lewis Mine, in Mariposa County, until he came to Rossland in November, 1901. Mr. Dunkle left a widow and 4 children.

SOCIETIES AND TECHNICAL SCHOOLS.

LAKE SUPERIOR MINING INSTITUTE.—The annual meeting will be held on the Minnesota Iron Ranges beginning Tuesday, August 19, and lasting several days. The excursions planned by the local committee will afford an excellent opportunity to visit all points of interest. Some very interesting papers will be presented at the different sessions. A. J. Yungbluth, of Ishpeming, Mich., is secretary.

NEW YORK UNIVERSITY.—A bulletin is issued by this institution. University Heights, New York City, describing the School of Applied Science. This department has departments of instruction in mechanical drawing, civil engineering, shop work, mechanical engineering, mathematics, chemistry, physics and geology. The school also offers instruction in chemical engineering and in marine engineering and naval architecture. The total number of students enrolled in the school during the past year was 104.

MONTANA STATE SCHOOL OF MINES.—The second annual catalogue of this school, at Butte, Mont., gives a historical sketch of the foundation of the school, a description of the principal building, the conditions of entrance, and the courses of instruction. The school offers the degrees of Mining Engineer and Electrical Engineer. The courses of instruction include chemistry and metallurgy, geology and mineralogy, mechanics, mining and mining engineering. These courses are described in some detail as is the equipment of the different laboratories. Students are offered a series of lectures on mining law. The school maintains a preparatory department in which the course of study covers one year.

INDUSTRIAL NOTES.

The Scaife Foundry and Machine Company, of Pittsburg, Pa., is to erect a new foundry at a cost of \$36,000 to replace the plant recently destroyed by fire.

The American Concentrator Company, of Joplin, Mo., has been advised that samples of ore for testing are on the way from Swansea, Eng., from Tasmania and from Belgium.

The Salt Lake, Utah, branch of the Allis-Chalmers Company has received, among other orders, an order for 40 steel shoes and 40 forged steel dies, for the Gold King Syndicate.

The Baldwin Locomotive Works, of Philadelphia, Pa., is reported to have secured a contract for 13 locomotives for Japan. Shipment will be made to Kobe and Yokohama at the end of the year.

David L. Samuel and Francisco W. Russell, of the City of Mexico, are reported to have formed a partnership to continue the business of the late John Bannister, who handled considerable American machinery for the Mexican markets.

At the recent annual meeting of the Eclipse Manufacturing Company, of Pittsburg, Pa., it was decided to increase the capital stock from \$50,000 to \$100,000 for the purpose of taking up the manufacture of railroad, mining, and bricklaying tools.

The Williamson Iron Company, of Birmingham, Ala., has made some sample coal mine cars with drop axles. The cars do not have to be as tall and will hold as much as the ordinary coal cars. The patent is owned by colored men and a trial is being given the cars in some of the Southern coal mines.

The Otis Elevator Company, of New York City, has received an order from the General Electric Company for 7 complete electric elevators with Otis motors and controllers for installation in the shops at Schenectady. The Otis Elevator company reports orders received for 51 electric elevators and 15 hydraulic elevator equipments during the past week.

The Birmingham, Ala., Railway, Light and Power Company has received 4 very large Corliss engines from the Birmingham Machine and Foundry Company. The engines cost \$60,000 and can generate 10,000 h. p. The engines are 36 by 60 in. One pair is to be used on a generator for running street cars and the other pair for an alternating current for lighting.

The William Tod Company, of Youngstown, O., has contracted for 3 cranes which will be delivered within the next 3 months. The largest crane is one of 70 ft. span, 60 tons capacity, and will be made by the Brown Hoisting Machinery Company, of Cleveland, O. Besides the 60-ton capacity in the main hoist, it will have an auxiliary of 10 tons, making the total 70 tons. The total lift will be 60 ft. to the floor of the crane track.

The Burnham-Standiford Company, of San Francisco, manufacturers of portable houses, has recently sent a carload of houses to the Eagle Shawmut Mine, in Tuolumne County, Cal. Two of the largest portable houses ever built have been sent to the Carson Valley Smelting and Refining Company, of Nevada, with which company the Burnham-Standiford Company has also installed its new refrigerating process, said to be novel, simple and very successful.

The Southern Cement Company has acquired by lease all the properties of the Birmingham Cement Company, including the plant at Ensley, good will, trade marks, etc. The Southern Cement Company has a plant for making cement from blast furnace slag at North Birmingham, Ala. The company is headed by Daniel Pierson, Jr., of New Jersey. The Birmingham Company's plant at Ensley will probably continue in operation, there being a good demand for cement in the South.

W. P. Lemley, George W. Jope and others, of Pittsburg, Pa., are organizing a company for the manufacture of refined iron bars, probably under the name of the Monarch Iron Company. The company purposes to put in about 20 puddling furnaces, 2 scrap furnaces, a muck mill and 3 finishing mills, 18 in., 16 in., and 12 in. for the manufacture of high grade bar iron. The manufacture of light rails and angles is also contemplated. The present office of the company is at 10 Bijou Building, Pittsburg, Pa.

The Colorado Iron Works, of Denver, Colo., report the following recent orders booked: Six 32-cu. ft. self-lumping slag trucks to the Cananea Consolidated Copper Company, Cananea, Mex.; a rubber top Bartlett concentrator to W. B. A. Dingwall, Matehuala, Mex.; 2 carloads of cast iron water jackets for the Monterey plant of the American Smelting and Refining Company; a 42 by 80-in. copper matte furnace for the Clear Creek Milling and Refining Company; a 100-ton pneumatic cyanide plant for the Horseshoe Mining Company, S. Dak.

At the annual meeting of the Susquehanna Iron & Steel Company, Charles A. Porter and his associates retained control. The minority interests succeeded in expressing protests against the Porter management

and electing 2 members of the board of directors. The directors of the Porter faction who were elected were Charles A. Porter, H. F. Bruner, Dr. L. S. Filbert, J. W. Steacy, Percy M. Chandler, W. S. Kimball and Henry Clay. The minority interests elected W. H. Butler and R. T. Houston. Charles A. Porter was re-elected president; H. F. Bruner, vice-president; R. G. Filbert, secretary, and J. W. Steacy, general manager.

The Pelton Water Wheel Company, of New York City and San Francisco, has secured a contract for a complete plant for the Hilo Electric Light and Power Company, of Hilo, Hawaii. The American electrical engineering and contracting firm of Bagnall & Hilles, Yokohama, Japan, has placed a contract with the Pelton Company, and the Cie de Transmission Electrica de Potenza, Italy, has ordered a number of water wheels, piping, etc.

The Ardjasarie Electric Power and Transmission Company, of Batavia, Dutch East Indies, is reported to have placed a contract with the Pelton Water Wheel Company for a complete water wheel plant.

The Crocker-Wheeler Company, of Ampere, N. J., states that it is finding an ever increasing demand for its various lines of direct current machinery, necessitating large increases of floor space. A new building, now half way to the roof, will nearly double the present capacity, and permit the placing of new and heavier machinery to accommodate larger sized generators and more rapid work on large orders for the smaller standard machines. The new building is of brick, slow burning mill construction, 3 stories high, and intended for the winding departments and light machine tools. A portion of the basement will be used for the experimental laboratories of the Crocker-Wheeler Company.

The Kalion Chemical Company, of Philadelphia, has bought for \$1,000,000 the Baltimore Chrome Works, of which Jesse Tyson is president, thereby securing a practical monopoly of the industry in the United States. It is said the purchase price covers all the realty, plants and finished and unfinished product of the concern. It is asserted that the Baltimore Chrome Works supplies the bulk of the dyeing and tanning material for this country. The ore used comes from Asiatic Turkey, although there are deposits in this country. The Baltimore factory was established in 1846. The present deal was effected through George B. Bower, of the Kalion Chemical Company, of Philadelphia.

The Baltimore Brick Company has recently increased its capital stock from \$2,100,000 to \$4,500,000. The new plan provides for \$1,000,000 first mortgage 5 per cent bonds, \$1,200,000 issued first preferred stock, \$600,000 second preferred stock, \$1,500,000 common stock, and \$1,200,000 first preferred stock held in the treasury for use in making future improvements. The \$1,500,000 or original first mortgage 6 per cent. bonds are exchanged for \$750,000 of the new 5 per cent. first mortgage bonds and \$1,050,000 of first preferred stock. The proceeds from the sale to a syndicate of \$250,000 of the new bonds and \$150,000 of preferred stock have been used to improve the plants of the company. Col. Charles F. Macklin is the president of the company.

J. P. O'Donnell, the head of the International Pneumatic Tool Company, of London, England, is in America arranging the final details of the transfer of that company to the Chicago Pneumatic Tool Company. The latter company will consolidate the factory of the International Pneumatic Tool Company with its plant already started in London and is sending men from its staff in America to take charge of the office and factories in London. The Chicago Pneumatic Tool Company has been compelled to run 2 of its plants in America extra time, working at night, and this addition to its London plant will give it a much needed increase in manufacturing facilities. J. W. Duntley, president of the company, will sail for London August 12. At the present time the Chicago Pneumatic Tool Company has experts in Glasgow, Scotland, giving an exhibition of ship riveting construction with pneumatic tools under the auspices of the Glasgow Federation of Shipbuilders.

Among the recent contracts awarded to the Buffalo Forge Company, of Buffalo, N. Y., is one of particular interest, that of the Continental Coal Company, of Gloucester, O., which has ordered 3 250-in. fans installed in its mines for ventilating purposes. The fans are 250 in., housing of the 3/4 type and of the special width of 72 in. The sides are built of extra heavy steel plate and are braced with angle irons of ample size to prevent vibration. The blast wheels of the fans are of the usual centrifugal type. The radial blades or vanes with backwardly curved tips are supported by 2 spiders of wrought iron tees springing from cast-iron hubs and are further stiffened by the conical side plates. The fan shaft is supported independent of the housing by 2 standard Buffalo self-aligning, chain-oiling outboard bearings mounted on masonry pedestals. This plant is similar in many respects to that of the Modoc Coal Mining Company, located at the same place and recently installed by the Buffalo Forge Company.

The American Steel Foundries Company has effected a permanent organization. The board of directors is composed of Joseph E. Schwab, brother of Charles M. Schwab, of the United States Steel Corporation; Eben B. Thomas, Wm. C. Brown, J. M. Shoonmaker, Alfred Clifford, S. R. Callaway, Wm. K. Bixby, Max Pam, Leslie D. Ward, Edward Shearson, Charles Miller, Lewis Nixon, Daniel Eagan, George B. Leighton, Edward F. Goltra, Clarence H. Howard, W. D. Sargent, Arthur J. Eddy, Howard K. Wood, Kenneth K. McLaren and Donald H. Mann. The directors elected the following officers: President, Joseph E. Schwab; first vice-president, Daniel Eagan; second vice-president, Clarence H. Howard; secretary and treasurer, F. E. Patterson; general counsel, Max Pam. An executive committee was elected as follows: Joseph E. Schwab, chairman; George B. Leighton, Clarence H. Howard, Daniel Eagan, Eben B. Thomas, Edward F. Goltra and Max Pam. This company is known as the steel casting combination and has an authorized capital of \$40,000,000. It is organized under New Jersey laws.

Westinghouse gas engines are being introduced in power plants in this country and abroad. Several recent orders received by the Westinghouse Machine and Electric Company, of Pittsburg, Pa., are: Philadelphia Water Works, Philadelphia, Pa., 8 280-h.p. and 2 125-h.p. 3-cylinder vertical engines, direct connected to pumps. This equipment aggregates 2,290 h.p. capacity. Logan Natural Gas Company, Lancaster, O., a 650-h. p. vertical 3-cylinder engine of exceptional size to be utilized for driving a gas compressor which will deliver natural gas to the distributing systems at a constant pressure; Riter-Conely Manufacturing Company, Leedsdale, Pa., 2 300-h. p. 3-cylinder vertical gas engines for general power work; Winchester Repeating Arms Company, New Haven, Conn., 2 150-h.p. engines and a 165-h.p. 3-cylinder vertical engine for general power distribution, operating upon producer gas; Bradford Electric Light and Power Company, Bradford, Pa., a 210-h.p. 3-cylinder vertical gas engine, to be used for driving generator for light and power work. (The company already has 4 of these engines aggregating 600-h.p. in daily service some 3 years); Penn American Plate Glass Company, Alexandria, Ind., a 175-h.p. 3-cylinder vertical engine direct connected to generator for power distribution; Lippincott Glass Company, Alexandria, Ind., an 85-h.p. 2-cylinder engine; Pittsburg Plate Glass Company, Ford City, Pa., 5 85-h.p. 3-cylinder vertical gas engines for general power work. These orders show the great variety of applications for Westinghouse gas engines.

TRADE CATALOGUES.

The St. Louis & San Francisco Railroad, better known as the 'Frisco System, issues a prettily illustrated 44-page pamphlet describing some of the hunting, fishing and health resorts along its lines. The 'Frisco system traverses that rugged belt of country known as the Ozark Range, extending from North-eastern Texas through Indian Territory and Arkansas into Southwest Missouri. This region has long been famous for its climate and contains numerous mineral springs, which have acquired deserved reputation as health resorts. The pamphlet gives all necessary details about the various places mentioned and may be had on application to any representative of the 'Frisco System.

Messrs. Adam Cook's Sons, 313 West street, New York City, makers of "Albany Grease," have issued a booklet which gives considerable information regarding this lubricant in a brief and attractive way. The pamphlet is in two colors, the cover bearing the familiar "Albany Grease" trade-mark, reproduced in yellow. The manufacturers state that this grease is now used to lubricate all kinds of machinery from an automobile to the United States battleship *Oregon*, and has been adopted by the United States Government. Illustrations in colors show what genuine "Albany Grease" looks like when put up in 10-lb. pails, and purchasers are cautioned to look for the yellow label. Copies of the booklet will be sent free by Adam Cook's Sons upon application.

The Carterville Foundry and Machine Works, of Carterville, Mo., and the Galena Iron Works, of Galena, Kan., W. J. Bryant, proprietor of both, issue a neatly illustrated 54-page pamphlet of ore crusher, rolls, ore cars, pumps, jigs and jig supplies, hoists, belting and packing, etc. The works have had extensive experience in erecting plants for treating the zinc and lead ores of the Joplin District, and the proprietor states that he has given particular attention to the manufacture of the Carterville crusher and Cornish rolls. Fully 80 per cent of the mills in the Kansas-Missouri District are said to use the Carterville crusher. The 30-in. rolls, first put on the market in 1899, have now come into wide use, and the proprietor states the Carterville and Galena works have made mining machinery and complete plants now in operation in British Columbia, Wyoming, Montana, Colorado, Arizona, New Mexico, Georgia, Nevada, and

old Missouri, to say nothing of the Joplin District. The works carry in stock a complete line of mill supplies, and make a specialty of repairing boilers or pumps and erecting stacks.

GENERAL MINING NEWS.

Petroleum Developments.—July proved a favorable month for oil operators, and although fewer wells were completed, there was an increase in the new production, says the Oil City Derrick. The gain, however, was not great enough to bring about any increase in the daily yield. The supply and demand of Pennsylvania oil are getting on a more even footing, and the shipments as well as the runs are expected to show a decline. The new pools that appeared very promising last month have made some progress, but not sufficient to show much as to their future extent. A number of gusher strikes were made in various parts of West Virginia, and both Greene and Beaver counties in Pennsylvania supplied several wells much above the average. Ritchie, Doddridge and Wetzel and Tyler counties in West Virginia at present hold out the greatest inducements for new production.

July completed fewer wells than June, but surpassed it in new production. There were 1,299 wells completed in the Pennsylvania and Trenton rock oil fields in July, including 221 that were unproductive, and the new production was 17,670 bbls. This was 102 fewer wells and 74 fewer dry holes, with a gain of 516 bbls. in the output of new oil. There were 540 rigs and 1,182 drilling wells in the Eastern and Western oil fields on July 31, which was a decrease of 29 rigs and an increase of 29 drilling wells from the figures at the close of June.

Weaver Coal Company.—Henry E. Weaver, of this company, confirms statements of his company's increase of capital from \$1,500,000 to \$3,000,000 as the result of John W. Gates taking \$1,000,000 of stock. The new concern will be known as the Weaver Coal and Coke Company, and will retain its offices in the Marquette Building, Chicago, Ill. Besides Mr. Gates, the new stockholders will be William Edenborn, of New York City, chairman of the board of directors of the United States Steel Corporation; Isaac L. Ellwood and Samuel W. Allerton, of Chicago. The stock of the new company will be listed as soon as possible. Large bituminous coal fields recently acquired by Mr. Gates will be added to the Weaver interests, including 5,000 acres in Illinois, 8,000 in Pennsylvania and 6,000 in Ohio, estimated to be worth \$1,500,000. The Weaver Company now owns, under the name of the Maryland Smokeless Coal Company, 5,000 acres in Randolph County, W. Va. The company deals in bituminous coal, but is expected to do a large business in West Virginia coke by increasing the ovens at the mines. A line of steamers, it is said, will be constructed on the Great Lakes to ship from Sandusky, Cleveland and Toledo to the company's docks at Milwaukee, West Superior, Duluth and Two Harbors. Heretofore the company has shipped almost entirely by rail.

ALABAMA.

(From Our Special Correspondent.)

Donelson Construction Company.—This company has 200 negroes, with mules and scrapers, on the right of way of the Eastern Railway of Alabama, from Talladega, in Talladega County, to Pyriton, in Clay County, and the first 10 miles of the road will be pushed to completion. The railroad is to reach pyrite beds in Eastern Alabama. The Louisville & Nashville Railroad is behind the new railroad.

ARIZONA.

MOHAVE COUNTY.

(From Our Special Correspondent.)

Leland.—Thomas Ewing, general manager of this group of claims, in Treadwell District, is preparing to start work with a large force of men.

Minnesota.—This mine, at Chloride, has agreed to furnish the new Vulcan Smelter with 25 tons of lead-silver ore daily.

Pioneer.—The shaft in this mine, at Gold Roads, is said to show an ore shoot 500 ft. long and 6 to 12 ft. wide.

Portales de Oro Mining Company.—This company, at Union Pass, is preparing papers to patent 8 gold claims in that camp in the Sacramento Range. Two claims in the group are reported producing shipping ore.

Quartette.—This gold mine, at Cottonwood Island, on the Colorado River, is working again.

Virginia Mining Company.—Ben Hastings, superintendent of this company, in Weaver District, has let a contract for 500 ft. of sinking on the Ramrod claim.

YAVAPAI COUNTY.

United Verde.—A mine fire which has been smouldering for several years in an old stope on the 4th level of this mine at Jerome is sending out so much smoke and gas through the main working tunnel on the 5th level that work in the mine is abandoned. It is also stated

that accompanying this outbreak of the fire there has been another bad cave in some of the stopes. The company has sought to confine the fire by erecting masonry walls, but these efforts seem to have been of little avail. The mine may be closed some weeks and the smelter may stop work soon.

CALIFORNIA.

AMADOR COUNTY.

(From Our Special Correspondent.)

Doyle.—A Vacaville company has secured a bond on this mine, adjoining the Amador Queen No. 1, about 4 miles south of Jackson. The surface workings have paid; but little development has been done. The main fissure—the Mother Lode—has not been found in the immediate vicinity.

Shenandoah.—The shaft at this mine, at Plymouth, is 750 ft. deep, and a cross cut will be run. S. K. Thornton is superintendent.

Wildman.—At this mine, at Sutter Creek, John Ross, Jr., superintendent, 30 stamps are dropping. Sinking is suspended. At the Mahoney Mine only 3 men are at work underground.

BUTTE COUNTY.

(From Our Special Correspondent.)

Gold Bank.—This mine, the largest producer of the quartz properties in the county, has been in borrasca of late, and it is said that prospecting will cease as soon as the ore in sight is milled. The mine is at Forbestown, and belongs to the heirs of the late W. W. Stow. H. P. Stow is superintendent.

