COAL AGE

McGRAW-HILL COMPANY, INC.
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Devoted to the Operating, Technical and Business Problems of the Coal-Mining Industry

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Functioning Badly

WE COAL MEN are in grave danger of being thrust from our long held place as the worst functioning industry. The U. S. Department of Commerce has published a summary of the report and recommendations of the committee appointed by the President's Conference on Unemployment. It has to do with seasonal operation in the construction industries. "The committee reports," says Mr. Hoover in a preface, "that building trades workers in most American cities are employed less than three-quarters of a year. As a result the trades are fully employed for only three to five months." At that we are not sure that the palm for bad functioning rests with the construction industry. It has some close rivals, and there are some industries that do not even attempt to rival it in its inactivitiy, but these are so casual that they are not held to account.

Who Are Your Favorites?

EVERY MANAGER has his favorites—the men he believes assist him most greatly in getting out cheap and good coal, but unless he has a close record of performances, a knowledge of actual and proper unit costs, he is liable to be led astray by a glib tongue, a confident manner and personal preferences. Most managers do not know enough about what are proper costs and what are actual costs at any mines for them to form any correct judgment.

In consequence they do not know to whom to award praise, to whom to give an increase of salary, whom to keep and whom to let out. Furthermore the company officials knowing that honor is not weighed in the balance, that salaries are based on guesswork, that jobs are dependent on mere prejudice resent such unfair management. But if accomplishment is measured carefully, if costs are matters of general knowledge, the subordinate company officials know that a verdict based on both can, and probably will, be fair and that satisfactory work will be appreciated. They will be explaining when the results are bad and will not wait to be requested to explain. They will recognize the trend of costs as soon as the manager.

Shifting Fans

A PROFITABLE economy in mining is to shift fans from plant to plant to suit the conditions at the various mines. As the workings develop, the equivalent orifice of the mine changes, and the fan will not work economically if that factor of the mine is not equal to the same factor of the fan. Of course, no mine retains for long an equivalent orifice that suits the fan, but there is no economy in continuing to operate ventilating equipment the equivalent orifice of which is greatly different from that of the mine. As the workings get larger they need another fan and also, in their declining days, as they get smaller they need a fan giving a lower water gage. By shifting fans each mine can get the ventilating unit it needs. It is a job requiring an expert to make the appropriate changes, and an expert is needed to determine just when a change would be economical and when the cost of the change would be less than the economy effected by it. But the relocation of fans affords a possibility of economy not to be overlooked. Where a company has few mines it will be necessary to buy new fans and perhaps to sell the old ones, and even large companies with many mines may find that practice advisable.

So little do some people, who should know better, understand ventilation that they are disposed to criticize a fan because it fails to get as good results when the mine is large as it did in the earlier days when the mine was small. Moreover, there are men to be found who would like to get twice as much air in a mine without a change in the water gage, which is obviously impossible, for the quantity of air the mine will pass varies with the square root of the pressure placed upon it.

Find a Place for Your Slack

FINE coal will continue to be sold at lower prices than lump coal, till place is found for all the slack mined and operators have to crush part of their product. Consequently, operators should bestir themselves to show the advantages of using fine coal in boiler plants. It *is* advantageous and the public should know it. Instead of lamenting the low cost of slack, bituminous operators should actively promote its use, as the anthracite companies have been promoting the sale of buckwheat.

This is a problem of salesmanship which should be impressed on every man who comes in contact with the backwoods, backward consumer who is still burning run-of-mine under boilers. The railroads should be urged to use stoker-fired equipment, and the domestic consumer should be recommended to use smaller coal, instead of buying lumps and reducing them to dust with a hammer. We all need to be told. Rapid progress is never made unless someone is prepared to deliver the message of better methods and lower costs.

Why leave this to the boiler salesman who does not meet the consumer till the consumer calls him in? If the boiler company's representative tried to sell the better equipment his word would be discounted as a too greatly interested party. In fact the average consumer of mine run never meets the maker of stoker-fired equipment, the maker of the better boilers not being engaged in the selling of the cheaper, less economical types. The salesman of coal can sell the idea better than almost anyone else as he is actually advising that his client buy less and cheaper coal. The boiler man

would be recommending his customer to spend more for boilers than the customer desired and, usually, to scrap the old boilers to buy of him the equipment he advocated. Attacking from that unfortunate angle he could not hope to overcome the buyer's resistance.