CALAVERAS COUNTY.

(From Our Special Correspondent.)

Altaville.—The 423 ft. shaft of this mine, near Angels, has been sunk, including engine, boiler, hoist, timbering, labor, etc., at an average cost of \$23.20 per ft.

Benson.—This mine, near Angels, is being opened for a company by J. C. Benson. New machinery has been installed and good ore found. The company has bonded the Osborne & Bradley Mine, Gold Hill. In this mine, near Angels, C. Wolf, superintendent, valuable shoots of ore have recently been found, and hoisting and pumping machinery will be installed.

Continental.—At this mine, West Point, J. W. Groves, superintendent, a 4-stamp mill has been completed.

Crystal.—At this mine, near Angels, owned by the J. G. Fair estate, machinery is being put in, and the mine will be opened after lying idle many years.

Fannie Marie Mining Company.—This company, Frank O. Courtmarsh, manager, owns the Fannie Marie Mine, at Glencoe, and some other claims near Mokelumne Hill. The shaft is down 300 ft., and a new galloway frame is about completed. A 10-stamp mill will be ready in September. Thirty men are employed.

Melones.—At this mine, at Robinson, W. C. Ralston, manager, 60 stamps are dropping. A new 8-ton electric locomotive is to haul the 8 6-ton ore cars 2,200 ft. from the tunnel to the ore bin.

Oriole.—Arrangements are being made for a 25-stamp mill on this mine at Angels. The property is owned by a Stockton company, F. E. Dunlap, manager.

Porteous.—This mine, at West Point, Thos. Porteous, superintendent, is turning out some good ore. Fifty tons at the 5-stamp mill went \$41 per ton.

Prince.—This mine, near the Fritz, near Angels, shows good ore on the 150 level.

Utica Mining Company.—At this mine, at Angels, the old Stickle shaft is used for the water skip and large pump to aid in freeing from water the Utica and South Stickle workings.

Wild Goose.—This deep gravel mine at Douglas Flat, a few miles from Murphys, is to be worked again. The Wild Goose, Junction, Texas and Comet, which 25 years ago paid well, have been bought by J. Evans, who is to reopen them. The large flow of water stopped work, but ample pumping facilities will now be provided. There is much virgin ground that will be opened.

Yellow Aster.—This mine, near West Point, owned by Geo. Congdon, of San Andreas, is turning out small lots of good ore.

LOS ANGELES COUNTY.

(From Our Special Correspondent.)

Red Rover.—The company owning this mine, at Acton, contemplates putting in a small mill. Of late the output has been nominal.

San Pedro Salt Company.—At Long Beach this company will this year complete one of the largest salt making plants in California, covering 1,600 acres of land. The dry air and small rainfall admit the production of a larger amount per acre than on the shores of San Francisco Bay, where most of the salt in the State is made. P. H. Coward, of Long Beach, is superintendent. M. Lewis, president, and F. W. Armi-

tage, secretary, have offices at 254 Wilcox Block, Los Angeles. The works are near San Pedro. Ocean water will be evaporated.

MARIPOSA COUNTY.

(From Our Special Correspondent.)

Hite Cove.—This once famous mine at Hite has been sold to San Francisco and London men through H. H. Todd. F. W. Krogh, of the Krogh Manufacturing Company, of San Francisco, has been visiting the mine to learn what machinery is needed.

MONTEREY COUNTY.

(From Our Special Correspondent.)

Los Burros District.—The S. O. Pugh quartz mill at Mansfield has made its first run with good results. A road is being built from the Ajax Mine to the mill. A road is also being made from the Grizzly Mine 7 miles to Point Gorda.

NEVADA COUNTY.

(From Our Special Correspondent.)

Allison Ranch.—This mine, near Grass Valley, recently reopened after long idleness, expects to have its mill ready by August 31.

Mento Mining Company.—This Grass Valley company has brought suit against its former president to compel him to deed the Home Ticket Mine to the company.

Pennsylvania Consolidated.—United States Circuit Judge Morrow has decided in favor of the plaintiff the apex suit of this company against the Grass Valley Consolidated Mining Company. The Pennsylvania company asked for \$600,000 damages for the extraction of its ore by the Grass Valley company, but the court will appoint a referee to take testimony as to the actual damage sustained. The complaint stated that by means of what are known as the 800 and 900 W. Y. O. D. levels the Grass Valley Company unlawfully entered upon the ledges of the Pennsylvania Company. In February, 1900, the Grass Valley Company instituted an action in ejectment against the Pennsylvania Company to recover possession of the quartz vein mentioned in the other action. Since the suits have been on both mines have employed fewer men, and about 150 miners were out of work. There was rejoicing at Grass Valley when the decision was given, for had the suit gone against the Pennsylvania it would have invalidated title to much mining property in the district.

PLACER COUNTY.

(From Our Special Correspondent.)

Deep Canyon.—At this mine, above Michigan Bluff, 20 men are employed.

Eclipse.—This quartz mine, at Ophir, is down to the 400-level. More men will be put at work.

Peckham Hill.—Fifteen men are extending the tunnel at Peckham Hill about 1,100 ft. below the level of the town of Forest Hill, where a Boston company, represented by Wm. R. Russell, has recently purchased 7 miles of gravel channel. A compressor and other machinery have been ordered.

SACRAMENTO COUNTY.

(From Our Special Correspondent.)

Amador & Sacramento Canal.—J. H. McKune has brought suit against Jennie B. Ritter, Eugenie Ritter-Houssaye, and others, to foreclose a mortgage on this ditch, the Comet placer in Live Oak District: the Washington, Michigan Bar, Mammoth, and a part of the Senator Claims, in Michigan Bar District, and the Union, Monitor, Hardshell, Carbine, Johnson, Aldine and Bobtail claims, and other property. The ditch has a capacity of several thousand inches of water, and extends from Indian Creek to near Galt. Some of the mining claims have paid well in times past.

Sinclair.—A rich quartz pocket has been struck at a depth of 6 ft. on this ranch, southeast of Folsom.

SAN DIEGO COUNTY.

(From Our Special Correspondent.)

Lepidolite Mines.—Frank Salmons, of Pala, has sold a 1/2 interest in one of his lepidolite mines at Pala for a reported price of \$4,000 cash and \$10,000 worth of property at Redlands. This is one of the newer claims and has not been in litigation. The Stewart claim adjoining, owned by Mrs. R. O. Butterfield, Nelson G. Douglass and Mrs. Salmons, is reported sold for \$75,000. It is understood Schieffelin & Co., of New York City, are interested in the purchases. There are contracts closed for the sale of the product in New York and Germany.

SANTA BARBARA COUNTY.

(From Our Special Correspondent.)

Earthquake Damages.—On July 28 and 29 several heavy shocks did some damage between Los Alamos and Lompoc. On the Careaga Ranch the large tanks of the Western Union Oil Company, filled with oil, were overthrown, the loss being about \$20,000. The earthquake occurred in the center of a very productive oil field. Pipe lines were broken or displaced, and the

pipes of the Lompoc water system were damaged. No lives were lost.

Summerland Oil Fields.—It is stated that New York men have consolidated all the oil wells on the seashore. The property consists of 17,875 acres of proven oil land, with a water frontage of 4,240 ft. Most of the productive wells are located under the ocean a considerable distance from the shore, and boring and pumping are conducted from wharves built for the purpose, some of which extend over 1,000 ft. seaward.

SHASTA COUNTY.

(From Our Special Correspondent.)

Anaconda Consolidated.—Jesse Frick, of Redding, has bonded these claims at De Lamar. The property is near the Graham Mine.

Mountain Copper Company, Limited.—During an argument for reduction of assessed valuation of this property before the supervisors, Lewis T. Wright, general manager, submitted a statement that the property had earned for its stockholders \$5,416,000 in the past 5 years, but estimated that, owing to depreciation in price of copper and the fire in the mine, the net earnings in 1902 would not exceed \$610,000. The supervisors refused to make any reduction in the assessment. The amount of ore actually accessible on March 1, 1902, is given as 538,635 tons, with an estimated net value of \$1,587,382.

Unity Dredging Company.—This company is to start work on the ground bonded from John Laveck and J. A. Hubbard. Dredgers are to be used. Lindsay Scrutton, of Browns Valley, is manager.

SIERRA COUNTY.

(From Our Special Correspondent.)

Tabor.—This mine, near Gibsonville, has cut the rim of the gravel channel at about 3,000 ft. in. The mine is on the same ridge as the Thistle Shaft drift mine, now known as the Bellevue.

SISKIYOU COUNTY.

(From Our Special Correspondent.)

Eastlick-Quigley.—Work on this hydraulic mine at Oro Fino is about through for the season, and the clean-up is under way.

Hydraulic Mines.—Hydraulic mining at Hamburg Bar, Seiad, and other points of the lower Klamath River, is about over for the season.

Punch Creek.—This quartz mine, at Humbug, is yielding fair grade gold ore from a 2 ft. ledge.

TUOLUMNE COUNTY.

(From Our Special Correspondent.)

Consolidated Eureka.—This mine, known also as the Dead Horse, owned by Hayward, Hobart & Lane, has suspended work temporarily. The mine, the deepest in the county, has old machinery, and has not paid as well as usual of late. It has been running continuously since 1880.

Darrow.—At this claim, near the Rawhide, at Jamestown, a 2-stamp mill is being erected.

Drapac.—This mine, at Soulsbyville, H. C. Converse, superintendent, is employing 30 men. A 10-stamp addition is being made to the mill.

Eagle-Shawmut.—At this mine, near Chinese Camp, owned by John Rosenfeld's Sons, of San Francisco, the new 100-stamp mill is at work. About 250 men are employed. Nine Pelton wheels are in use.

Golden Dawn.—This mine, near Soulsbyville, is to be opened by Nicholls Brothers, the owners, who have bought a 2-stamp mill, engine, etc.

Hardtack.—Superintendent Connally is trying to arrange with the Hunter Mine for a tramway from the Hardtack to the Hunter Mill.

Huster.—This mine, at Carters, has been bonded from C. A. Holland for 12 months.

Lady Washington.—Ballard & Martin are running the tunnel in this mine at Carters in hopes of striking the old Dead Horse vein.

Lost Fox.—Superintendent Ingalls is framing the numbers for a new 20-stamp mill on this mine, at Carters. There are 3,000 tons of ore on the dump.

Mount Jefferson.—In this mine, at Groveland, J. M. Meigham, superintendent, a shoot of ore has been cut about 85 ft. below the 300-level. The free milling ore reported high grade, with 8 per cent of rich sulphurates.

Nonpareil.—The work of equipping this mine, at Big Oak Flat, A. P. Dron, superintendent, is progressing. A fine hoist has been installed. A large body of ore has been uncovered.

Republican.—A contract has been let for sinking the shaft to 600 ft. Ten stamps will be added to the mill. B. Deleray is superintendent at Chinese Camp.

Sullivan.—Work has started on this mine, an extension of the Black Oak, at Soulsbyville.

Sunnyside.—Chas. A. Smith, superintendent of this mine, near Groveland, has started 9 men at work. A roller mill will be put in.

COLORADO.

BOULDER COUNTY.

Boulder Oil Wells.—The McAfee Company has shipped to the refinery of the United Oil Company at Florence 2 cars of oil. The Bingham, which has been idle for some time, has purchased casing, tubing, pumps, etc., and will pump oil into stationary tanks. The Eagle is down over 2,250 ft. The Crawford has completed its casing, and with about 2,000 ft. of oil in the well is slowly sinking into the oil sand.

CLEAR CREEK COUNTY.

East Argentin.—This property, near Georgetown, has about completed its dam, and expects to have its power plant in operation before long.

Kelley Tunnel.—This tunnel, at Georgetown, is in over 800 ft., and advancing 8 ft. per day. A Leyner drill is used. Vice-president C. I. Burt, of Davenport, Ia., recently inspected the property.

CUSTER COUNTY.

Wolcott Gold Mining, Milling and Development Company.—This company, with mining property at Querida and offices in Chicago, Ill., J. A. Bishop, of Chicago, being president, recently issued a prospectus in which the names of ex-Senator E. O. Wolcott and John Campbell, of the Colorado Springs Court, were used. Messrs. Wolcott and Campbell have published statements saying that the use of their names was without their sanction, and that they are in no way sponsors of the company.

GILPIN COUNTY.

Fairfield Mining Company.—This company has made a strike in the Fairfield Mine, in Russell District, at 300 ft. Assays are said to show values between 15 and 20 oz. gold per ton. The property is worked under lease and bond by E. W. Williams and Dr. Nickerson, of Denver, who are associated with Eastern men.

Frontenac.—Charles Pishon and D. and J. Zancanella, of Russell Gulch, have taken a lease on this property, at the head of South Willis Gulch, and have begun developments.

New Haven.—A good strike has been made in this mine, at the head of Lump Gulch, by E. W. Morse, who is working in the interests of himself and Denver men. A crevice from 3 to 4 ft. wide is reported to give assays of nearly 3 oz. gold and 21 per cent copper.

Specie Payment.—This mine, on Bellevue Mountain, south of Russell Gulch, is making regular shipments of smelting ore to the Denver smelters, and of milling ore to the Hidden Treasure Mill in Black Hawk. The property is owned by Rhode Island men, and is paying regular dividends.

GUNNISON COUNTY.

Akron Concentrator.—This 50-ton plant is turning out a good quantity of concentrates. The Erie and Eureka mines keep it supplied.

Gold Pick Company.—This company continues to push its tunnel at Vulcan. The tunnel is in nearly 450 ft., and has gained a depth of about 200 ft., and is nearing the Gold Pick lead.

Scott-Ogden Mining and Leasing Company.—This company has secured a lease on the Black Queen, in Crystal District.

Tomichi Valley Smelter.—This plant in July turned out 150 tons of bullion valued at over \$30,000. The mines which are furnishing it with their entire output now are the David H. and Iron King.

LAKE COUNTY—LEADVILLE.

(From Our Special Correspondent.)

Leadville Ore Output.—The July output is about 80,000 tons of all classes of ores. An increase is noted in siliceous ores and also in zinc, but the greater part of the output is iron. The resumption of shipments by the Monarch Company and the placing of heavy machinery at the Greenback indicates a heavier tonnage for August.

Leadville Zinc Production.—In July 8,000 tons were mined, the heaviest tonnage ever made in a single month in the district, mostly from the A. M. W. Mill, Moyer Mine and mill and the Yak. Important experiments are being made by the Empire Zinc Company with low-grade zinc ores from the old Colonel Sellers Mine. As soon as the Resurrection Mill is completed 150 tons daily will come from there.

A. M. W. Combination.—Shipments for July were 7,500 tons, but will be curtailed in August owing to low-grade ore and a large amount of prospecting. The new mill will start this month, and handle 100 tons daily at the A Y & Minnie in addition to the big tonnage handled at the A. M. W. Mill. Work on the new Mahala shaft will also start.

Corona.—Condon & Co., the new lessees, have sunk the shaft to 200 ft. after the A Y & Minnie ore. The property adjoins the Minnie.

Fairplay.—Lessees, headed by Eugene Sullivan in this Yankee Hill claim, have caught a new vein that runs as high as 2 oz. gold.

Gold Basin Mining Company.—The vein showing rich gold averages is widening, and the shaft will be sunk another 100 ft. The company is operating the old Big Four ground.

Greenback Mining Company.—The new hoist and engine have arrived, and as soon as they are in place the property can mine 300 to 500 tons of iron sulphides a day. Ore is being blocked out at 1,350 ft., the bottom level.

Ibex Mining Company.—An increase is noted in low-grade shipments, and much prospecting is under way. Shipments for July were 8,500 tons.

Keystone Mining Company.—After a temporary shutdown on account of water, work is to resume. Pittsburg, Pa., people are at the head of the enterprise.

La Plata Mining Company.—Leases are being secured on this territory, which has been idle for a long time.

Leadville Placer Mining.—Tests made along the Arkansas River below Leadville show gold in all the gravel. The Twin Lakes Placer Mining Company and the Hayden-Lima Placer Company both are prepared to handle a large amount of dirt. The latter company's steam shovel will handle 800 yds. a day, and Manager Richards estimates that the ground will average 32c. per cu. yd.

Midas.—The immense iron shoot shows no sign of exhaustion. Shipments were 6,000 tons in July.

Mosquito Range Mines.—Recent developments in the London property showing good gold values have revived prospecting along Mosquito, and the country is being re-located for several miles.

New Leadville Home Mining Company.—All work is done through the Penrose and the iron ore is improving in value. The July tonnage was 5,400 tons.

Phoenix Mining Company.—A very strong iron shoot is being developed in the Sixth Street shaft. July shipments were 4,000 tons of low-grade iron.

Printer Boy Gold Mining Company.—The vein so far as uncovered is satisfactory. Several New York owners are on the ground.

Valley Leasing Company.—Manager Deane will at once get a new plant of machinery for the old Valley shaft. The new shaft is down 160 ft., and at 250 ft. should tap the sulphides. As soon as machinery is in place the old shaft will be sunk another 100 ft.

Wolcott Mining Company.—On September 4 the company will hold a meeting to extend the life of the corporation, which owns a large acreage in the city limits on which is the Coronado Mine. E. H. Wolcott, of Indiana, is at the head of the company.

SAN JUAN COUNTY.

(From Our Special Correspondent.)

Brooklyn.—Manion Brothers & Murphy, of Silverton, are shipping 2 carloads weekly of \$60 ore from this mine at Chattanooga.

Esmeralda.—The force numbers 35 men at the Esmeralda in Maggie Gulch, near Silverton. The output is a carload daily of good ore.

Eureka Exploration Company.—The engine and boilers for the Silver Wing Mill near Silverton have been remodeled by this company and are being installed. Work will soon be resumed.

Freeport & Cripple Creek Gold Mining Company.—This company, recently organized in Boston, Mass., has called for bids for driving 2 tunnels, one on the south side of Eureka Mountain and the other on Tower Mountain. C. A. B. Halverson, of Silverton, superintendent, has engaged carpenters and is erecting buildings for employees.

Gold King Consolidated Mining Company.—The recent strike in the American tunnel near Silverton has proved much richer than anticipated. A large force of carpenters is employed and the 80-stamp mill will be greatly enlarged to accommodate the increased output. A boarding house to accommodate 250 more miners is to be built at once. The company also contemplates erecting a number of cottages for its mill employees, and a lead mill will also be erected upon the present site of the offices and machine shops. The new power house is completed and the powerful electrical machinery is being installed.

Royal Mining Company.—A new tram of the Sackett type, 1,200 ft. long, will be in operation August 10. The ore body has lately increased in value, a streak of gray copper carrying considerable ruby silver being cut.

San Juan Queen.—Chiono et al., of Silverton, have a small force busy and are making weekly shipments of good ore.

Walla Walla.—Saenger & Neef, of Denver, are developing this group of 8 claims on Boulder Mountain.

SAN MIGUEL COUNTY.

(From Our Special Correspondent.)

Japan Tunnel.—Progress now is slow owing to a

very hard streak of ground. The total distance driven in July was a little over 200 ft.

Ophir Consolidated.—The Silver Bell Mill is closed while the foundations for the batteries for the new mill are being set. During the shut-down the mill will be thoroughly overhauled. A small cyanide plant was recently purchased from the Smuggler-Union Company to test the tailings. If the experiment is a success a large plant will be constructed. W. S. Buckley is manager.

Peck Cyanide Company.—Kemp & Davis have secured a lease on the ground formerly owned by the Peck Company and the cyanide plant, near Pandora, and have begun to treat 200 tons per day. Simon-ton & Jones have a lease on the 20-ton plant, east of Telluride, and are working 2 shifts.

Telluride Coal Mining Company.—Preparations are being made to open up rooms at this company's mine, above San Miguel, a mile west of Telluride. The coal will be thoroughly tested this winter, but not put on the market. If it proves satisfactory, and can be mined at a profit, a tramway and other equipment will be built next spring. A recent analysis shows 70 per cent fixed carbon, 17 per cent volatile matter, 6.8 per cent ash and 8 per cent water. It is a semi-anthracite.

Telluride County Road.—The road from Telluride to the mines in Savage and Marshall basins is nearly completed to the Valley View Mine, over half the distance.

SUMMIT COUNTY.

Cashier.—This mine near Breckenridge is to put in 20 more stamps at once, thus doubling the capacity of the mill.

Gold Pan.—Work at the great pit is retarded by a scarcity of water.

Michigan.—This mine, near Kokomo, keeps up shipments of 50 tons per day.

Mountain Pride Company.—This company's mill, on Baldy, near Breckenridge, is turning out about 6 tons of good concentrates from 40 tons of ore run through the mill daily.

Oro Grande.—This plant, at Dillon, 10 miles below Breckenridge, has had a good water supply. Its great pit is now down 70 ft., and bed rock is expected to show up any time. Another big ditch is being built to bring the waters of Straight Creek to the company's pipe line.

TELLUR COUNTY—CRIPPLE CREEK.

Colorado-Philadelphia Mill.—This mill at Colorado City will suspend operations for a time on account of a scarcity of water. The mill treats about 300 tons of ore per day and employs 200 men. The Standard plant has been treating only about 300 tons daily out of a capacity of 450 tons. Both plants are owned by the United States Reduction and Refining Company. The ores that these mills were unable to treat were sent to the company's plant at Florence.

Londonderry Gold Mining Company.—This company has been denied an injunction restraining the Wild Horse from taking ore from its territory. The Wild Horse Company claims apex rights and the court has ordered one-half the money obtained from the ore mined in the disputed territory to be paid into court, pending the settlement of the case. The United Mines Company is given 25 days in which to answer the complaint.

Portland Gold Mining Company.—Suit has been filed in the Federal Court by this company against the Monument Gold Mining Company for damages. The complaint alleges that a vein which apexes in the Tidal Wave claim of the Portland Company is being worked by the Monument Company and that ore to the value of \$250,000 has been taken out.

(From Our Special Correspondent.)

Owing to a scarcity of water a number of the larger mines are using the mining water for the boilers, the mineral in the water being first precipitated by the use of chemicals.

Accident.—This mine, on the west slope of Foley Hill, below the Pointer, is stopping ore in the 400-ft. level said to go from \$70 to \$80 in gold, with silver values. The property is owned by J. McDougal, of Brooklyn, and has a new hoisting plant.

Anaconda Company.—The semi-annual report shows that for the 6 months ending June 30, 23 different sets of lessees had shipped from the various blocks and dumps of the company's estate ore to the value of \$83,625. The total gross output for the mines amounted to \$92,358, and the balance in the treasury of the company July 1 was \$20,049.

Elkton.—A short time ago operations on the eighth level of this mine were closed down and the ore broken was left in the mines. The company is now considering taking out this ore. The station on the ninth level is being cut and good ore being mined from the upper levels. Portions of the Raven and Tornado claims are under lease.

Gold Coin.—This company is said to have cut the Dorothy vein in the 9th level.

Moose Gold Mining Company.—The property of this company is under lease to Mr. Maynard, of Buffalo, N. Y., who also owns about one-half of the stock. Recently in the 1,000-ft. level a narrow streak of high-grade ore has been encountered.

Pharmacist.—The annual meeting of the Pharmacist will be held at the company's office, at Colorado Springs, on September 1.

Portland Gold Mining Company.—Suit was begun in the United States Circuit Court on July 31 against this company to restrain it from using the Sloan filters, patents for which are alleged to belong to the Sloan Filter Company. Gains and profits from the use of the filter, damages and costs of the suit are also asked. The filter is a complicated device and an important part of the new mill at Colorado City.

Stratton Group.—W. S. Stratton has ordered a re-survey of all the properties of the Stratton Cripple Creek Mining and Development Company in the district. This extra precaution is taken to prevent possible litigation by parties attempting to locate fractions on the company's ground.

United States Reduction and Refining Company.—The statement of the month's ores handled at the plant on Bull Hill shows that 11,000 tons of an average value of \$40 a ton was shipped to the mills of the United States Reduction and Refining Company at Colorado City and Florence.

IDAHO.

ADA COUNTY.

Lincoln Company.—John T. Hodson, the general manager of this company, whose property is located in the Pearl District, not far from Boise, has placed an order with the Salt Lake Hardware Company for a 100-ton combination amalgamating and concentrating mill, and the plant may be in commission within 120 days. Fred C. Richmond, the Hardware Company's mill expert, examined the property.

BLAINE COUNTY.

Standard Mines and Milling Company.—This New York City company has acquired the Five Points gold bearing claims near Hailey. E. F. Rogers, who is superintendent has let a contract for 300 ft. of tunnel work.

BOISE COUNTY.

(From Our Special Correspondent.)

The mills in Pearl can soon begin to use electric power from the big power plant on the Payette River above Emmett, which is now in running order.

Charlotte Gulch Mining and Milling Company.—This company, operated by the Western Trust and Guarantee Company of Chicago, has a shaft down about 80 ft.

ELMORE COUNTY.

(From Our Special Correspondent.)

Overlook Mining Company.—This company in Neal District is pushing preparations for the 60-ton Chilean mill now en route from Chicago. The company has 14 ft. of gold-silver ore opened at a depth of 200 ft. by a 500-ft. tunnel. This company is operated by the Western Trust and Guarantee Company, of Chicago.

IDAHO COUNTY.

Elk City Mining District.—This region, drained by the south fork of the Clearwater River, lies east and north of Buffalo Hump, and is the scene of considerable prospecting. The Cleveland group of 21 claims, on Relief Creek, 4 miles east of Oro Grand, has been bonded to Spokane, Wash., men represented by Dennis Clark and R. M. Sherman. The property is equipped with a sawmill and a 1-stamp prospecting mill. A 20-stamp mill is being erected on Crooked River at Oro Grand, 12 miles from Elk City and 10 miles east of Buffalo Hump, by the Crooked River Mining and Milling Company. The mill is expected to be ready in September. A large low-grade porphyry dike carrying free gold will be worked.

Valley Creek.—This mine in Stanley Basin is owned by Wayne Darlington, F. W. Hastings and Lyttleton Price, who are erecting a 20-stamp mill with a cyanide annex.

(From Our Special Correspondent.)

American Eagle.—In this mine at Dixie a rich strike is reported, the ore being 4 ft. wide. Mr. Clark, of Spokane, bought out one of the owners for a reported price of \$125,000, for a 1/4 interest.

Big Buffalo.—The mill at Buffalo is running regularly on good ore but no results are given out.

Crackerjack.—The mill at Buffalo is making a preliminary run on some high grade gold ore.

Dewey.—The machinery for a 100-stamp mill for this mine is reported at Emmett, the end of the railroad, but will stay there for the winter as there is no wagon road within 50 miles of Thunder Mountain.

Idaho Gold Mines Development Company.—This company, composed of Chicago men has been organized under the laws of Arizona with a capital of \$2,500,000. It owns 16 claims on the southwest slope of

Rainbow Peak, and has bonded 4 claims on Rush Creek, just east of Thunder Mountain. The manager leaves Boise in a few days with supplies to superintend development.

Jumbo.—The mill at Buffalo is reported running on better ore than usual and it is expected that the clean-up for July from its 4 stamps will be about \$7,000.

Thunder Mountain Consolidated Gold Mining Company.—This company has bought a small stamp mill of the Baxter Machine Works, of Boise, for the Philadelphia group on Lava Creek. It was taken about half way on wagons and is now being packed in.

Wise Boy.—The owners have been pushing work on the mill at Buffalo, and the 10 stamps will be ready to drop in a few days.

SHOSHONE COUNTY.

Hecla.—This mill at Gem, after being shut down nearly 18 months, is about to start work.

ILLINOIS.

El Paso & St. Louis Securities Company.—This company is reported to have secured a large body of undeveloped lands reaching from the Williamson County field southwest to the Ohio River and will build a railroad through the strip. Bids for the construction and equipment of the road have already been asked. The company is capitalized for \$400,000, with a provision in the articles of incorporation permitting the increase of the capital to an unlimited amount.

SANGAMON COUNTY.

(From Our Special Correspondent.)

Republic Iron and Steel Company.—This coal mine, north of Springfield, has been shut down a week for repairs.

Springfield Co-Operative Coal Company.—This company, north of Springfield, is enlarging its air-shaft. The hoisting shaft is meanwhile temporarily connected with the fan by an air box, with doors over the top of the hoisting shaft, which are raised by the cages as they come up and opened by levers for the cages to go down.

INDIANA.

(From Our Special Correspondent.)

Bituminous Coal Prices.—An advance of 5c. and 10c., according to grade, for coal loaded on cars at the mines throughout the Indiana field, took place August 1. Jacob Kolsen, manager of the Jackson Hill mines in Sullivan County, made the announcement. The reason assigned is the market opened to Indiana coal in the far Northwest heretofore covered by Ohio and West Virginia operators. Mr. Kolsen states that the demand is unprecedented.

INDIAN TERRITORY.

CHOCTAW NATION.

(From Our Special Correspondent.)

Great Western Coal and Coke Company.—The entire coal interests of Wm. Busby, at Alderson and Baker, the business of the Wilburton Coal and Mining Company, of Wilburton, and the 1/2 interest of the Samples Coal and Mining Company, of McAlester, have been succeeded by this company, with a capital stock of \$300,000, of which \$250,000 is paid up. The offices of the company will be at Parsons, Kan.; South McAlester, I. T., and Oklahoma City, O. T. The following are directors, all being equally interested: William Busby, J. F. Steele, C. H. Kimball, W. L. Bartlett and G. M. Allen. The new firm intends to develop the old interests, already extensive, and to purchase others. The business now comprises numerous mines, located at Alderson, Wilburton, Baker and McAlester, I. T., besides two large general stores, the sales agency of the Choctaw, Oklahoma & Gulf Mines, at Hartshorne, and of several other companies. Wm. Busby, the president, who began a few years ago with a small retail coal yard at Parsons, Kan., is now the most extensive operator in the territory.

LOUISIANA.

ARCADIA PARISH.

(From Our Special Correspondent.)

Jennings Oil Field.—Since the burning gusher was extinguished, drilling has been resumed by all the companies. The damage by the fire was about \$20,000. New tanks have been erected in place of the ones destroyed.

Northern Oil Company.—This company started drilling a new well on July 23. The Pelican Oil Company well, which is expected to enlarge the proven area very much, is down 1,300 ft.

CALCASIEU PARISH.

(From Our Special Correspondent.)

Anse La Butte Oil Field.—The A. Morisi Sons' Deep Well Company has found oil of good quality and the field looks promising. The well of the New Iberia Company has been started and others will start shortly.

National Sulphur Company.—This company, capital \$150,000, has been incorporated and will put down a well at Lake Charles at once. Other new companies are the Vinton Oil Syndicate, capital \$50,000, and the Vinton Oil and Sulphur Company, whose well is already down 300 ft.

MICHIGAN.

COPPER—HOUGHTON COUNTY.

Oscola.—Hoisting from No. 5 shaft has stopped. No. 6 shaft is supplying 600 tons of rock daily. It is reported that 14 machines have been taken off in the Kearsarge property. The annual report filed with the Houghton County clerk gives the names of 2,010 stockholders. President A. S. Bigelow is credited with 1,865 shares, G. M. Hyams 1,349 shares, J. Henry Brooks 1,456 shares and Paine, Webber & Co. 4,682 shares.

Quincy.—The July product was 11,016 tons of mineral.

(From Our Special Correspondent.)

Arcadian.—Work is confined to the Douglass shaft, which is producing 225 tons of rock daily. The shaft is down 875 ft. and sinking 50 ft. per month. Seventy-five men are employed. Diamond drill work continues.

Atlantic.—The extra head at the stamp mill will be closed for repairs as soon as released by the Champion. Repairs to No. 4 head are completed, and it is again in commission. F shaft will be reopened to permit the hoisting of broken ground, and then permanently closed.

Baltic.—The third head at the stamp mill is ready for service. It will treat rock from the Champion Mine, the output of which will be doubled, making 500 tons daily. The July production was 358 tons of mineral.

Franklin.—No. 1 shaft, at the Junior Branch, is now sinking to the 16th level. Thirty power drills are in commission.

Ile Royale.—Nearly 100 men have been discharged and work in No. 1 shaft is suspended. Two stamps at the mill are out of commission, and hereafter the daily output of rock will be only 500 tons, treated by a single head. The unsatisfactory condition of the copper market is blamed for the curtailment.

Quincy.—This mine is producing over 3,200 tons of rock daily—all that the stamp mills at Mason can stamp. No. 8 shaft, on the Mesnard property, is down to the 14th level, or 1,700 ft., and is producing 150 tons daily.

Wolverine.—The new stamp is practically completed. The old mill, with 1 stamp, will be dismantled and the machinery sold to the Phenix. The product for July was 275 tons of mineral.

COPPER—KEWEENAW COUNTY.

(From Our Special Correspondent.)

Ahmeck.—Exploration on this property, adjoining the Mohawk and carrying the Kearsarge amygdaloid lode, will start this summer.

Arnold.—A small party of miners is working at the Copper Falls property. Wesley Clark is superintendent.

Mohawk.—Work on the new stamp mill is rushed. The Nordberg Manufacturing Company, of Milwaukee, Wis., has shipped considerable machinery, and the remainder is expected soon. It is planned to have 2 heads in commission October 1. A shipment of 60 tons of mohawkite has been forwarded to the Balbach smelters, at Hackensack Meadows, N. J.

COPPER—ONTONAGON COUNTY.

(From Our Special Correspondent.)

Adventure.—This company has awarded a contract for the erection of 25 double dwelling houses at the mine location.

Mass.—This company's mill at Keweenaw Bay is running night shift only and treating 2,500 tons of rock each week. The coal dock now has a capacity for 25,000 tons.

MINNESOTA.

(From Our Special Correspondent.)

The iron ore shipment for July and the season to August 1 have been larger than ever before, amounting to these totals:

Roads.	1902.	1901.	1900.	1899.
Duluth, Missabe & Northern	902,064	659,352	684,171	545,842
Duluth & Iron Range	886,909	964,468	648,783	606,689
Great Northern Railway	595,000	430,000	277,518	192,672

Totals for July.....2,383,973 2,053,838 1,610,472 1,345,203

Season to Aug. 1....7,222,263 4,678,735 4,831,966 3,406,172

All the roads are very busy and will probably ship as heavily in August as in July

The Duluth, Missabe & Northern Road has ordered 10 225,000-lb. locomotives for delivery next spring and will duplicate the long train system in use on the Duluth & Iron Range.

L. W. Powell, who has been agent in Duluth for

the Oliver Iron Mining Company, has been made assistant to the president of the mines of the United States Steel Corporation, an advancement directly in line with his work. W. A. McGonagle, who has been assistant chief engineer of the Duluth & Iron Range road, has been made assistant to the president of the road, with direct charge of operations. Mr. Olcott's new duties give him no time for railroad management.

The county board of equalization has fixed the taxable values of all mines in St. Louis County at a trifle more than \$30,000,000. The only mines in the State outside of St. Louis County are the Arcturus, Holman and Diamond, none of which are shipping, and the Hawkins, which will be a shipper this year. These were assessed by the Itasca County board as follows: Hawkins, \$200,000; Arcturus, \$20,000; Holman, \$15,000; Diamond, \$14,000.

IRON—MESABI RANGE.

(From Our Special Correspondent.)

Cleveland Cliffs Company.—This company has taken an exploring lease on 160 acres in section 32, T. 57, R. 22, from the Itasca Mining Company for 25c. a ton and \$48,000 to be paid when the lease is called for. This land adjoins the Hawkins Mine of the Deering Harvester Company, now being opened, and comprises all the remaining lands of the Itasca Mining Company, except one lot of 80 acres now being explored. The Itasca Company had the Deering property.

Fayal.—This mine has shipped this year about 700,000 tons and will probably have no trouble in making the record set by the management.

Mesabi Central Land and Exploration Company.—This company's lands, comprising about 1,400 acres in T. 58, R. 18, and T. 58, R. 19, and the Kinney Mine of the Republic Iron and Steel Company, have been sold to E. H. Jennings and others of Pittsburg, Pa., for \$250,000. The mine has about 5,000,000 tons and is leased to the Republic Iron and Steel Company at 18c. a ton. The purchasers are supposed to act in the interest of the Republic Company. The unexplored lands are not supposed to be especially valuable.

Pettit.—This mine of the Republic Iron and Steel Company is shipping 230 tons a day. Water that has bothered the management from the beginning is under control. The mine makes 1,500 gal. of water a minute.

MISSOURI.

JASPER COUNTY.

(From Our Special Correspondent.)

Joplin Ore Market.—Zinc ore has fallen again. With the decrease in price came increased sales and there were not sufficient cars to take the shipments. The highest bid during the week was \$39 per ton at which price only 2 bins were sold. There are a large number of producers that are holding their ore for a further raise in price and consequently little high grade ore was sold. The price on an assay basis was reduced to \$35 per ton for 60 per cent. Compared with the corresponding week of 1901, the zinc shipment was greater by 1,422,760 lbs., the lead sales greater by 61,350 lbs., and the value greater by \$65,328. Compared with the corresponding 31 weeks of last year the sales of zinc were greater by 8,146,880 lbs. and the lead sales less by 2,558,540 and the value greater by \$812,842.

Following was the shipment from the various producing camps for the week ending August 2:

	Zinc, lbs.	Lead, lbs.	Value.
Joplin	2,821,560	479,420	62,460
Galena-Empire	1,109,180	82,420	18,647
Webb City-Carterville	2,632,070	460,280	53,890
Aurora	675,340	30,420	10,875
Spurgeon	75,670	25,710	1,525
Oronogo	324,840	40,070	6,815
Prosperity	271,750	36,660	5,971
Central City	81,600	6,440	1,360
Duenweg	713,830	91,820	13,362
Cave Springs	105,820	12,780	2,007
Neck-Alba	164,300	52,720	4,222
Zincite	190,910	3,210	3,513
Carthage	217,730	.....	3,920
Carl Junction	683,530	.....	13,671
Granby	432,000	57,000	6,170
Sherwood	61,770	.....	1,112
Wentworth	44,180	.....	751
Total	10,606,140	1,375,960	\$209,710
Total 31 weeks	320,724,930	38,329,240	\$5,545,514
Zinc value, week, \$176,156; lead, \$33,554; zinc value, 31 weeks, \$4,703,885; lead, \$841,629.			

ST. FRANCOIS COUNTY.

(From Our Special Correspondent.)

St. Francois Townsite and Milling Company.—This company has increased its capital from \$50,000 to \$100,000. Recent prospecting on its land with a diamond drill is said to have struck some very rich lead ore.

MONTANA.

BEAVERHEAD COUNTY.

Ajax.—This claim at the head of Big Hole River is owned by A. J. Noyes, of Wisdom, and J. E. Norse, of Dillon. A 5-stamp mill from the old Climax Mine is being hauled in.

GRANITE COUNTY.

Dorothy Gold Mining Company.—According to a local paper, a small force of men is at work on the

road leading to this company's property, near Granite, and machinery may be installed. The company has been much criticized for the statements made in advertisements in Eastern papers.

Montana Gold Mining Company.—This company is opening the Sunday Mine between Drumlummon and Phillipsburg near the Royal Gold Company's property. A tunnel has been driven 350 ft., from the face of which a winze is down 60 ft. The ore is said to run from \$50 to \$100 per ton in gold. A Huntington mill is used and gold bullion has been shipped for several months. Carl J. Smith, of Butte, is president of the company, and F. H. Pilling, treasurer.

MADISON COUNTY.

Red Bluff Mining Company.—This company is pushing work on its 100-ton mill near Red Bluff. It is intended to work the entire dump through the mill, during which time the mine will be pumped out and further developments will be made with the view to mining more ore.

Revenue.—This mine, near Norris, is to have a heavier hoist.