Another—and a Better—World

CARLISLE SPEDDING, a young man about to be put in charge of certain Whitehaven collieries at the beginning of the last century, took a trip to Newcastle-on-Tyne to see how the mines were being operated in the Northumberland collieries. Probably he had economic purposes in view and went principally to find out how to make the Cumberland collieries profitable, but he was nevertheless quite largely interested in safety, as is evidenced by his later introduction of the practice of "coursing," or as we would say, circulating the air through the mine workings.

He also invented the "Spedding Steel Mill" by which in those days, before the introduction of safety lamps, it became customary to light gaseous mines. He learned that a spark produced by friction would not ignite gas, and by revolving a steel wheel against flint he was enabled to obtain a steady stream of sparks that would illuminate, even if uncertainly, the face at which the miner was working, the methane being too slow in combustion to be ignited by so fleeting a source of heat.

But whatever the purpose of his visit, this is true: He had to disguise himself as a miner to get an opportunity to visit the mines, so closely did the owners of one property hold their secrets from the employees of the owners of another though in the same country.

Today we may note with pleasure the World Power Conference held by the same nation with scientists of all the civilized world present and with the notables of that country welcoming the visitors and all contributing freely to that congress the facts regarding their methods of operation. The world indeed has changed—and for the better. Those who doubt that fact kindly take notice. A little more than a century ago, the world in general kept its manufacturing methods so secret that enterprising Englishmen went abroad as workmen to learn what was being done in foreign countries. It will be recalled how many years earlier one of them, Richard Foley, disguised as a fiddler, seeking work, with infinite patience and no little hardships, obtained the secret of the nail-splitting machine then in use only in Sweden. English manufacturers were at that time, at least, equally secretive.

The World Power Conference is only one of many straws showing how the world is changing. Men are more and more traveling, not alone for pleasure and profit of the mind but to learn how to conduct their business. Ideas are no longer buried in one man's mind to die with him. They fructify in every country; they bear seed the world over. The greatest gift that any man can give is not a library of dead books, of histories or of manuscripts that describe the past, but the records of his own contribution to human progress, the new methods that have sprung from his experience, the ideas that his own brain has evolved. The libraries are well, but the record of modern practices is even better and, best of all, even a man of small means often can in this way serve the public better than the man of millions.

A Superiority Complex

IT IS A SAD commentary upon unionism that most of the local unauthorized strikes occur in the strongest union fields. The latest exhibit worthy of note was the strike at the new Orient No. 2 mine in southern Illinois where union officials had just negotiated a new scale for loading-machine operators. A strike occurred at once. It wasn't a strike of loading-machine men, but of men running coal cutters. The agreement, which had just been written, provided that these men should receive the union scale of thirteen cents a ton and that until scales were installed at the mine, their method of checking coal should be left to the machine men involved and the management. But when the men could not readily fix with the mine superintendent upon a method of payment, they struck. Naturally the company insisted that they go back to work and then take up the case under the contract. It was simply another instance of unauthorized striking.

A probable reason for this strike is that the men had been working steadily developing the mine for a considerable period in spite of the fact that fishing was pretty good. But such a strike could hardly have occurred, no matter how powerful the lure of the catfish, had it not been for the union state of mind. In Illinois, the union's strength these many years has produced a superiority complex in the minds of the men. This attitude is infrequently seen during times like these, but it still is likely to crop out in men who have been eating three square meals a day and who ride back and forth to work in automobiles of their own. They forget that they have pledged themselves to keep the mine running and settle disputes by peaceful methods. They forget that they are pledged, as union men to support the policies their leaders determine. They are spoiled by the very strength of their union.

Now that unionism is in distress everywhere, there is ample reason for President Lewis to campaign the fields he still holds, declaring in no uncertain terms that the very life of the union depends upon union men living up to their contracts. Said he in Iowa: "There devolves upon your union the same degree of obligation that exists in the making of a contract between two men. . . . If a man in some business transaction violate his word to you once, twice, thrice, you arrive at a point where you no longer deal with him because of loss of confidence. . . . You members of this organization will understand that when officers of your union ask you to carry out your wage agreements they are doing so to protect your own record as an organization. The existence of the United Mine Workers of America must be justified if it is going to exist."

These are no longer hollow words. They used to pass the union miner by without affecting him emotionally beyond tickling his risibilities slightly. Now they send a shiver down into his stomach. It is an unpleasant shiver. The union miner doesn't thank anybody for stimulating that sensation within him. But he has got to experience it for the good of the industry. It takes a good leader to go about the unionized fields giving it to him without disrupting the union in the process. President Lewis is that kind of a leader. So we rise once more to hope that Mr. Lewis will stick to his job even though the health of President Gompers of the American Federation of Labor is again reported to be frail.