PARK COUNTY.

Cowles Mining Company.—This company reports that it is opening a group of parallel veins on the Boulder River, 65 miles from Big Timber. Several tunnels have been driven, the longest being in 800 ft. The ore averages about \$26 per ton. A 10-stamp mill is busy day and night. Additional stamps and a cyanide plant are contemplated. E. H. Cowles is general manager and L. T. Pockman assayer. The company is working the Hidden Treasure group 30 miles above contact.

Milwaukee-Montana Company.—This company, 5 miles northeast of Contact, has a 5-stamp mill busy. The vein is developed by 7 tunnels. The battery consists of 5 750-lb. stamps, operated by a Pelton wheel under a 70-ft. head. The mill has been running since early in June. Joe McNulty is in charge.

Standard Mining Company.—This company has a 5-stamp mill a mile southwest of Contact. A third tunnel is to be started which will develop the mine to a depth of 400 ft. The ore is transported to the mill by a gravity surface tramway. A Cammet concentrator handles the pulp from the battery. The tailings are all saved in a dam below the mill. The mill power is furnished by a standard, double nozzle, 4-ft. Pelton wheel, under a 105-ft. head. The water is conveyed to the penstock by a flume 800 ft. long. The ore is mostly free-milling quartz, a small amount of sulphide appearing on the lower level. C. R. Murdoch is in charge.

RAVALLI COUNTY.

Lent.—J. B. Stevens has secured a bond on this claim in Mineral Hill District for Duluth, Minn., men. During the last 15 years \$30,000 worth of work has been done on the Lent. The mine was bonded for \$75,000 10 years ago, but the deal fell through. Last year the former owners failed to do assessment and a Utah man jumped it.

SILVER BOW COUNTY.

Barnes-King Company.—This company at Kendall is completing the addition to its mill and will soon be able to double the output.

Kendall.—This mill is running to full capacity. The piping which carries the water supply from Warm Spring Creek has been repaired.

Kendall King.—Development on this property at Kendall is progressing. The shaft is down 35 ft.

Minnie Healey.—The State Supreme Court has decided the stay of injunction asked by A. F. Heinze's attorneys and the injunction will become effective when the Boston & Montana Company's required bond for \$300,000 is approved. About 450 men have been laid off in the mine.

Snow Bird.—The Supreme Court has handed down a decision in the suit of the Anaconda Copper Company against F. A. Heinze and the Montana Ore Purchasing Company, in which the plaintiff sought to recover title to this mine in Butte. The Supreme Court sustained the contention of the Anaconda Company and ordered a new trial. In the decision it is held that the lower court erred in refusing to allow the plaintiff to submit testimony in rebuttal.

NEVADA.

NYE COUNTY.

Fraction.—In the 270-ft. level of this mine at Tonopah rich gold and ruby silver ore is increasing. The rock breaker is now in operation.

Tonopah Company.—The main shaft is down 380 ft., and the cross-cut is in 450 ft. The amount of work done since January 1 altogether amounts to 3,600 ft.

PENNSYLVANIA.

ANTHRACITE COAL.

Coal Miners' Strike.—Murderous assaults and other acts of violence by striking miners in the anthracite

regions have continued during the week. A watchman at the Bliss colliery, near Nanticoke, was beaten to death on August 5. In and about Mahanoy the foreign element is very turbulent, workmen are stoned or fired upon from ambush, and non-union men are in constant danger when unprotected. At Shenandoah the presence of the militia has prevented more bloodshed. Meanwhile, though officials of the United Mine Workers continue to assert that the miners will win the strike, they have increasing difficulty in holding the men in line. The relief funds received are not distributed as cash, but orders are given on stores for necessary food, and thrifty, provident miners who have saved money are denied the aid given those who are without funds. A number of collieries have started mining. The list of collieries now at work, though with partial forces, includes the Pettebone, of the Delaware, Lackawanna & Western Company, near Wilkes-Barre, the Hutchins, owned by Hutchins & Co., near Wyoming, the Dickson, of the Delaware & Hudson Company, near Scranton; the Dusky Diamond of Reese & Davis, at Beaver Brook; the Oxford, of the People's Coal Company, at Scranton; the Cayuga, of the Delaware, Lackawanna & Western Company, near Scranton; the Nanticoke No. 7 of the Susquehanna Coal Company, at Nanticoke.

Mine Inspector Stein is reported to have said that it will take from 1 to 4 months after the strike is ended to get the mines in the district about Shenandoah in working order. Five mines are in such condition that they will be abandoned. These are the Kohinoor, Preston No. 3, Bear Run and East Bear Ridge, of the Reading Company, and the Lawrence Mine, belonging to the Snaefter estate. The loss from the closing of these mines Mr. Stein estimated at \$1,500,000. It also means a small army of men thrown out of employment. It will take 4 months to put the Hammond Mine in condition to work.

BITUMINOUS COAL.

Cambria and Somerset County men have purchased 3,000 acres of coal land in Somerset County from Josiah Way and William Hoover. The buyers include Horace R. Rose, H. M. Lowman, James N. McKee and Dr. George E. Conrad, of Johnstown. The amount involved is about \$200,000.

Rolling Mill Mine Explosion.—The coroner's jury which investigated the terrible explosion at this mine on July 10 returned a verdict that the explosion was caused by a person or persons to the jury unknown taking into room No. 2 of the 6th right heading, where gas was known to exist, open lamps and using the same in direct violation of the mining rules and regulations of the Cambria Steel Company.

Clearfield Bituminous Coal Company.—This company, through its trustee, Wm. D. Bigler, recently bought some 23,000 acres in Cherryhill, White, Green and Rayne townships, Indiana County, for a reported price of over \$900,000. This block of coal was the last of any great size remaining in the hands of farmers. It comprised 21 farms, the owners of which had agreed not to sell until the tract went as a whole, and at a fair price. It includes an unbroken strip about 2 miles wide and 6 miles long. The price secured ranges all the way from \$30 to \$50 per acre, the average being about \$40, which is considered a fair price in the thin vein field of this county.

SOUTH DAKOTA.

CUSTER COUNTY.

(From Our Special Correspondent.)

Grantz Mining Company.—Free milling ore is being sacked on the Aspen group for shipment to Denver. A contract has been let to H. Bostwick to cut 100,000 ft. of lumber for a shaft house, boarding house, and other improvements.

Pink Quartz.—Samuel Scott lately shipped a piece of rose quartz weighing 2,200 lbs. from the Pink Quartz Mine to Philadelphia. It was pink, purple and white, and is to be sawed into slabs and shipped to Paris for use in decorating. This is the largest piece ever shipped from the Black Hills.

LAWRENCE COUNTY.

(From Our Special Correspondent.)

Belt Development Company.—The northeast drift from the bottom of the 700-ft. shaft at Kirk is now in 800 ft.

Boston-South Dakota Company.—The mill in Black-tail Gulch has started 20 stamps and will be running 40 within a few weeks. Concentrating machinery and cyanide tanks are to be added. The ore is a quartz conglomerate, and carries from \$4 to \$8 the ton in gold, part of it being free. Titus Corkhill, ex-State Mine Inspector, is superintendent.

Columbus Consolidated Mining Company.—At the stockholders' meeting, at Denver, Colo., officers and directors were elected as follows: H. J. Mayham, of Denver, president; Otis E. Putnam, Worcester, Mass., vice-president; George D. Begole, Denver, secretary; Benjamin W. Carlow, Worcester, Mass., treasurer; these and A. M. Stevenson, Denver; Herbert S. Shaw, Denver; Asa Baldwin, Moses Thompson and Norma

T. Mason, Deadwood, and Sumner T. Wilbur, Worcester, Mass., directors. Moses Thompson is mine superintendent.

Homestake Mining Company.—The De Smet Mill, at Central City, has received a new main shaft, to replace the old one, which cracked some months ago, and the mill has started again. The machinery has all arrived for the 700-ton cyanide plant at Gayville to handle the tailings from the De Smet, Caledonia and Deadwood-Terra mills. The tanks are up, and the plant will start September 1.

Imperial Mining Company.—The Dividend Mine, at the base of Green Mountain and the Bertha Mine in Ruby Basin have been purchased. Ore is being mined at both places and shipped to the company's cyanide plant in Deadwood.

Pluma Mining Company.—The shaft is nearly 300 ft. deep and has passed through the ledge of ore into slate.

PENNINGTON COUNTY.

(From Our Special Correspondent.)

Empire State Mining Company.—J. B. Safford, who organized the company, and has been superintendent, has sold his stock, and another superintendent is expected. The 5-stamp mill is working steadily on the Golden Slipper.

Friday Gulch.—The showing of ore in the Sunbeam shaft has caused some activity. Harry Davis, Leo Atchison, Herbert Atchison, Samuel Boland and Robert Flynn, owners of adjoining property, have formed a syndicate for the development of their claims.

Ida Florence Mining Company.—T. R. Griffith, of Breckinridge, Colo., recently examined the mine, and the company is preparing to build a 40-stamp mill. The shaft may be sunk 350 ft. deeper.

Mount Aetna Mining Company.—Matthew Tailleux, superintendent, has begun work on the Lucky Boy group of claims. A shaft house is being erected and hoisting machinery is arriving.

Tycoon Mining Company.—The Ranger group of 12 claims, at Keystone, is being patented. The company may enlarge the present mill to 40 stamps.

TEXAS.

JEFFERSON COUNTY.

(From Our Special Correspondent.)

Baumont Oil Field.—July shipments show a big decline from June, both water and rail shipments were less; oil available for shipments at current prices is scarce and oil in tanks shows a decrease. Until more wells are pumped, new contracts are not sought and oil even for water shipments will be hard to get during August. Total July shipments were 875,000 bbls. Crude oil is quoted at 25c. f. o. b. Gladys.

Union Oil Refining and Fuel Company.—This company has let a contract for the construction of refinery buildings; work has already started.

UTAH.

(From Our Special Correspondent.)

Ore and Bullion Settlements.—During the week ending August 2 the banks report settlements on ore, bullion and gold bars as follows: Gold, silver, lead and copper ores, \$166,100; bullion from American smelters, \$118,800; gold bars, \$21,500.

BEAVER COUNTY.

(From Our Special Correspondent.)

Frisco Shipments.—The Horn Silver sent 5 cars of lead-silver ore to Salt Lake for the week ending August 2.

Ben Harrison.—Added equipment is to be installed in the plant at Milford to include an 80-h.p. boiler, a 6 by 8-in. hoist engine, a 10-h.p. upright engine, an exhaust blower and a 6-drill air compressor.

Black Diamond.—Under the management of J. Dederichs this property is to be explored. The incline is now down 180 ft.

Curzon.—Sulphides are showing at the bottom of a 75-ft. shaft.

BOX ELDER COUNTY.

(From Our Special Correspondent.)

Century.—The control of this property has passed to P. W. Madsen, by purchase of about 17,000 shares besides those he already held. Mr. Madsen is quoted as saying the output for July would be near \$7,000, of which \$6,000 would be in gold bars and \$1,000 in concentrates.

JUAR COUNTY.

(From Our Special Correspondent.)

Tintic Shipments.—For the week ending August 2 the following consignments were sent to the samplers at Salt Lake: Carisa, 7 cars ore; Eagle & Bluebell, 2 cars ore; Mammoth, 13 cars ore; Gemini, 10 cars ore; May Day, 2 cars concentrates; Eureka-Hill, 6 cars ore; Rabbit's Foot, 1 car ore; Jensen & Milo, 1 car ore; Grand Central, 9 cars ore; Lower Mammoth, 5 cars ore; Ajaz, 1 car ore; Uncle Sam, 4 cars ore;

Yankee Consolidated, 6 cars ore; South Swansea, 4 cars ore; Bullion-Beck, 2 cars ore; Alaska, 1 car ore.

Bullion-Beck vs. Gemini.—The litigation in progress before P. L. Williams as referee has been settled out of court. The Gemini will pay the Bullion-Beck \$30,000 and dismiss its counter claims. It is said that through a mistake in the survey each had been extracting ore from the ground of the other.

Eagle & Blue Bell.—From the new strike 30½ tons of ore brought an average of \$82.97 per ton. The drill passed through 70 ft. of ore, of which 15 ft. was shipping and the rest low grade or milling ore. It is said this find makes the Eagle & Blue Bell one of the best low grade properties in Tintic District.

Grand Central.—It is stated the management will construct a tramway about 1 mile long from the mine to the railroad to have a capacity of nearly 100 tons daily.

SALT LAKE COUNTY.

American Smelting and Refining Company Smelter.—Three of the furnaces at the new plant are in commission, and the Germania has 4 furnaces in blast. More than 1,000 tons of ore are now being reduced to bullion every 24 hours.

United States Mining Company.—Switches are being laid from the railroad tracks to the smelter yard, and as soon as the lines to the bins are built ores will be shipped from the company's mines at Tintic and Bingham. The company will use its own ore cars. They will be of large size, with automatic dump. The tramway connecting the Bingham mines of the company with the loading station on the Rio Grande Western tracks in Bingham Canyon is expected to be finished in a few weeks.

(From Our Special Correspondent.)

Alta Shipments.—For week ending August 2, the City Rock shipped 1 car ore; Columbus, 1 car, and the Dipper, at the mouth of Big Cottonwood Canyon, 1 car of gold ore.

Bingham Shipments.—For the week ending August 1 shipments to the samplers in the valley were: Niagara, 2 cars ore; Sampson, 2 cars ore; New England, 2 cars ore; Neptune, 7 cars ore; Meuirbrook, 1 car ore.

Bingham Copper and Gold Company.—The shipments from the smelter for the week ending August 2 were about 180,000 lbs. of copper bullion.

Red Wing.—This property will resume work with the proceeds of an assessment now being collected.

Utah Consolidated.—The usual consignment of 3 cars of bullion went to the Eastern refineries during the week closing August 2—approximately 180,000 lbs. of bullion.

SUMMIT COUNTY.

(From Our Special Correspondent.)

Park City Shipments.—For the week ending August 2 the output from this camp and its mines was as follows: Ontario, 990,150 lbs. ore; Daly West, 2,820,750 lbs. ore; Anchor, 431,100 lbs. ore; Silver King, 1,375,480 lbs. ore.

Comstock.—After sinking 300 ft. the owners have struck galena in the shaft.

Daly West.—This company has gained the good will of the miners by its efforts to aid the families of those killed in the recent disaster and probably not one lawsuit will be brought. Many settlements have already been closed. Not only are the claims of the miners' families being honored, but those of relatives of men who lost their lives as rescuers, although not employed by the company. It is stated from Park City that \$1,000 is given to the family of each single man; widows receive \$2,000 and each child is paid \$500.

TOOELE COUNTY.

(From Our Special Correspondent.)

Fish Springs Shipments.—The Utah in the week closing August 2 shipped 2 cars of high grade lead-silver ore to the Taylor & Brunton sampler.

Stockton Shipments.—For the week ending August 2 shipments were: Mono, 1 car ore; Ophir Hill, 10 cars concentrates; Galena King, 1 car ore.

Honerine.—The shaft-house, boiler-house and shaft timbers to a depth of 100 ft. have been destroyed by fire and the 4 100-h.p. engines are out of commission. The origin of the fire is unknown. The machinery had not been running for several weeks. It is understood that another plant will be erected. The loss was covered by insurance.

WASATCH COUNTY.

(From Our Special Correspondent.)

Elaterite Mines.—J. T. McConnell, Western manager of the Florence and Raven mining companies, has gone to the mines about 35 miles northeast of Colton, where about 40 men are mining and developing the veins of elaterite on leased ground. Mr. McConnell says the demand is far in excess of the supply.

WASHINGTON.

FERRY COUNTY.

(From Our Special Correspondent.)

Lone Pine-Surprise.—In the northeast drift, on the No. 2 Lone Pine vein, upper level, 3 men are stopping ore 4 ft. wide; on the lower level 3 men are stopping ore 12 ft. wide.

Morning Glory.—A streak of good ore 1 ft. wide is reported cut on the adit level.

Republic & Kettle River Railway.—The road is ballasted 10 miles north of Republic, and the balance is being finished. Rails are being laid up Eureka Gulch, and the spurs to the mines are being completed.

Silver Dollar.—The gallows frame is up and machinery is being installed comprising a 50 h. p. tubular boiler, a 6 by 8 in. double cylinder, hoist good for 600 ft., a Worthington 5 1/4 by 3 1/2 by 5 sinking pump, a Moore 4 by 2 1/2 by 4 steam supply pump, to draw water from Mud Lake, and a feed pump.

Tom Thumb.—The Washington & Great Northern Railroad has rails to this mine, and the mine superintendent is awaiting orders.

Washington & Great Northern Railway.—It will take about 2 weeks to finish ballasting the road, but passengers leaving Spokane at 8:30 a. m. arrive in Republic in the evening of the same day. The track has been laid to the Tom Thumb Mine—the most distant point—and on the spur to the Mountain Lion Mine. Track laying on all the other spurs will be finished in about a week. The company will take special lots of 100 or 200 tons to the end of its road at any time, but will not run regular ore trains until the road is turned over to the operating department.

WEST VIRGINIA.

MINERAL COUNTY.

Blaine Mining Company.—This company has completed its organization. The company will develop 1,000 acres of coal, owned and leased near Blaine, on the West Virginia Central Railroad. Mines already opened for the company have an output of 500 tons a day. T. B. Davis, Jr., is president; C. E. Smith, secretary, and W. X. Young, treasurer. Headquarters will be at Davis.

FOREIGN MINING NEWS.

AFRICA.

NATAL.

The Mines Department reports 56,527 tons coal mined in May, against 48,740 tons in May, 1901. The total number of persons employed at coal mines during the month was 198 whites, 1,922 negroes and 1,926 East Indians; 4,046 in all. The coal exported in May was 111 tons; sold to steamers at Durban, 19,639 tons.

TRANSVAAL.

A cable dispatch gives the output of the Witwatersrand Mines in July at 155,000 oz. fine gold. This makes a total for the seven months ending July 31 of \$11,864 oz., or \$16,781,229. In 1900 the operation of the mines began in May, and the total production to July 31 was 53,216 oz., or \$1,099,975.

ASIA.

INDIA—MYSORE.

(From Our Special Correspondent.)

Some time ago I reported that the gold mines in the Kolar District of Mysore, India, were to receive power from the Cauvery Falls some 90 miles distant, where the Government was erecting an electric installation. This installation is now in partial operation, and the Mysore and Champion Reef companies are obtaining a supply of power from this source. In a short time all the companies will be fully supplied. The question of fuel supply has always been a serious one in this mining district, and the prices charged for electric power by the Mysore Government is considerably less than the cost of power supplied by boilers and engines. Another advantage is that the amount of labor required is much reduced. In fact, native labor will not be required in the milling department, with the consequence that operations will not have to be suspended during plague scares. Altogether, considerable advantage will accrue to the companies, and shareholders are much gratified with their prospects. It should be noted that this electric installation has been built by the General Electric Company, of the United States, its tender having been much lower and the guaranteed time of erection being much less than any English firm could offer.

AUSTRALIA.

WESTERN AUSTRALIA.

The gold output for June is reported at 189,621 oz. crude, an increase of 27,654 oz. over June, 1901. For the six months ending June 30 the total was 1,035,626 oz. crude, against 858,113 oz. for the first half of 1901, an increase of 177,513 oz., or 20.7 per cent. The total this year was equal, approximately, to 923,063 oz. fine gold, or \$19,079,712.

CANADA.

BRITISH COLUMBIA—BOUNDARY DISTRICT.

Boundary Ore Shipments.—Owing to the continued shortage of coke, ore shipments are still comparatively small. No ore is going to or is being treated at either the Mother Lode or the Sunset smelters. The record for the week ending August 1 shows 7,900 tons sent out and treated, as follows: Granby Mines 7,280 tons, Emma, 357 tons; Jewel, 263 tons. The total for the year aggregates 186,744 tons. The outlook for the coke supply for the smelters is not encouraging, but the Granby Smelter is said to have yet a 10 days' supply on hand.

Rambler-Cariboo.—At the annual meeting of shareholders upwards of 90,000 shares of stock were represented. The old board of directors was re-elected excepting C. Kapps, in whose place M. Connel, of Colfax, was elected. A complete report of the past year's operations was made by Manager W. A. Adams. Much new development work is contemplated. The concentrator and new machinery is giving good satisfaction and the manager reported large ore reserves. J. D. Chaplin, of St. Catharines, Ont., one of the largest shareholders, was at the meeting.

BRITISH COLUMBIA—CARIBOO DISTRICT.

Consolidated Cariboo.—At this company's property, at Bullion, piping is about over for the season owing to the light snowfall last winter and scanty rains in the spring. The bedrock cut has been driven 900 ft.

Onward Company.—This company, on Keithley Creek, 20 miles from Barkerville, is reported to have broken into the old hill channel. Veith & Borland are the owners. The gravel is said to run \$2.50 to the pan.

Pride of the Lake.—This property, on Quesnel Lake, is owned by Birrell, McRae & Winkley, of Quesnel Forks. Four men have been employed ground sluicing this season with good results. A hydraulic plant will be put in next year.

BRITISH COLUMBIA—LARDEAU DISTRICT.

Northwestern Development Company.—A gold brick weighing 26 oz. has been received from the Granite Mill, where a trial shipment of 12 tons of ore from the Camborne claim. The company is installing a 10-stamp mill, a saw-mill, a tramway and complete electrical equipment.

BRITISH COLUMBIA—SLOCAN DISTRICT.

Slocan Ore Shipments.—The total amount of ore shipped from the Slocan and Slocan City mining divisions for the year 1901 was approximately 30,000 tons, says the *New Denver Ledger*. Since January 1 to July 26, 1902, the shipments have been as follows:

	Week.	Total.
Payne	40	670
Ivanhoe	22	295
Sunset (Jackson Basin)	22	683
Reco	22	322
American Boy	22	556
Arlington	70	2,360
Hewett	20	720
Bosun	20	690
Last Chance	20	150
Wonderful	20	151
Enterprise	140	1,000
Lavina	85	85
Bismarck	22	22
Queen Bess	22	160
Silver Glance	22	37
Whitewater	40	2,533
Ottawa	20	8
Capella	20	20
Fourth of July	11	11
Trade Dollar	20	20
Slocan Boy	22	44
Neepawa	22	81
Hartney	22	25
Marion	22	80
May	5	5
Paystreak	7	7
Surprise	22	22
Monitor (for June)	22	645
Slocan Star	22	528
Duplex	7	7
Emily Edith	20	20
Wakefield	40	40
Prescott	4	4
Rambler	224	2,484
Molly Gibson (since last report)	22	1,500
Washington	30	30
Follott	2	2
C. O. D.	2	2
London Hill	15	15
Ruth	80	246
Total tons	707	16,791

MINING STOCKS.

(Complete quotations will be found on pages 205 and 206.)

New York.

Aug. 7.

The stock market has not been at all interesting this week. Amalgamated Copper has shown few fluctuations and those between narrow limits; it sold up to \$67 1/2, and closes at \$66 1/4. The copper shares dealt in on curb were not strong. British Columbia is quoted \$6 1/2 @ \$7 1/2; Gold Hill, \$1 @ \$1 1/4; Greene Consolidated, \$27 1/4 @ \$27 3/4. Some sales of United Copper were made at \$34 1/2 @ \$35.

Very little was done in the Cripple Creek stocks and

prices showed little change. The Comstocks were also very quiet, and were generally weaker.

The Standard Oil Company made a notable cut in its quarterly dividend, payable in September. It was announced on Tuesday that the dividend would be \$5 per share only, or 5 per cent., as against 10 per cent for the June quarter and 20 per cent in March. The dividend declared a year ago was 8 per cent. The September dividend will make 35 per cent for nine months of 1902, against 48 per cent for the full year 1901. The immediate effect was to send the stock down from \$687 to \$660, from which it recovered to \$670, at the close. On Wednesday, however, it dropped to \$650, closing at \$660.

Virginia Coal and Coke attained some prominence during the week. On Tuesday 2,500 shares were sold at 12 1/2 up to 14 1/2, while \$80,000 of the company's bonds were sold at 63 1/2 @ 65.

Boston.

Aug. 6.

(From Our Special Correspondent.)

It would seem as if all the recent talk about a coming advance in copper shares was the outgrowth of a desire rather than because there has been any real improvement in the situation. It did look a week or 10 days ago as if an effort was being made to create an interest by putting some life into the market, but what improvement was effected in prices has been undone.

The closing down of a shaft at each of the Osceola and Isle Royale mines and a part of the stamps at the mills had a dampening effect on holders of copper shares and certainly does not tend to bring any fresh interest into the market. Calumet & Hecla is selling at its lowest price for almost three months—\$535 per share, ex the \$5 dividend. Tamarack has lost \$5 to \$170. Calumet's recent annual report has undoubtedly caused some selling of the stock. The Amalgamated holdings of Calumet & Hecla are larger than is generally accredited. It is known that a large block of the stock was taken over recently from an estate by Amalgamated interests.

Dominion Iron and Steel has been just as erratic as ever. It broke \$5.37 1/2 during the week to \$61.50, and rallied again to \$68.25, closing at the latter price to-night. Dominion Coal has stiffened to \$139.50. Some comment has been made because the latter's dividend has not been forthcoming. Buying of Dominion Iron and Steel has been caused by rumors that the Nova Scotia Iron and Steel Company will be taken over and all its interests—coal and steel—be amalgamated on the basis of \$150 for Dominion Coal and \$75 for Dominion Iron and Steel.

A \$4 drop was recorded in Atlantic Mining to \$26, on the report that the rock is again running lean. Osceola broke \$3 to \$57, on the announcement that No. 5 shaft had been closed down and a large number of men discharged. Isle Royale broke \$2.12 1/2 to \$11.62 1/2, when it was announced that 100 men would be discharged as a result of the low price for copper and the small profit in mining. Wolverine fell \$4 to \$56 when it was shown in the annual report that the surplus had been cut down materially. United Copper holds well around \$35, but it is remarked that new bidders are noticed for the stock.

Daly West improved \$2.62 1/2 to \$54. Notwithstanding the recent disaster the company will pay a 60c. dividend this month, calling for \$108,000. Settlements are being made fast with the families of the miners who lost their lives. Mohawk stiffened to \$46, but reacted to \$44.50. Mass closed at \$17 to-night. Shannon dropped \$2.25 to \$10.50 on limited business, and Centennial fell \$2.50 to \$17.50, but recovered to \$19 again. Bingham settled \$1.50 to \$33.50, and Utah settled to \$20.12 1/2. Copper Range Consolidated has lost almost \$3 to \$57.

A party of local gentlemen have purchased the Bolanitos gold and silver mines in the Guanajuato District of Mexico and will form a \$5,000,000 company. Some deal will be made with the Cochiti people for their cyanide mill. Cochiti stockholders may be given favorable terms in stock of the new company.

Colorado Springs.

Aug. 1.

The mining market developed considerable strength this week, especially during the last two days. This has manifested itself not so much in marked advances in prices as in a general improvement in buying. The trading in Elkton during the past seven days has been quite heavy, and presumably some one is acquiring a considerable portion of the capital stock of this company, to the bewilderment of the inside clique, which is as much in the dark as the general public. The first heavy buying developed Tuesday, when 22,500 shares changed hands at from 33 to 34c. Heavy offerings of stock did not succeed in breaking the price. During the next two days 15,500 shares additional were taken in at from 33 1/2c. to 34 3/4c., the price still holding strong. The stock closed to-day at 34 @ 34 1/2c.

El Paso was strong during the week, and advanced from 50c. to 52 1/2c., selling to-day at 52 1/4c. @ 52 1/2c. As the time of reopening the deep workings approaches—September 10—considerable buying in these shares is developing. The new \$50,000 surface equipment is on the ground and is being installed as rapidly

as possible. The equipment includes several pumps capable of lifting 3,000 gallons of water a minute.

Isabella developed considerable strength during the last two days, 7,500 shares selling at 25%@26c. The stock dropped back to 25% to-day, with but little demand. Gold Dollar Consolidated attracted some attention this week on account of the comparatively heavy trading, something like 25,000 shares changing hands at 3% and 3%.

Portland sold from \$1.80 down to \$1.78 and back to \$1.80 during the week. The Sloan Filter Company, owners of the Sloan patent, employed by the Portland mill, at Colorado City, commenced suit this week in the Federal Court at Denver against the Portland company. This action has already been discounted as far as the stock market is concerned.

Salt Lake City. Aug. 7.

(From Our Special Correspondent.)

The situation on the Exchange shows no great advances nor declines. Prices have held up to those of last week, and if the hot weather will let up it is said the advances will be retained. There is a general feeling that the tide has turned toward higher prices in the fall and that evidence of it is in the steady rise of the low priced stocks. This week's run of stocks was larger by 40,000 shares than last week. Daly-West stands steady at \$51@53.70; Daly-Judge, at \$11.50 to \$11.92½ with sales of 2,995 shares. Of the Tintic producers May Day put out 33,050 shares at 24%@20¼c., while South Swansea sold 4,100 shares at 25%@24c. California sold 40,950 shares at 32c., down to 19% c. Century advanced to 64c., from 43c. at the opening, selling 20,598 shares, due probably to the fact the control has passed to the hands of one man and he the present president. Ontario sold 515 shares at \$8.40@8.15.

The Exchange closes with the transfer of 162,655 shares for the week.

San Francisco. Aug. 2.

(From Our Special Correspondent.)

The market opened dull and rather weak. Later prices stiffened somewhat, and a little demand developed, especially for the Gold Hill stocks.

Consolidated California & Virginia was quoted at \$1.25@1.30; Ophir, \$1.25; Caledonia, 96@98c.; Mexican, 52c.; Challenge, 21c.; Potosi, 18c.; Chollar, 9@10c.

On the Oil Exchange business was rather quiet and sales only moderate. Some quotations noted are: Peerless, \$8.50; Kern, \$4.20; Sterling, \$1.40@1.45; Monte Cristo, \$1.25; Junction, 16c. The heaviest trading was in Junction and Monte Cristo.

London. July 26.

(From Our Special Correspondent.)

The London mining market has been very depressed all week, and prices have fallen all round, owing to the absence of support. The South African section has suffered considerably from the circulation of pessimistic reports by certain news companies as to the general state of affairs in the Transvaal. Succeeding days have seen the publication of statements relating to lawlessness on the Rand, scarcity of labor, rebellions of Basuto tribes, and disaffection among the Dutch population. The fact is, it is very difficult to obtain reliable news as to the progress of events in South Africa since the war ended. The special newspaper correspondents have mostly left the country, and no official reports are made, as when the war was going on. The mining companies also find difficulty in obtaining information as to things in general, and it is not easy to collate or even reconcile their various reports. The market is therefore very uncertain and inclined to drop.

The West Australian market is again suffering from bear attacks, and "banging" goes on freely. The markets are to some extent supported by the issuing houses, so that prices do not fall seriously. The general public and the shareholders do not seem to take any interest in affairs, so that the market is in very few hands. In other sections of the mining market things are equally gloomy; there is little chance of any revival at present.

El Oro Mining Company, owning the mine of that name in Mexico, has decided to acquire the adjoining property, named Somera No. 1. This property is expected to contain the continuation at depth of El Oro vein, and the owners have been squeezing the company for all they are worth. An option was taken on the property by the company, but the time allowed was found insufficient to test it completely. The owners would not renew the option, so the company had to chance it and purchase it for \$125,000 in cash. To raise the necessary funds the capital of the company has been increased from £1,000,000 to £1,150,000. At the present time 100,000 of the new shares will be offered to shareholders at £1 5s. each, and the remaining additional capital will be issued later to provide extra machinery and plant. The company has paid since its formation in July, 1899, 4 dividends of 1s., 1s., 1s. 3d. and 1s. 6d., respectively, and with the new 100-stamp mill and cyanide plant recently started the returns may be expected to increase.

Nobody nowadays cares to introduce new mining propositions to the British public, and it is quite a while since a new prospectus has been published. This week, however, the public have been invited to subscribe to the Welcome Hill (Moel y Groesau) Mines, Limited, which has been formed to acquire gold mines in Merionethshire, North Wales. These mines are a few miles north of the St. David's mines, which have been active producers for a year or more, and not far from the Llanuwchllyn mines, which were worked some years ago. As in most mines in Wales, the average grade is not high, and here and there are rich patches encouraging the miner to go on. The present issue will not be largely applied for by the public, but by means of underwriting the necessary working capital will no doubt be obtained.

COAL TRADE REVIEW.

New York. Aug. 8.

ANTHRACITE.

Seven collieries are now reported preparing coal for market, while some 20 washeries are shipping a considerable tonnage of the steam sizes. Everything indicates that in spite of the claims of labor leaders, the idle men who are receiving no aid from their union will not stand by and watch other men get good wages. There may be further bloodshed and more troops may be called out, but the number of men returning to work is bound to increase. Supplies of anthracite all over the country are getting low, and the public is anxious to see mining resumed. Much of the alarm shown by uninformed writers in the daily press is, however, groundless. It can be asserted on the best authority that the companies as they resume mining will charge the regular winter rates for coal after September 1, as per schedule, and if retail prices are higher than last winter it will not be because of higher wholesale prices. There is no need of consumers in the East getting excited yet. In past years October has come without winter buying being strong. In the West the situation is different. One or two roads will doubtless make special efforts to get coal up the lakes, since they get good returns on the traffic, but there is bound to be a marked shortage of anthracite at the docks at upper lake points when navigation closes.

At Duluth some docks are bare of anthracite, and others have but very little. No coal is for sale except for consumption nearby, and rail orders are rejected. At Mississippi and Missouri River points dealers are trying to get Colorado anthracite, the price of which has been advanced 75c. per ton by the principal producers. It is said that orders from points east of the Mississippi have been received for Colorado anthracite, but that producers have made no attempts to fill these orders, fearing interference by the miners' union. Arkansas semi-anthracite will be in demand. At Kansas City domestic sizes of Pennsylvania anthracite are retailing at \$9.50@10 per ton. In Chicago territory supplies are getting low, while the demand is increasing, and the trade is preparing to depend largely on all-rail shipments for the winter's needs. Some wholesalers have closed their yards, others occasionally sell a little. Prices were advanced August 1 10c. per ton, making the price for domestic sizes \$7.15 delivered. An extra advance before long is expected by some. The amount of anthracite received at Milwaukee during the past 2 months is not over 6,000 tons, and a rise in prices is possible. Along the lower lakes and in Canada territory, trade is light, as sales are restricted. Importations of Welsh anthracite are talked of at Montreal. At Toronto dealers have advanced the price of domestic sizes 50c. to \$7 per ton. In the all-rail trade and along the Atlantic seaboard there are wide variations in the amount of coal in stock at different cities and the distribution of sizes. In general the territory near New York City has been pretty well stripped of broken size, and egg is scarce, while stove and chestnut are in better supply; at points east of New York there are more of the larger sizes, while chestnut is scarce. Retail dealers are advancing prices as supplies grow low, and an uneasiness over winter supplies is growing. The following retail prices are noted: Albany, \$6; Amsterdam, N. Y., \$7; Utica, \$6.50; Poughkeepsie, \$6; Pittsfield, Mass., \$7.50; Springfield, \$8@8.50; Worcester, \$8.50; Holyoke, \$9; Northampton, Mass., \$7.50@8; Lowell, \$7.50; Newburyport, \$8; Brockton, Mass., \$8.75; Portland, Biddeford and Saco, Me., \$8; Manchester, N. H., \$9; Middletown, Conn., \$8; Hoboken and Newark, N. J., and New York City, \$8; Reading, Pa., \$8@8.9; Orange, N. J., \$6.50@7; Plainfield, N. J., \$7; Baltimore, Md., \$7.50; Philadelphia, \$7.75. Coal has been offered at these prices alongside New York Harbor points: Stove, \$8.45; chestnut, \$8.35; pea, \$7; No. 2 buckwheat, \$4.40; No. 3 buckwheat, \$4.25, and pea and dust, \$3.60, with no quotation on egg or broken.

The amount of anthracite reserved by the Reading system for its own use was reported to be 165,000 tons on August 1. The report that the Lehigh Valley and Reading are releasing coal is denied. Some washery

coal is arriving at New York Harbor and Philadelphia direct from the mines.

BITUMINOUS.

The Atlantic seaboard bituminous trade continues very active. Receipts of coal at tidewater shipping ports during the week have been pretty liberal, and the speculative market is inclined to be weak at \$3.05@3.25 f. o. b. New York Harbor shipping ports, but from present indications are not likely to go much lower. Producers are trying their best to get their contracts well in hand, and in some cases have gone forward nearly all the coal called for to April 1 next. This is particularly true of contracts with consumers at the shoal water ports beyond Cape Cod.

The labor situation at the mines shows no change, except for the increasing number of men returning to work. In the Pocahontas field more men are busy than at any time since the strike started. In the New River and Kanawha fields the validity of certain injunction orders issued by Federal judges has been sustained, and the labor leaders are not as aggressive as they were. The strike there is liable to last some weeks yet.

Demand at points beyond Cape Cod is good, and producers are getting a good tonnage forward, though supplies in the hands of consumers are believed to be liberal. Along Long Island Sound demand is heavy, but the market is quieter than a few weeks ago. Consumers at New York Harbor points who give sufficient notice have little trouble in getting all the coal they need. Demand in the all-rail trade is strong, and producers are giving more attention to it.

Transportation from mines to tidewater is inclined to be slow. Car supply is fairly good. We quote freight rates from Philadelphia as follows: Boston, Salem and Portland, 70c.; Providence, New Bedford and Long Island Sound, 60c.

NOTES OF THE WEEK.

The Pennsylvania Railroad Company reports the coal traffic, originating on its lines east of Pittsburgh and Erie, for the 7 months ending August 1 as follows, in short tons:

	1901.	1902.	Changes.
Anthracite coal.....	2,775,202	1,612,659	D. 1,162,543
Bituminous coal.....	11,680,349	14,988,183	I. 3,278,834
Coke	4,790,450	5,725,008	I. 934,618

Totals19,255,001 22,305,910 I. 3,050,909

The large gain in bituminous coal more than made up the loss in anthracite tonnage.

Birmingham. Aug. 4.

(From Our Special Correspondent.)

There are still some minor differences at several places in this State, and all the coal miners are not back at work yet. It is estimated that between 500 and 1,000 miners at various places are idle and are receiving support from those miners who have gone back to work under the new contract. With the exception of two places, the differences are about mining rules, and there are indications that a settlement will be arrived at shortly.

Thirty-two miners belonging to the United Mine Workers of America, employed at the Pocahontas Mine, in Walker County, have been removed to the mines at Coalburg, in Jefferson County, to work for the Sloss-Sheffield Company. The company operating the Pocahontas Mine could not agree on a contract with the miners, and the United Mine Workers were removed in a body. The convict miners at Coalburg are being removed rapidly to Flat Top Mountain Mines, in Walker County.

Chicago. Aug. 5.

(From Our Special Correspondent.)

Dullness has characterized the wholesale market for bituminous coals in the week ending to-day. There is still a surplus of the lower grade products of Indiana and Illinois mines. Conservative dealers who did not load their yards with large stocks, anticipatory of a strike at the bituminous mines, report a fair and steady trade, especially in the better grades.

Smokeless lump and egg has advanced 25c. a ton for Pocahontas, the new price being \$3.75; smokeless New River lump and egg is still \$3.50; smokeless nut remains at \$3.25, and smokeless run-of-mine has dropped 10c. to \$3. Indiana semi-block has also declined 10c., being now \$2; other grades are unchanged from last week: Clinton lump, \$1.80@1.90; Indiana block, \$2.55; Indiana lump, \$1.85@1.95; Northern and Central Illinois run-of-mine, \$1.80@2; Southern Illinois run-of-mine, \$2@2.20; blacksmith's coal, \$3.35; Hocking, \$3 for city and \$3.20 for country deliveries; Youghiogheny, \$3.30.