A Stripping Shovel and Car-Haul Incline

Getting More Work from a Stripping Shovel

Long-Reach Stripping Shovels Are Slow in Operation— By Providing a Separate Machine to Waste the Spoil the Capacity of a Small Shovel May Be Greatly Increased

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MACHINE stripping, from its humble beginning fifty years ago, when a cover 15 ft. in thickness was considered a mountain, has been developed to such an extent that uncovering coal 60 ft. below the surface soon will be commonplace. In all this progress importance should be attached to the development of equipment rather than to the actual methods of stripping. It is the equipment and its performance that determine the economical limits of any stripping operation.

The biggest of present-day shovels will uncover coal at depths of as much as 60 ft. below the surface. This may perhaps be done at a profit if the market is favorable, but in all probability some other form of equipment could be used that would reduce the operating cost. There is a practical limit to the size of the shovels that can be used for stripping coal. Increased capacity and reach entail increased weight which tends to crush the coal bench on which the shovel travels. These large shovels also can be manipulated only with a large labor force and at the expenditure of more power. The capacity of a shovel for work is not proportional to the length of its reach, and its efficiency, theoretically, decreases as its size is increased.

Thousands of acres of coal lie under a cover that is only slightly thicker than that which heretofore has been stripped by shovels. Coal thus protected by heavy cover, is more merchantable than that from shallow stripping and should find a ready sale, especially if the bed is advantageously located with respect to its natural market. Under such circumstances the ratio of thickness of cover to thickness of coal which in the standard practice of the past in the northern coal fields has been fixed at six to one, might be expected to increase if the coal is buried under an overburden not exceeding 60 ft. Purer coal and reduced cost of stripping might be instrumental in making the ratio as high as 10 to 1. Thus the stripping of a 6-ft. bed under 60 ft. of cover might be entirely feasible.

Combination of Shovel and Belt Failed

Back in 1904 George E. Turner built a stripping machine near Missionfield, Ill., incorporating in its construction a long conveyor boom and a short-boom shovel. Both of these devices were mounted on a single truck and functioned and operated as a unit. Later on the shovel attachment was removed from the conveyor truck and its place taken by an independent steam shovel. Two units were thus provided which acted independently of each other. As recounted by Grant Holmes in an article entitled "Early Coal Stripping Full of Heartbreak," published in the June 5 issue of *Coal Age*, the conveyor machine was "a theoretical success but a practical failure." The belt had to be replaced frequently and various other parts constantly were breaking. This experiment apparently blasted the hopes of stripping men so far as the belt conveyor for carrying heterogeneous materials, such as a mixture of clay, shale and slate, from the pit to the spoil bank, was concerned. Consequently up to the present few attempts have been made to apply conveyor belts to the disposition of stripped material.

In 1915 the Dobbie Foundry & Machinery Co., of Niagara Falls, New York, built a portable incline to handle two solid-body cars or skips which are filled with spoil by a small stripping shovel. Each skip is then drawn separately by a hoist and rope to the top of the incline, where it enters a dump and is tipped

Note—Naturally a small shovel can work faster than a big one. By employing an incline to dispose of the spoil as shown in the headpiece the shovel can be kept steadily at work digging overburden. Each machine thus does only the work for which it was designed and together they can dig and waste as much overburden as could a far larger shovel alone.

forward on its front wheels, discharging its contents onto the spoil bank below. The purpose of the Dobbie portable incline and the Turner conveyor are identical, both serving to carry the overburden from a small stripping shovel to a waste bank. The construction of the Dobbie portable incline, however, is quite unlike that of the Turner machine and overcomes the objectionable features that were responsible for the failure of the latter.

As shown in the accompanying illustrations the frame of this incline is in reality a cantilever truss made up of I-beams, angles, channels and plates which is tied to a bedframe of H-beams. This bedframe rests on four railroad trucks set in pairs on a wide double track to prevent rocking. The incline on a slope of 18 deg. is 173 ft. long over all and has a rise of 64 ft. from the top of the track rail to the tip of the truss. The dump is so located as to permit the building of a spoil pile 52 ft. high, with its vertex 150 ft. horizontally from the bucket of the stripping shovel. The long overhang of structural steel which projects toward

FIG. 1
Wasting Spoil

This view of the portable incline is taken from the spoil bank. It shows the simple construction of the cantilever with the car or skip dump at its upper extremity. This machine is capable of wasting as much spoil as could be dug and wasted by a giant stripping shovel. A comparatively small steam shovel in combination with this incline are thus able to do as much work as a big expensive stripper. The view which is naturally foreshortened shows the incline out of proportion. The headpiece gives a better idea of the relative sizes.

and above the waste pile is counterweighted by a reinforced-concrete block cast on the bedframe of the incline.