Anthracite has nominally advanced 10c. with the beginning of August, and is now quoted at \$5.90. There is, of course, practically no sale, with no coal coming from the mines and the city stocks almost exhausted. Retailers are making what little profit there is in selling anthracite, their present price being \$7.05.

Cleveland. Aug. 6.

(From Our Special Correspondent.)

Shippers of coal by the lake routes have reported during the last few days that their supply of coal has

been temporarily better than it was during the major portion of last week. Last week, however, was an exceptional one for light receipts at the lake ports. The supply fell below 50 per cent of the requirements of the shippers, and it began to look as if the season's movement was hopelessly off. The sudden spurt at the beginning of this week has been somewhat encouraging, but few of the shippers have any hope that it will last. In fact, the trouble seems to be with the railroads, which have cars enough, but it is increasingly notable that the engines are not adequate to the growing needs of the railroads. It seems entirely possible that the coal shippers will be far behind their movement at the end of the year unless some material change comes in the conditions between this and December. The supply of boats for the movement up the lakes has been extraordinary during the week, and the shippers have had an abundance of tonnage to move any amount of coal which they could get to the ports. The domestic demand has been sharp, especially from the manufacturing concerns. Coke is a little scarce just now, transportation facilities being responsible.

Pittsburg. Aug. 6.

(From Our Special Correspondent.)

Coal.—The coal output from the Pittsburg District never was heavier, the only disturbing feature during the week being a shortage of motive power. Although there was a sufficient number of railroad cars on the Wheeling division of the Baltimore & Ohio Railroad, the eight mines were closed as the cars could not be moved. Like conditions prevailed all over the district. By hard work on Sunday the congestion was relieved and all the mines are again in full operation. It is announced that the Pittsburg Coal Company, the railroad coal combination, will increase its production this year by fully 4,000,000 tons. There have been an unusual number of inquiries for coal this week, and prices on all new business have advanced 20c. a ton over the circular rates. The official figures given from the Davis Island dam show that the five rises in July made that month the greatest in the history of shipments from Pittsburg to Southern ports. In addition to 1,081,690 tons of coal sent out by the Monongahela River Consolidated Coal and Coke Company and independent concerns, there were shipped 29,100 tons of iron products in barges and 5,875 tons in packets. The harbor is crowded with empty coal boats and barges, and the river miners are assured of steady employment for several months. There is but enough coal loaded to supply the local trade. The Blaine Coal Company, a new independent company, was chartered at Harrisburg on Monday. The capital is put at \$100,000, but this is merely nominal. The company has secured a valuable tract of 1,200 acres of coal land in the third pool of the Monongahela River, which it will develop at once. The new mine is expected to produce 2,500 tons of coal a day.

Connellsville Coke.—There was a slight gain in production but no improvement in transportation facilities, and prices are firmer than the previous week. From \$3.50 to \$4 is asked for furnace coke, but there is little to be had for prompt shipment. For Eastern shipment the price this week ranges from \$4 to \$4.25 a ton at the ovens for furnace coke. The production, according to the weekly report in the last issue of the *Courier* was 249,615 tons. The shipments for the week aggregated 11,777 cars, distributed as follows: To Pittsburg and river tipples, 3,693 cars; to points west of Pittsburg, 5,591 cars; to points east of Connellsville, 2,493 cars. This was a decrease of 285 cars compared with the shipments of the previous week.

San Francisco. August 2.

(Special Report of J. W. Harrison.)

During the week there have been the following coal arrivals: One from Oregon, 550 tons; one from Washington, 2,600 tons; one from British Columbia, 5,068 tons; two from Australia, 4,611 tons; one from Baltimore, 3,700 tons; total, 16,529 tons. The quantity arriving this week will be about equal to our present consumption. Footing up the arrivals for the month of July this year, as against the coal arrivals for the same months of 1901, we find that there has been about 8,000 tons more coal entered the port of San Francisco this year than last. It would be generally supposed on account of the large quantity of fuel oil which is displacing coal, that the quantity of coal consumed this year would be considerably less than last. It shows plainly that our manufacturing interests are doing a very much more extensive business, and have a most encouraging outlook for the future. There have been 14 coal arrivals from Australia during the past month, which leaves only 17 on the chartered list of coal carriers. This is the smallest quantity that has been on the loading list for a considerable time, and as there is a reported advance on coal freights from the Colonies, the chances are that not many new names will be added to the list for several months. Business in the fuel line is reported fairly good, although the ruling prices leave but small profits to importers.

Prices.—Our special correspondent reports prices

for Coast coals to dealers as follows: Wellington and Southfield, \$8; Roslyn, \$7; Seattle and Bryant, \$6.50; Coos Bay, \$5.50; White Ash, \$5. For Rocky Mountain coals, large lots, quotations are: Castle Gate, Clear Creek, Rock Springs or Sunnyside, \$8.50; Colorado anthracite, \$14. For Eastern and foreign coals, cargo lots, prices are: Pennsylvania anthracite, \$14; Cumberland, \$12; Welsh anthracite, \$13; cannel, \$11.50; Brymbo, \$7.50; Wallsend, \$7.

Foreign Coal Trade. Aug. 7.

Export trade continues very quiet, and little new business is looked for until the home market is quieted by some settlement of the anthracite strike.

The London *Colliery Guardian* reports that the Ashington Coal Company, of Blyth, Northumberland, had secured a contract with Messrs. Bird & Sons, of Paris, for the supply of 50,000 tons of coal for the Pacific Coast of America. This will be the first time, it is believed, that coal has left the Northumbrian port for that quarter of the globe.

Exports of coal and coke from the United States for the six months ending June 30 are reported by the Bureau of Statistics of the Treasury Department as below, in tons:

	1901.	1902.	Changes.
Anthracite	1,027,149	604,322	D. 422,827
Bituminous	2,654,974	2,695,592	I. 40,618
Total coal.....	3,682,123	3,299,914	D. 412,209
Coke	200,210	218,375	I. 18,165
Totals	3,882,333	3,488,289	D. 394,044

The decrease in anthracite was chiefly in the shipments to Canada in May and June. The distribution of the coal exports to different countries is shown in the table below:

	1901.	1902.	Changes.
Canada	2,486,221	2,258,330	D. 227,891
Mexico	280,305	287,778	D. 7,473
Cuba	201,307	223,673	I. 22,366
West Indies.....	190,305	168,180	D. 22,125
Europe	275,741	163,638	D. 112,103
Other countries.....	239,184	168,315	D. 70,869
Totals	3,682,123	3,299,914	D. 412,209

The decrease in shipments to Canada was wholly in anthracite. The exports to Europe show a very considerable comparative decrease this year. The coke exported went chiefly to Mexico.

Imports of bituminous coal into the United States for the fiscal year ending June 30 are reported by the Bureau of Statistics as below:

	1901.	1902.	Changes.
Canada	1,465,963	1,477,482	I. 11,519
Mexico	33,843	9,661	D. 24,182
Australia	352,522	334,862	D. 17,660
Japan	7,011	17,124	I. 10,113
Europe	95,372	101,524	I. 6,152
Other countries.....	22,527	469	D. 22,058
Totals	1,977,238	1,941,422	D. 35,816

With the exception of some Nova Scotia coal, received at New England ports, these imports were to the Pacific Coast. In addition to the bituminous coal, 302 tons of anthracite were imported in 1902, against 1 ton in 1901.

Messrs. Hull, Blyth & Co., of London and Cardiff, report under date of July 26, that the tone of the Welsh coal market continues easy, business being very quiet. Quotations are: Best Welsh steam coal, \$3.84@3.90; seconds, \$3.72; thirds, \$3.48; dry coals, \$3.48; best Monmouthshire, \$3.36@3.42; seconds, \$3.12; best small steam coal, \$2.04; seconds, \$1.92; other sorts, \$1.74.

The above prices for Cardiff coals are all f. o. b. Cardiff, Penarth or Barry, while those for Monmouthshire descriptions are f. o. b. Newport, exclusive of wharfage, but inclusive of export duty, and are for cash in 30 days, less 2.5 per cent discount.

The freight market remains exceedingly inactive all round. Mediterranean rates are again weaker. Some rates quoted from Cardiff are: Marseilles, \$1.20; Genoa, \$1.20; Naples, \$1.20; Singapore, \$3.00; Las Palmas, \$1.50; St. Vincent, \$1.74; Rio de Janeiro, \$2.94; Santos, \$3.24; Buenos Aires, \$3.24.

IRON TRADE REVIEW.

New York. Aug. 7.

The market, as shown by our local reports, has been rather quiet. This does not mean any cessation of activity at mills and furnaces, but only that there is little material to be had for the balance of the year. Business done has been mainly by parties who want near-by deliveries, and who have to pay prices depending upon their need of the material.

It is reported that an order for 30,000 tons of steel rails for the Pacific Coast has gone to German mills, the company buying the rails being unable to get any delivery here earlier than next July.

Birmingham. Aug. 4.

(From Our Special Correspondent.)

The pig iron market in this section is very strong, and all the iron that the manufacturers care to sell can be sold. The sales for delivery next year are many. The Alabama Consolidated Company will have the furnace at Gadsden ready about January, 1903. Col. T. G. Bush, president of the company, says that

it is practically a new furnace, and that the old one will be repaired. With the addition of additional blowing machinery and more stoves, the two furnaces at Gadsden will be operated. He says that, though there was no intention of constructing a larger furnace, the new furnace at Gadsden would have a larger bosh by 6 in. in diameter than No. 3 furnace of the Republic Company, at Thomas. The furnace would have a capacity of between 200 and 250 tons of iron daily.

Within the next two years Alabama will see no less than six new or entirely reconstructed blast furnaces. It is said that the Alabama Steel and Wire Company will erect two furnaces at Bessemer, 12 miles south of Birmingham, and a steel plant at Ensley, near the wire, rod and nail mill. The Oxmoor Furnace Company will reconstruct the Oxmoor furnaces as soon as the sale of the property is passed upon by directors of the Tennessee Coal, Iron and Railroad Company. The formation of the Valley Iron Company, in which it is stated Messrs. G. B. McCormack, Erskine Ramsey, James Bowron, Nat Baxter, formerly officers in the Tennessee Coal, Iron and Railroad Company, are interested, is said to mean that two furnaces and other plants will be erected near Sulphur Springs and Valley Head, in the northern part of the State. The new furnace of the Alabama Consolidated Coal and Iron Company is also considered. The expenditure of no less than \$5,000,000 for iron and steel plants in the Birmingham district during the next two years is anticipated.

The following quotations are given: No. 1 foundry, \$17.50@18; No. 2 foundry, \$17@17.50; No. 3 foundry, \$16@16.50; No. 4 foundry, \$15@15.50; gray forge, \$14@15; No. 1 soft, \$17.50@18; No. 2 soft, \$17.

The steel industries in this district are faring as well as heretofore. The demand is good. In finished iron and steel circles there is also a good demand. In smaller industries, foundries, machine shops and other establishments much work is being done and good prices obtain.

Buffalo. Aug. 6.

(Special Report of Rogers, Brown & Co.)

We note a steady increase in the volume of business for next year's delivery. Many of the heaviest consumers in this territory have now covered for their requirements during the first half, and some sales have been made for deliveries running through September of 1903. A more general degree of confidence in the continuance of the present active conditions seems everywhere in evidence, and under heavy sales several furnaces have advanced their prices for next year's iron. The following figures are intended to convey an approximate idea of prices being paid for iron available during 1902. We quote for cash, f. o. b. cars, Buffalo: No. 1 strong foundry coke-iron, Lake Superior ore, \$25.75; No. 2, \$25.25; Southern soft No. 1, \$23.50@24.50; No. 2, \$23@24.

Chicago. Aug. 5.

(From Our Special Correspondent.)

Prices of Northern and Southern pig iron show considerable fluctuation, due to apprehension about the coal and coke situation and to the unabated eagerness of buyers. The condition of things is not a healthy one, in the opinions of leading furnace and foundry proprietors, but how to better it no one can suggest. Sales of both Northern and Southern are practically completed up to April 1, 1903, except for occasional small spot lots, picked up by chance. Such lots readily command \$26. For delivery after April 1 next No. 1 Northern foundry is quoted to-day at \$21.50@22.50, No. 2 \$21@22 and No. 3 50c. or less under No. 2. Southern has a small unsold balance available for deliveries before April 1. This commands a premium of \$1 to \$2 a ton over iron deliverable after April 1, quotations for which are as follows: No. 1, \$21.15@22.15; No. 2, \$20.65@21.65; No. 3, \$20.15@21.15, Chicago.

Coke is very scarce and high, its price varying from \$6 to \$7. The latter price is readily obtained for prompt deliveries. All coke now coming in is from the Connellsville District, West Virginia being altogether cut off by reason of the strike.

Cleveland. Aug. 6.

(From Our Special Correspondent.)

Iron Ore.—A statement has just been prepared showing the movement of ore down the lakes during July. The total shipment from all of the upper lake ports was 4,074,386 tons, as against 3,697,823 tons for the same month a year ago. The total shipment to August 1 this year was 12,973,219 tons, as against 8,661,437 tons for the same period a year ago. The increase for the month of July was 375,563 tons, and for the period to August 1 was 4,311,778 tons, or about 50 per cent. This establishes a new record for the movement of iron ore, and indicates that the season's movement is likely to be enormous. The boats are still being delayed at unloading ports, but the shippers are chartering freely at the head of the lakes at the old rates of 75c. from Duluth, 65c. from Marquette and 55c. from Escanaba.

Pig Iron.—Foundrymen have been asking for material freely of late, but their demand seems to be

more for prompt delivery than for new material. The selling ahead has increased to such a point that already a shortage for the first quarter of next year is threatened, and prices have gone up \$1, being now quoted at \$22@22.50, Valley furnace, for No. 2 foundry. Southern foundry producers are still asking \$17@17.50, Birmingham. Bessemer sales are light for immediate shipment, but all transactions are on a basis of about \$24 to \$24.50. The so-called independent furnaces are asking \$21 for next year's delivery, and are getting it. The association furnaces are holding off. Basic producers have done very little selling past the first quarter, but they are holding firm on their quotation of \$20 in the Valley.

Finished Material.—A Cleveland concern came upon the market during the week and asked for steel plates for first quarter delivery of next year. They found the Steel Corporation mills about sold up, and had to rely upon the so-called independent mills. This developed the fact that the outside mills, being no longer members of the Plate Pool, are not bound by any prices which it made formerly, and are therefore asking their own prices for such material as they sell. These mills are insisting upon the continuance into next year of this season's prices. This means a great disparity in prices between the association and non-association mills and results naturally in the association mills getting all of the business. For future delivery the smaller mills want present prices of 2@2.10c., and the association mills want 1.60c., a range of about \$8 a ton. The demand for structural material brings out a similar situation, and the prospects are that many of the consumers who fail to supply their needs before the larger mills fill their capacity will have to pay store prices to the producers. At present but one quotation is made for material for immediate shipment—from 2.50c. to 3c. The billet trade has grown in interest since many of the mills discovered that they could not use the imported product to their satisfaction, and are therefore calling for a home supply. Billets manufactured here are bringing \$32.50, while importations are made to Pittsburgh at \$31@32. Blue annealed sheets are in big demand, but light sheets, gauges No. 20 and lighter, are a drug on the market, and the prices are falling. The heavier sheets are bringing 2.50c. for No. 10 as a basis.

Philadelphia. Aug. 6.

(From Our Special Correspondent.)

Pig Iron.—The Eastern Pennsylvania pig iron market has quieted down in a rather unexpected way, but brokers and consumers are suspicious of the quiet. They are inclined to talk a great deal, and believe that developments of a surprising nature are not very remote. Just what they are they are not able to make plain. A good deal is being said about the quantity of iron that is being arranged for from abroad. Negotiations are now pending for considerable supplies, but the difficulty is that the iron is not known, and does not work in quite as satisfactorily as our well known American makes. Quotations for No. 1 foundry are nominally \$22.50@23; No. 2, \$21.50@22, with 50c. more asked; gray forge, \$21@22.

Billets.—Billets appear to be declining, and lower quotations have been made, those given to-day being \$28@28.50. The situation is unsettled, but negotiations are progressing, and considerable steel has been arranged for delivery during the fall months.

Merchant Iron.—Very little news has been received from the mills this week. Prices are high for early delivery and shaded for late delivery. Steel bars have sold as low as 1.55@1.65; refined iron, however, keeps up, and mill capacity is all well sold.

Muck Bars.—Muck bars are quoted at \$36.

Sheet Iron.—Sheet iron is exceptionally quiet this week in large orders, but small orders are as abundant as usual. Quotations for best sheet range from 2.30c. for No. 10 to 3.40c. for No. 28.

Merchant Steel.—In fair demand for tire steel and tools. Spring steel is quoted a trifle higher for spot deliveries. Most buyers are disposed to delay placing heavy orders for a short time.

Pipes and Tubes.—Pipes are not in as active demand this week but are very strong. Small orders for tubes are coming in even faster than last week. Spot deliveries continue at premium rates.

Plates.—The situation in plates is unsettled owing to the inability of Pennsylvania makers to accommodate requirements that are now being presented for immediate delivery. Everything is filled up. Universals, 2@2.10c.; flange, 2.10@2.25c.; fire-box, 2.25@2.35c.

Structural Material.—For anything that may be regarded as a quick delivery prices are at premium rates. A good deal of small business keeps coming in, and mills are welcoming that sort of business, as the margin is considerably better than on large lots.

Old Rails.—Old rails are quoted at \$24.50@25 for iron and \$21@21.50 for steel.

Steel Rails.—It is stated that the demand for girder rails will soon set in upon a very large scale, and that certain mills are preparing to increase their ca-

capacity to supply this demand, which it is said will be very heavy for next year.

Scrap.—Old materials are hard to quote. The usual kinds wanted are held very high, such as country scrap, railroad scrap and heavy steel. Choice railroad scrap sold this week at \$24; low phosphorus scrap brought \$28.50; old axles are picked up occasionally. Wrought turnings sell at \$17, and cast borings at \$11.

Pittsburg. Aug. 6.

(From Our Special Correspondent.)

Transactions in the iron and steel markets during the week have been very light, and prevailing high prices are firmly held. Some of the leading concerns avoid making quotations when possible, as it would be difficult to accept any new business for delivery this year. For the midsummer season prices in almost every line are stronger than in many years past. The prediction that pig iron prices would be lower next year is not likely to be verified, but, on the contrary, the present high level may be continued at least through the first half for all new business that may be booked. As already told, the Valley producers are behind in deliveries, and a large amount of business taken for this year will go over into 1903. The coke shortage, due to the inability of the railroads to supply the requirements in the Valleys, has resulted in the banking temporarily of several furnaces. This will make the shortage in deliveries more pronounced at the end of the year. Unless there is an improvement in the pig iron supply it seems certain that some iron and steel mills will be forced to shut down. A summing up of the situation at the merchant blast furnaces in the Valleys shows that the buying of all grades of pig iron, particularly foundry, for next year has been remarkable. With the sales that have already been made and the business that is likely to go over from this year the bulk of the expected production for the first half of 1903 has been contracted for. No price is named for prompt bessemer iron, and almost any price can be had for foundry. Many inquiries are received for iron for the first half, but producers are not anxious to take on any more business, preferring to reserve what available supply they may have for better prices. With steel rails fixed at \$28 for the year, it does not seem likely that pig iron prices will reach a higher figure than is now being quoted, but it is almost certain that there will be no weakness in the markets throughout the coming year.

The only dulness is in sheets and wire products, and as a result a number of wire mills have been closed. This is principally due to the high price of rods. There are too many sheet mills, and in order to secure business some cutting of prices has been done, mainly in galvanized sheets. An independent concern this week accepted a desirable order at 75 and 10 per cent off, which is a cut of 10 per cent from former quotations, which were a trifle lower than a month ago. The American Sheet Steel Company continues to quote galvanized sheets at 75 per cent off.

The principal cause of the mills and furnaces being behind in deliveries is the inability of the railroads to move the loaded cars. The immense tonnage handled during the year has taxed the motive power of the various railroads to such an extent that many locomotives were crippled and are out of service for repairs. An extraordinary effort was made on Saturday night and Sunday to remove the congestion, and with good results. It is estimated that fully 30,000 cars were moved in the Pittsburg District. As these cars will average 40 tons capacity, the total tonnage moved was over 1,000,000 tons. The West Penn division of the Pennsylvania Railroad and the Baltimore & Ohio Railroad have been most congested, but the tie-up has been practically removed and if no accidents occur both lines will be restored to their normal condition before the end of the week.

All the tin-plate lodges of the Amalgamated Association of Iron, Steel and Tin Workers have now voted on the proposition of the American Tin-Plate Company, of a 25 per cent reduction in wages, in order to secure export trade amounting to 1,500,000 boxes. While no official announcement has been made by the officers of the association, reports received here from different towns where tin-plate plants are located indicate that the proposition has been overwhelmingly defeated. A strong effort is being made by the officers to have some of the important lodges that voted in the negative reconsider the action taken, and they still seem to have hope of success.

Pig Iron.—No sales of pig iron of any grade have been made for early delivery, and no sales of bessemer for any delivery are noted. Some gray forge and foundry iron for extended future delivery has been sold. Bessemer for the fourth quarter and for the first quarter of next year is quoted at \$21.25@21.75, Valley furnaces. Gray forge remains at \$21, Pittsburg, for any delivery. Foundry No. 2 is quoted at \$23@24, Pittsburg, for this year's delivery, and \$22@22.50 for the first quarter.

Steel.—There is but little change in the steel market. The scarcity continues, and bessemer billets are held at \$33.50@34 and open-hearth at \$34.50. Offers of \$32 for bessemer billets have been made but not accepted. The plate market continues strong. The base price of 1.60c. is quoted for late shipment, and for early delivery prices range from 1.85c. to 2.25c.

Sheets.—The weakness in the sheet market continues, and some price cutting in galvanized sheets is reported. Prices this week are quoted at from 75 to 75 and 10 per cent off. Black sheet, No. 28 gauge, are firm at 3c.

Ferro-manganese.—There is no change in the situation. Domestic, 80 per cent, is held nominally at \$52.50, but no sales were made. The English product continues to be quoted at \$53 and the German at \$52.

New York. Aug. 8.

Pig Iron.—Buying of foundry iron for 1903 delivery is not as active as a few weeks ago, but there is a very fair amount of business being done. Spot foundry is very scarce indeed, with no relief in sight except from foreign importations, which are increasing. We quote Northern irons tidewater delivery: No. IX, foundry, \$23@25; No. 2X, \$21@22; No. 2 plain, \$22@24. For Southern iron on dock, New York, No. 1 foundry, \$22.75@23.25; No. 2, \$21.75@22.25; No. 3, \$21.25@21.75. Scotch iron is offered at \$20@23; Middlesborough No. 3 at \$18.75@19.25. Spot Scotch is selling at \$22@25 ex-ship.

Bar Iron and Steel.—The market is still strong. We quote large lots on dock: Refined bars, 1.95@2.05c.; common, 1.90@2c.; soft steel bars, 2@2.10c.

Plates.—Demand is active and the market strong. We quote for tidewater delivery in car-loads: Tank, ¼-in. and heavier, 2.05@2.30c.; flange, 2.15@2.40c.; marine, 2.25@2.50c.; universal, 2.05@2.25c.

Steel Rails.—A heavy tonnage has been placed for 1903 delivery. An order is reported placed by two transcontinental roads for 30,000 tons with a German firm. Standard sections are quoted at \$28 f. o. b. mills for 1903 delivery; light rails \$30@35, according to weight.

Structural Material.—The market for all kinds of structural material is still very active. We quote for forward delivery on large lots at tidewater as follows: Beams and channels, 2@2.30c.; tees, 2@2.25c.; angles, 2@2.25c.

Cartagena, Spain. July 19.

(Special Report of Barrington & Holt.)

The week has been a very busy one, and six cargoes have been shipped: 1 of magnetic ore, 5,400 tons; 1 of manganiferous ore, 1,370 tons, and 3 of dry ore, 9,400 tons. This makes the total to date 187,625 tons. Several new sales are reported at increased prices.

Quotations for iron ores are per ton, f. o. b. shipping port: Ordinary 50 per cent ore 6s. 6d.@6s. 9d.; special low phosphorus, 7s.@7s. 6d.; special iron ore, 50 per cent iron, 3 per cent manganese, 6 per cent silicon, 8s. 6d.; specular ore, 58 per cent iron, 9s.; magnetic ore, 60 per cent iron, 5 per cent silicon, 11s. 6d. for lumps, 9s. 6d. for smalls. For manganiferous ores quotations are: No. 1, 20 per cent iron and 20 per cent manganese, 14s. 3d.; No. 1 B, 25 iron and 17 manganese, 11s. 3d.; No. 2, 30 iron and 15 manganese, 10s. 3d.; No. 3, 35 iron and 12 manganese, 9s. 6d. All grades of manganiferous ores are rated at 11 per cent silicon and under 0.03 phosphorus.

Iron Pyrites.—Quotations for iron pyrites, 40 per cent iron and 43 per cent sulphur, are 11s. per ton, f. o. b. shipping port. Shipments of pyrites for the week were 320 tons to Genoa.

CHEMICALS AND MINERALS.

New York. Aug. 7.

Heavy Chemicals.—Trade is quiet with prices unchanged. Domestic chemicals, we quote, per 100 lbs., f. o. b. works, as follows: High-test alkali, in bags, 77½@82½c. for prompt shipment, and 75@77½c. for forward; caustic soda, high-test, \$1.90@1.95 for early delivery, and \$1.85@1.87½ for futures; bicarb. soda, ordinary, 95c., and extra, \$3; sal soda, 65c.; chlorate of potash crystals, \$8.50, and powdered, \$8.75; bleaching powder, off-test, \$1.35; best grades mostly under contract. For foreign goods we quote per 100 lbs. in New York: Alkali, high-test, 90@92½c.; caustic soda, high-test, \$2.25; sal soda, 67½@70c.; chlorate of potash, \$10.25@10.75; bleaching powder; prime brands, Liverpool, \$1.75; Continental, \$1.60@1.70.

Imports of foreign chemicals into the United States for the six months ending June 30 are reported by the Bureau of Statistics of the Treasury Department as follows, in tons:

	1901.	1902.	Changes.
Alkali	13,968,137	14,709,714	I. 741,577
Caustic soda	1,635,901	2,118,844	I. 482,943
Sal soda	2,709,458	1,740,324	D. 969,134
Chlorate of potash	435,033	612,203	I. 177,170
Bleaching powder	53,234,208	62,874,558	I. 9,640,350

The only decrease shown this year is in sal soda. The increase in bleaching powder was especially large.

Potash Salts.—The imports of potash salts into the United States for the fiscal year ending June 30 are reported by the Treasury Department as follows, in pounds:

	1901.	1902.	Changes.
Muriate of potash.....	135,956,222	136,893,771	I. 937,549
All other salts.....	56,105,606	74,923,733	I. 18,818,127
Total	192,061,828	211,817,504	I. 19,755,676

The total invoice value in 1902 was \$3,748,812. There is no duty on these salts.

Acids.—The market is fair with good demand in most lines.

Quotations per 100 lbs. are as below, unless otherwise specified, for large lots in carboys or bulk (in tank cars) delivered in New York and vicinity.

Blue vitriol.....	\$4.70@5.25	Oxalic, com'l.....	\$4.60@5.00	
Muriatic, 18 deg.	1.50	Sulphuric, 50 deg.,	bulk, ton.....	13.50@15.50
Muriatic, 20 deg.	1.62½	Sulphuric, 60 deg.,	bulk	1.05
Muriatic, 22 deg.	1.75	Sulphuric, 60 deg.,	bulk	18.00@20.00
Nitric, 36 deg....	4.00	Sulphuric, 66 deg.,	bulk	1.20
Nitric, 38 deg....	4.25	Sulphuric, 66 deg.,	bulk	21.00@23.00
Nitric, 40 deg....	4.50			
Nitric, 42 deg....	4.87½			

Brimstone.—The dullness noted for the past few weeks continues. One lot of 2,000 tons was received by steamer this week from Sicily. Freight rates are slightly advanced.

Ex-steamer cargoes are held at \$23 for best un-mixed seconds, while shipments are quoted at \$22@ \$22.25. Best thirds are about \$2 less than seconds.

Imports of brimstone into the United States for the six months ending June 30 were 180,334 tons, against 71,524 tons in the first half of 1901; an increase of 108,810 tons, or 152.1 per cent. If we add the increase in pyrites, shown below, we find the total imports of sulphur this year to have been 284,683 tons, against 161,435 tons in 1901; an increase of 123,248 tons, or 76.5 per cent.

Messrs. Emil Fog & Sons report the exports of brimstone from Sicily in June at 24,648 tons, against 21,580 tons in June, 1901. For the year ending June 30 the same firm gives the exports as below, in metric tons:

	1901.	1902.	Changes.
United States.....	147,094	166,403	I. 19,309
Great Britain.....	19,923	26,311	I. 6,388
European Continent.....	343,426	235,299	D. 108,127
Other countries.....	11,054	9,964	D. 1,090
Totals	521,497	437,977	D. 83,520

Stocks in Sicily on June 30, 1902, were 276,589 tons, against 183,086 tons on June 30, 1901; an increase of 93,503 tons.

Pyrites.—Trade is fair with orders well up to supply. Prices are unchanged.

Quotations are f. o. b. Mineral City, Va.: Lump ore, \$5 per ton, and fines 10c. per unit; Charlemont, Mass., lump, \$5, and fines \$4.75. Spanish pyrites 12½@13½c. per unit, New York and other Atlantic ports. Spanish pyrites contain 46 to 51 per cent of sulphur; American, from 42 to 44 per cent.

Imports of pyrites into the United States for the six months ending June 30 were 217,394 tons, containing approximately 104,349 tons of sulphur; against 188,357 tons, carrying 89,611 tons of sulphur in the first half of 1901. The increase in sulphur contents was 14,738 tons, or 16.4 per cent.

Sulphate of Ammonia.—Sellers are still resting on a quiet market. Gas liquor on spot is quoted at \$3.02½@ \$3.05 per 100 lbs., while shipments are worth \$2.95@ \$2.97½.

Phosphates.—There is little or no life in the phosphate market. Mining in Florida is practically suspended, owing to wet weather. Prices remain without change.

Exports of phosphates and phosphate rock from the United States for the six months ending June 30 were 356,902 tons, against 338,748 tons in the first half of 1901; an increase of 18,154 tons, or 5.4 per cent.

Messrs. J. M. Lang & Co. report the shipments of high grade Florida rock through the port of Savannah in July as follows: One cargo, 3,300 tons, to Rotterdam; two cargoes, 5,611 tons, to Hamburg; total, 8,911.

Ocean freights continue fairly steady at the same rates as have prevailed during the past month.

We quote prices below:

Phosphates.	Per ton F. o. b.	or European Ports.	
		Unit.	Long ton.
*Fla. hard rock (78@80%)	\$6.50@7.00	0½@7d.	\$10.27@11.06
*Fla. land peb. (68@73%)	3.00@3.25	4½@5d.	6.05@ 7.00
*Fla. Peace Riv. (58@63%)	2.25@2.50	4½@5d.	5.70@ 6.00
*Tenn., (78@82%) export.	3.25@3.50	5½@6d.	6.58@ 9.30
*Tenn., 78% domestic	3.00		
*Tenn., 75% domestic	2.75@3.00		
*Tenn., 73@74% domestic	2.40		
*Tenn., 70@72% domestic	2.10@2.25		
So. Car. land rock.....	3.25	4½@5d.	5.67@ 6.30
So. Car. river rock.....	2.75@3.00		
Algerian (63@68%).....	5½@6½d.		7.48@ 8.45
Algerian (58@63%).....	5½@6d.		6.30@ 7.20
Algerian (53@58%).....	5	5½@5d.	5.50@ 5.78

*Fernandina, Brunswick or Savannah.
†Mt. Pleasant. ‡On vessels, Ashley River.

A recent official report gives the shipments of Tebessa phosphates through the port of Bone, Algeria, in 1901, as follows, in metric tons: Dyr Mine, 88,440; Kouif, 103,600; Societe Francaise, 32,880; Ain Kerma, 1,770; total, 226,690 tons. In 1900 the total was 241,070 tons, showing a decrease of 14,380 tons last year.

Nitrate of Soda.—Market conditions are somewhat firmer owing to more active buying in Europe. Spot is quoted at \$1.87½@ \$1.90 per 100 lbs.; August-November, at \$1.85@ \$1.87½, and December and next year, at \$1.82½.

Imports of nitrate of soda into the United States in the six months ending June 30 were 86,243 tons, against 93,179 tons in the first half of 1901; a decrease of 6,934 tons, or 7.5 per cent.

Messrs. Mortimer & Wisner's monthly statement of nitrate of soda, dated New York, August 1, gives the following interesting statistics:

	1902.	1901.	1900.
	Bags.	Bags.	Bags.
Imported into Atlantic ports from West Coast S. A. from Jan. 1, 1902, to date.....	634,952	518,283	582,298
do do do from Europe.....			2,063
Stock in store and afloat Aug. 1 1902, in New York.....	3,937	44,523	13,400
do Boston.....		1,000	
do Philadelphia.....	20,000		26,675
do Baltimore.....		62,175	750
do Norfolk, Va.....			
do Charleston.....	26,800		
do Savannah.....			
To arrive, due Nov. 15, 1902.....	507,940	383,941	379,785
Visible supply to Nov. 15, 1902.....	558,677	491,639	420,610
Stock on hand Jan. 1, 1902.....	77,517	13,446	9,586
Deliveries past month.....	109,803	86,295	48,549
Deliveries Jan. 1 to date.....	661,732	724,031	553,122
Total yearly deliveries.....	1,308,820	1,176,651	
Prices Current, Aug. 1, 1902.....	\$1.90	\$1.90	\$1.77½

Deliveries this year were 62,299 bags less than for the corresponding period in 1901, but 108,610 bags more than in 1900.

Liverpool. July 26.

(Special Report of Joseph P. Brunner & Co.)

There is no new feature to report as regards the position of heavy chemicals, a moderate trade passing without change in quotations.

Soda ash in fair demand at usual varying prices as to market. Nearest spot range for tierces may be called about as follows: Leblanc ash, 48 per cent, £5 15s.@£6 per ton; 58 per cent, £6 2s. 6d.@£6 7s. 6d. per ton; ammonia ash, 48 per cent, £4 5s.@£4 10s. per ton; 58 per cent, £4 10s.@£4 15s. per ton, net cash. Bags 5s. per ton under price per tierces.

Soda crystals in request at generally £3 7s. 6d. per ton, less 5 per cent for barrels, or 7s. less for bags; with special terms for certain export quarters.

Caustic soda keeps very firm, and a fair trade passing at the following quotations: 60 per cent, £8 15s.; 70 per cent, £9 15s.; 74 per cent, £10 5s.; 76 per cent, £10 10s. per ton, net cash.

Bleaching powder is difficult to move as regards new business, but £6 12s. 6d.@£6 15s. per ton, net cash, is still usual range for hardwood packages, with special quotations for Continental and a few other export markets.

Chlorate of potash dull at nominally 3d. per lb., net cash.

Bicarb soda is selling to a fair extent at £6 15s. per ton, less 2½ per cent for the finest quality in 1 cwt. kegs, with usual allowances for larger packages; also special quotations for a few favored markets.

Sulphate of ammonia dull and easier at about £12 6s. 3d.@£12 8s. 9d. per ton, less 2½ per cent for good gray 24-25 per cent in double bags f. o. b. here.

Nitrate of soda is nominally quoted on spot at £8 15s.@£9 per ton, less 2½ per cent for double bags f. o. b. here, but there is not much going on.

METAL MARKET.

New York. Aug. 7.

GOLD AND SILVER.

Gold and Silver Exports and Imports.

At all United States Ports in June and Year.

Metal	June.		Year.	
	1901.	1902.	1901.	1902.
Gold:				
Exports.....	\$5,344,844	\$3,375,750	\$29,491,228	\$20,499,564
Imports.....	3,260,743	1,414,316	15,927,969	10,618,867
Excess. E.	\$2,084,101	E. \$1,961,434	E. \$13,563,257	E. \$9,880,697
Silver:				
Exports.....	\$4,598,905	\$3,250,066	\$28,474,062	\$22,534,624
Imports.....	1,934,357	1,802,853	15,135,186	12,361,131
Excess. E.	\$2,664,548	E. \$1,447,213	E. \$13,298,876	E. \$10,173,493

These figures include the exports and imports at all United States ports, and are furnished by the Bureau of Statistics of the Treasury Department.

Gold and Silver Exports and Imports, New York.

For the week ending July 31 and for years from January 1:

Period.	Gold.		Silver.		Total Excess Exports or Imports.
	Exports.	Imports.	Exports.	Imports.	
Week ...	\$4,909,728	\$116,988	\$357,375	\$14,117	E. \$5,085,986
1902.....	24,034,088	1,442,169	15,022,960	775,091	E. 36,809,818
1901.....	25,786,523	1,736,728	18,917,324	2,289,468	40,677,653
1900.....	22,228,174	1,609,714	23,218,414	2,577,960	E. 41,258,244

Exports of gold were chiefly to France and Germany; of silver to London. Imports of both gold and silver were from the West Indies and South America.

Financial Notes of the Week.

Business continues very active for the season. Rates for money are somewhat higher, in view of the demand on New York from the interior. The only shipment of gold abroad thus far reported this week is one of \$500,000, said to be a special transaction. Rates of exchange have fallen sufficiently to make any large exports unprofitable for the present.

The statement of the New York banks, including the 63 banks represented in the Clearing House, for the week ending August 2, gives the following totals, comparison being made with the corresponding weeks of 1901 and 1900:

	1900.	1901.	1902.
Loans and discounts.....	\$803,697,900	\$878,506,900	\$919,671,600
Deposits	894,482,500	955,912,200	957,145,500
Circulation	26,645,700	30,572,800	32,184,100
Specie	176,586,400	180,545,700	173,443,900
Legal tenders.....	76,179,100	80,597,700	79,580,900
Total reserve.....	\$252,765,500	\$261,143,400	\$253,024,500
Legal requirements.....	223,620,625	238,978,050	239,286,375
Balance surplus.....	\$29,144,875	\$22,165,350	\$13,738,125

Changes for the week this year were increases of \$6,377,100 in loans, \$5,048,300 in deposits, \$186,400 in circulation, \$190,500 in legal tenders; decreases of \$692,700 in specie and \$1,764,275 in surplus reserve.

The following table shows the specie holdings of the leading banks of the world at the latest dates covered by their reports. The amounts are reduced to dollars and comparison is made with the holdings at the corresponding date last year.

	—1901.—		—1902.—	
	Gold.	Silver.	Gold.	Silver.
N. Y. Ass'd.....	\$180,545,700	.....	\$173,443,900	.....
England	186,595,105	.....	189,621,130	.....
France	490,485,720	223,824,140	518,156,285	\$224,377,245
Germany	167,685,000	71,865,000	193,390,000	71,520,000
Spain	70,015,000	85,230,000	70,975,000	97,995,000
Neth'ls	31,254,000	28,194,000	24,247,500	33,580,500
Belgium	14,866,500	7,433,500	15,373,335	7,686,615
Italy	78,245,000	9,700,500	80,980,000	10,207,000
Russia	347,255,000	37,675,000	371,495,000	44,400,000

The returns of the Associated Banks of New York are of date August 2 and the others July 31, as reported by the *Commercial and Financial Chronicle* cable. The New York banks do not report silver separately, but specie carried is chiefly gold. The Bank of England reports gold only.

Silver has not been so well supported this week. A large transfer has been made from China to India, and this seems to have affected the market. A fair demand is shown at the lower price.

The United States Assay Office in New York reports receipts of 98,000 oz. silver for the week.

Shipments of silver from London to the East for the year up to July 24, are reported by Messrs. Pixley & Abell's circular as follows:

	1901.	1902.	Changes.
India	£4,515,210	£3,703,945	D. £811,265
China	339,125	86,910	D. 252,215
The Straits.....	79,976	70,550	D. 9,426
Totals	£4,934,311	£3,860,405	D. £1,073,906

Receipts for the week this year were £40,250 from the United States, £20,000 from Australia and £13,500 from New Zealand; £73,750 in all, bar silver. Exports were £10,000 to Malta, £1,500 to Port Said, £30,000 to Bombay and £10,000 to Calcutta; a total of £51,500.

Indian exchange continues firm, and the Council bills offered in London were taken at an average of 15.97d. per rupee. Trade in India is improving, since the rains, though late, give promise of fair crops. The Indian Government is well supplied with silver for the present, and is taking none, though there has been some buying for private account.

The Bureau of the Mint reports the coinage executed at the Mints of the United States during the month

of July, 1902, the first month of the fiscal year, as follows:

Denomination.	Pieces.	Value.
Double Eagles.....	106,000	\$2,120,000
Total gold.....	106,000	\$2,120,000
Standard dollars.....	1,050,000	1,050,000
Half dollars.....	838,000	419,000
Quarter dollars.....	1,644,000	411,000
Dimes.....	3,740,000	374,000
Total silver.....	7,292,000	\$2,254,000
Five cents.....	2,778,000	138,900
One cent.....	6,390,000	63,900
Total minor.....	9,168,000	\$202,800
Total coinage.....	16,566,000	\$4,576,800

As compared with July, 1901, there was an increase of 8,435,000 pieces coined, but a decrease of \$1,045,000 in the total value. These changes were due to the heavy coinage of subsidiary silver this year.

The Treasury Department's estimate of the money in the United States on August 1 is as follows:

	Total.	In Treasury.	In Cir-culation.
Gold coin (inc. bullion in Treasury).....	\$1,193,925,457	\$248,005,005	\$631,156,433
Gold certificates.....	.....	.....	314,764,019
Silver dollars.....	540,682,817	24,330,810	68,906,465
Silver certificates.....	.....	.....	447,445,542
Subsid. silver.....	98,225,389	12,002,930	86,222,459
Treas. notes of 1890.....	28,763,000	127,415	28,635,585
U. S. Notes.....	346,681,016	9,252,347	337,428,669
Currency certif. ....	.....	.....	.....
Nat. Bank notes.....	358,984,184	12,937,219	346,046,965
Total.....	\$2,597,261,863	\$306,655,726	\$2,290,606,137

Population of the United States, August 1, 1902, estimated at 79,230,000; circulation per capita, \$28.53. For redemption of outstanding certificates an exact equivalent in amount of the appropriate kinds of money is held in the Treasury, and is not included in the account of money held as assets of the government. This statement of money held in the Treasury as assets of the Government does not include deposits of public money in national bank depositories to the credit of the Treasurer of the United States, and amounting to \$119,563,534. The amount in circulation was \$14,076,725 greater than on July 1, and \$71,038,988 greater than on August 1, 1901.

Prices of Foreign Coins.

	Bid.	Asked
Mexican dollars.....	\$0.41 3/4	\$0.43
Peruvian soles and Chilean pesos.....	.....	39 1/2
Victoria sovereigns.....	4.86	4.88
Twenty francs.....	3.86	3.88
Twenty marks.....	4.77	4.85
Spanish 25 pesetas.....	4.78	4.82

OTHER METALS.

Daily Prices of Metals in New York.

August	Silver		Copper				Spelter	
	Standard	N. Y.	Lake	Electro-	London	Lead	N. Y.	St. L.
1 4.87 3/4	53	24 1/2	@ 11 3/4	@ 11 1/2	52 1/2 @ 28 3/4	4.05	5.37 1/2	5.20
2 4.87 3/4	52 3/4	24 1/4	@ 11 3/4	@ 11 1/2	52 1/2 @ 28 3/4	4.05	5.37 1/2	5.20
4 4.87 3/4	52 3/4	24 1/4	@ 11 3/4	@ 11 1/2	52 1/2 @ 28 3/4	4.05	5.37 1/2	5.20
5 4.87 3/4	52 3/4	24 1/4	@ 11 3/4	@ 11 1/2	52 1/2 @ 28 3/4	4.05	5.37 1/2	5.20
6 4.87 3/4	52 3/4	24 1/4	@ 11 3/4	@ 11 1/2	52 1/2 @ 28 3/4	4.05	5.37 1/2	5.20
7 4.87 3/4	52 1/2	24 1/2	@ 11 3/4	@ 11 1/2	52 1/2 @ 28 3/4	4.05	5.37 1/2	5.20

London quotations are per long ton, (2,240 lbs.) standard copper, which is now the equivalent of the former g. m. b's. The New York quotations for electrolytic copper are for cakes, ingots or wirebars; the price of electrolytic cathodes is usually 0.25c. lower than these figures.

Copper.—Buyers continue to hold off, and in consequence the market remains very dull and without special feature. There is no copper pressed for sale and prices remain unchanged. We quote Lake at 11 3/4 @ 11 1/2; electrolytic in cakes, wirebars and ingots 11 1/2 @ 11 3/4, in cathodes at 11 1/4 @ 11 3/8; casting copper at 11 1/2 c.

The London market for speculative sorts has been quiet and has fluctuated very little. It closed last Thursday at £53 2s. 6d. for spot; £53 7s. 6d. for 3 months. On Friday it was £52 18s. 9d. and £53 3s. 9d., respectively. Monday was bank holiday and the exchange was closed. On Tuesday the market was £52 10s. for spot, £52 15s. for 3 months, and the balance of the week ruled at £52 11s. 3d. for spot, and £52 15s. for 3 months.

Refined and manufactured sorts we quote: English tough, £56 @ £56 10s.; Best selected, £56 10s. @ £57; Strong sheets, £69; India sheets, £67; Yellow metal, 6d.

Exports of copper from Atlantic ports for the week ending September 7, as reported by our special correspondents, have been 2,710 long tons of fine copper. Imports for the week have included 1,533 tons fine copper—of which 583 tons were from Mexico—

and 2,612 tons copper ore from Tilt Cove, Newfoundland.

Imports of fine copper into the United States and re-exports of foreign copper are reported by the Bureau of Statistics of the Treasury Department as below, in long tons, for the six months ending June 30:

	1901.	1902.	Changes.
Imports.....	14,193	14,629	I. 436
Re-exports.....	3,879	3,092	D. 787
Balance, net imports.....	10,314	11,537	I. 1,223

Imports and re-exports of copper ore and matte for the same period are reported as below, also in long tons:

	1901.	1902.	Changes.
Imports.....	28,621	31,091	I. 2,470
Re-exports.....	6,134	8,623	I. 2,489
Balance, net imports.....	22,487	22,468	D. 19

As the report does not separate ores and matte, it is difficult to estimate the quantity of fine copper contained in the last named imports. The statement of the Bureau gives the exports of domestic copper for the six months ending June 30 as below, in long tons:

	1901.	1902.	Changes.
Copper ore and matte.....	5,688	11,156	I. 5,464
Fine copper.....	47,840	90,018	I. 42,178

Mr. John Stanton's statement, heretofore published, gives the total exports, reduced to fine copper, at 97,966 long tons for the first half of this year, against 48,027 tons in 1901; an increase of 49,939 tons, or 104 per cent.

Tin.—A fair business has been done, principally for early delivery, consumers generally being bare of supplies. Arrivals have been small and stocks in the hands of dealers are much reduced. Tin for prompt shipment has ruled at a premium. At the close we quote spot tin at 28 1/2 c.; August delivery, 28 1/4 c.; September, 28 c.

Visible stocks of tin on August 1 are reported as below, in long tons of 2,240 lbs:

	Store.	Afloat.	Totals.
London.....	3,741	3,582	7,323
Holland.....	2,898	422	3,320
U. S., exc. Pacific ports.....	2,458	3,708	6,166
Totals.....	9,097	7,712	16,809

The total shows a decrease of 252 tons as compared with August 1, 1901.

Exports of tin from the Straits Settlements in July were 3,670 tons, against 4,160 tons in July, 1901; a decrease of 490 tons this year.

The imports of tin into the United States for the six months ending June 30 were as follows, in long tons of 2,240 lbs:

	1901.	1902.	Changes.
Straits.....	10,512	11,793	I. 1,281
Australia.....	247	145	D. 102
Great Britain.....	6,580	7,364	I. 784
Holland.....	502	665	I. 163
Other countries.....	75	176	I. 101
Totals.....	18,006	20,143	I. 2,137

The total increase this year was 11.9 per cent. The larger part of the gain was in imports direct from the Straits.

Lead.—The market is active at last prices. We quote St. Louis at 3.97 1/2 @ 4.05 c.; New York, 4.05 @ 4.10 c.

The foreign market is lower at £11 1s. 3d. @ £11 3s. 9d. for Spanish; English lead, 5s. higher.

Imports of lead in all forms into the United States and re-exports of imported lead refined here in bond, for the six months ending June 30, are reported by the Bureau of Statistics of the Treasury Department as below, in short tons:

	1901.	1902.	Changes.
Lead in ores and base bullion.....	62,718	51,555	D. 11,163
Lead, metallic.....	115	2,143	I. 2,028
Total imports.....	62,833	53,698	D. 9,135
Re-exports.....	53,930	43,677	D. 10,253
Balance.....	8,903	10,021	I. 1,118

Of the total imports this year 46,750 tons, or 87.1 per cent, were from Mexico; and 4,846 tons, or 9.0 per cent, from Canada. In addition to the re-exports given above, there were 3,164 tons of domestic lead exported this year, against 2,320 tons in the first half of last year; an increase of 844 tons, or 36.4 per cent.

St. Louis Lead Market.—The John Wahl Commission Company telegraphs us as follows: Lead is unchanged, with Missouri brands selling at 4c. and argenteriferous at 4.05c.

Spanish Lead Market.—Messrs. Barrington & Holt write from Cartagena, Spain, under date of July 19 as follows: The price for silver during the week has been 13.50 reales per ounce. The exchange has gone up by 11 centimos, making it 34.51 pesetas to £1. The local quotation for pig lead on wharf has been 62.20 reales per quintal, which on above exchange is equal to £10 3s. per ton of 2,240 lbs., f. o. b. Carta-

gena. Exports of pig lead have been 203,000 kgs. to London; 66,776 kgs. to Marseilles; 15,000 kgs. to Hamburg; a total of 284,776 kgs. In addition, there were 1,382 kgs. silver bars shipped to Marseilles.

Spelter.—The market is strong and advancing. The smelters appear to have sold all their available product for August and there is still considerable demand to be filled. In consequence, August delivery is at a premium. There is also a good business doing for the last quarter of the year, buyers generally recognizing that consumption is very large and the supplies not increasing. We quote 5.20c. St. Louis; 5 3/4 c. New York. The foreign market is unchanged, good ordinaries being quoted at £18 15s.; specials at 5s. higher.

Exports of spelter, or metallic zinc, from the United States for the six months ending June 30 were 2,593 short tons, against 2,261 tons in the first half of 1901; a decrease of 68 tons, or 0.3 per cent. Exports of zinc ore were 21,850 tons, against 19,564 tons last year; an increase of 2,286 tons, or 10.5 per cent.

St. Louis Spelter Market.—The John Wahl Commission Company telegraphs us as follows: Spelter is strong and again higher. The latest sales, as near as we can learn, are on a basis of 5.25c., East St. Louis, for spot and near-by delivery. Futures can be had at a shade less.

Spanish Zinc Ore Market.—Messrs. Barrington & Holt write from Cartagena, Spain, under date of July 19 that there is a demand for zinc ore, and prices are higher. Recent shipments were 948 tons blende to Antwerp.

Antimony is unchanged. We quote Cookson's at 9 3/4 c.; Hallett's at 8 1/4 c.; Italian, Hungarian, Japanese and U. S. Star at 8c.

Imports of antimony into the United States for the six months ending June 30 were as follows, in pounds:

	1901.	1902.	Changes.
Metal and regulus.....	1,825,497	2,829,073	I. 1,003,576
Antimony ore.....	288,903	248,817	D. 40,086

The increase in metal and regulus this year was 54.9 per cent.; while the decrease in ore was 13.9 per cent.

Nickel.—The price is now quoted by leading producers at 40 @ 47c. per lb. for large quantities down to ton lots, according to size and terms of order. The price for smaller lots, according to quantity, runs as high as 60c. a pound.

Exports of nickel, nickel oxide and nickel matte from the United States for the six months ending June 30 are reported at 1,420,000 lbs., against 2,881,164 lbs. in the first half of 1901; a decrease of 1,461,164 lbs., or 50.7 per cent.

Platinum.—Consumption continues good. Ingot platinum in large lots brings \$18.50 per oz. in New York.

Platinum ware—crucibles and dishes—best hammered metal from store, is quoted at 74c. per gram.

Imports of platinum into the United States for the six months ending June 30 were 3,873 lbs., against 3,324 lbs. in the first half of 1901; an increase of 549 lbs., or 16.5 per cent.

Quicksilver.—The New York price continues \$48 per flask for large orders, with a slightly higher figure for small lots. In San Francisco prices are steady, and the quotation is \$45.50 @ \$46.50 per flask for domestic orders. For export orders \$44.50 per flask is quoted. The London price remains £8 15s. per flask, with the same figure quoted from second hands.

Exports of quicksilver from all United States ports for the six months ending June 30 were 335,076 lbs., against 429,409 lbs. in the first half of 1901; a decrease of 92,333 lbs., or 21.5 per cent.

Minor Metals and Alloys.—Wholesale prices, f. o. b. works, are as follows:

	Per lb.	Per lb.	
Aluminum.....	33 @ 37c.	Ferro-Tungsten (37%)..... 28c.	
No. 1, 99% ingots.....	31 @ 34c.	Magnesium.....	\$2.75
No. 2, 90% ingots.....	4c. up	Manganese, pure (N. Y.).....	60c.
Rolled sheets.....	20 @ 23c.	Mangan' Cop. (20% Mn).....	32c.
Alum-bronze.....	33 @ 39c.	Mangan' Cop. (30% Mn).....	38c.
Nickel-alum.....	1.50	Molybdenum (Best).....	\$1.82
Bismuth.....	80c.	Phosphorus.....	50c.
Chromium, pure (N. Y.).....	50c.	Copper, red oxide.....	70c.
Copper, red oxide.....	50c.	American.....	50c.
Ferro-Molyb'dum (50%).....	\$1.25	Sodium metal.....	50c.
Ferro-Titanium (10%).....	90c.	Tungsten (Best).....	62c.
Ferro-Titanium (20 @ 25%).....	55c.		

Variations in price depend chiefly on the size of the order.

Average Prices of Metals per lb., New York.

Month.	Tin.		Lead.		Spelter.	
	1902.	1901.	1902.	1901.	1902.	1901.
January.....	23.54	26.51	4.000	4.350	4.27	4.13
February.....	24.07	26.68	4.075	4.350	4.15	4.01
March.....	26.32	26.03	4.075	4.350	4.28	3.91
April.....	27.77	25.93	4.075	4.350	4.37	3.98
May.....	29.85	27.12	4.075	4.350	4.47	4.04
June.....	29.36	28.60	4.075	4.350	4.96	3.99
July.....	28.38	27.85	4.075	4.350	5.27	3.95
August.....	.....	26.78	.....	4.350	.....	3.99
September.....	.....	25.31	.....	4.350	.....	4.03
October.....	.....	23.62	.....	4.350	.....	4.23
November.....	.....	23.67	.....	4.350	.....	4.29
December.....	.....	24.36	.....	4.153	.....	4.31
Year.....	.....	26.54	.....	4.334	.....	4.08

Average Prices of Copper.

Table with columns for Month, New York Electrolytic (1902, 1901), Lake (1901), and London Standard (1902, 1901). Rows include January through December and Yearly averages.

New York prices are in cents, per pound; London prices in pounds sterling, per long ton of 2,240 lbs., standard copper.

Average Prices of Silver, per ounce Troy.

Table with columns for Month, London (1902, 1901), N.Y. (1902, 1901), and Y.Y. (1902, 1901). Rows include January through December and Yearly averages.

The New York prices are per fine ounce; the London quotation is per standard ounce, .925 fine.

DIVIDENDS.

Table with columns: Name of Company, Date, Latest Dividend Per Share, Total, and Total to Date. Lists various companies and their dividend details.

*Monthly. †Quarterly. ‡Semi-annual.

Note.—A complete list of the dividends reported this year appears on page 174.

ASSESSMENTS.

Table with columns: Name of Company, Location, Date, and Amt. Lists companies and their assessment amounts.

STOCK QUOTATIONS.

NEW YORK.

Table of stock quotations for New York, listing Company and Location, par value, and prices for July 31, Aug. 1, Aug. 2, Aug. 4, Aug. 5, and Aug. 6.

Total sales, 423,226 shares. *Per cent.

Coal, Iron and Industrial Stocks.

Table of stock quotations for Coal, Iron and Industrial Stocks, listing Company and Location, par value, and prices for July 31, Aug. 1, Aug. 2, Aug. 4, Aug. 5, and Aug. 6.

Total sales, 304,613 shares. †Ex-dividend

BOSTON, MASS.*

Table of stock quotations for Boston, Mass., listing Name of Company, par value, Shares listed, and prices for July 31, Aug. 1, Aug. 2, Aug. 4, Aug. 5, and Aug. 6.

* Official Quotations Boston Stock Exchange. Total sales, 60,587 shares.

PHILADELPHIA, PA. \$

Table of stock quotations for Philadelphia, Pa., listing Name and Location of Company, par value, and prices for July 31, Aug. 1, Aug. 2, Aug. 4, Aug. 5, and Aug. 6.

§Reported by Townsend, Whelen & Co., 300 Walnut St., Philadelphia, Pa. Total sales 14,548 shares. †Ex-dividend.

STOCK QUOTATIONS.

COLORADO SPRINGS, COLO.*

Table of stock quotations for Colorado Springs, Colo. listing companies like Acacia, Alamo, Am. Con., and various mining stocks with columns for date, price, and sales.

*Colo. Springs Mining Stock Exchange. All mines are in Colorado. Total sales 208,700 shares.

Colorado Springs (By Telegraph.)

Table of stock quotations for Colorado Springs (By Telegraph) listing companies like Acacia, Alamo, and various mining stocks.

MEXICO.

July 25.

Table of stock quotations for Mexico listing companies like Durango, Guanajuato, and various mining stocks.

ST. LOUIS, MO.* Aug. 4.

SPOKANE, WASH.* Aug. 1.

Table of stock quotations for St. Louis, Mo. and Spokane, Wash. listing companies like American Boy, Black Tail, and various mining stocks.

*From our Special Correspondent.

Total sales 49,000 shares. *Reported by Hunner & Harris.

LONDON.

July 20.

Table of stock quotations for London listing companies like Anaconda, Copiapo, De Lamar, and various international mining stocks.

c.—Copper. d.—Diamonds. g.—Gold. l.—Lead. s.—Silver.

PARIS.

July 24.

Table of stock quotations for Paris listing companies like Acieries de Creusot, Firminy, and various international mining stocks.

SALT LAKE CITY.* Aug. 2.

TORONTO, ONT. Aug. 5.

Table of stock quotations for Salt Lake City and Toronto, Ont. listing companies like Ajax, Ben Butler, and various mining stocks.

All mines are in Utah. *By our Special Correspondent. Total sales, 159,940 shares.

Total sales, 67,650 shares.