On this incline two tracks are laid. Each consists of 60-lb. rails on an 84-in. track gage. On each track runs a 5-cu.yd. solid-body car which is pulled up and lowered down the incline by a 1⅛-in. steel rope, guided by sheaves and securely attached to the car.

Each car is raised and lowered independently by its own cylindrical hoist drum. These two drums are driven in tandem through a train of gears by a 100-hp. 440-volt induction motor, which also is geared to a small slow-motion drum for propelling the incline. The entire machine is moved by a snatch block and cable.

In the dump section of the incline the car track proper is horizontal. On each side of it at the dumping point, however, are placed elevating rails which engage a pair of wheels on the rear axle of the car outside of the regular track wheels. As the rope pulls the car into the dump, the front wheels remain on the track while the auxiliary wheels on the rear axle follow the elevating rails, swinging the car into an almost vertical position about the front axle as an axis. These details are shown clearly in Fig. 3.

The Dobbie portable incline has been used successfully for nine years at the limestone quarry of the Diamond Portland Cement Co., Middle Branch, Ohio, in conjunction with a steam shovel for stripping overburden preparatory to quarrying operations. The limestone formation worked at this quarry is the Putnam Hill bed. It attains a thickness of 8 to 10 ft., is underlaid by the No. 4 coal seam and covered by sandy loam, clay and slate. The average thickness of the overburden is 15 ft., the maximum being about 36 ft. Where the thickness of the cover is greater than 20 ft., shale occurs directly above the limestone. Otherwise the cover is all of a loose sandy nature.

Because the thickness of the overburden is fairly uniform, it is stripped off by parallel cuts extending across the property. The berm, or exposed bench of limestone, between the stripping and loading shovels is about 85 ft. wide. Approximately 60 ft. of this width is occupied by the carriage and short overhang of the incline, the remaining 25 ft. representing the width of cut made by the stripping shovel. The rock or quarrying shovel, which follows the stripper at a distance of 400 to 500 ft., naturally, handles a cut of limestone no wider than the stripping cut. On reaching the end of a cut, the stripper "runs back light" to the point of starting, each successive cut being made in the same direction.

Several reasons that justify "running back light" and making all cuts in one direction might be given. Chief of these, however, is the necessity for keeping the stripping and loading shovels some distance apart in order to maintain a reserve of exposed limestone in front of the loading shovel. This intervening distance between shovels must be maintained also in order to keep the incline out of the blasting zone. The difficulty encountered in maneuvering the incline—that is, in

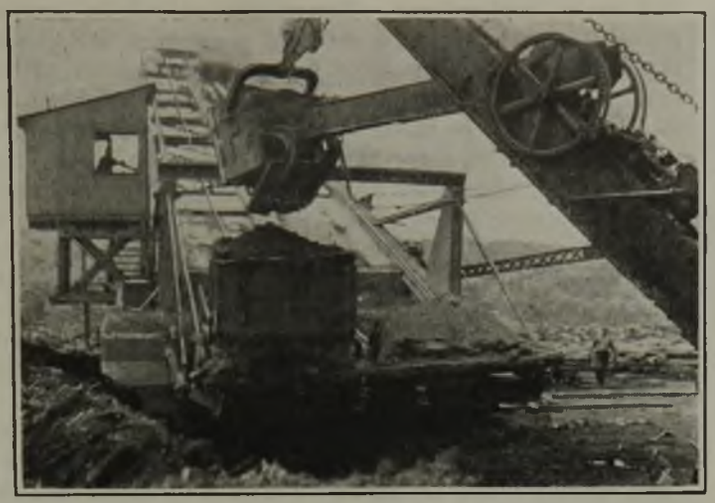

Fig. 2—Loading a Car on the Incline

Solid-body cars are used on this incline. Each car holds about two dippers full of spoil and makes one trip to every four dips of the shovel.

turning it—demands that it be "moved back light." If the incline were mounted on caterpillars, it would be more portable and obviously the necessity for "moving back light" would be removed.

The stripping shovel, is an old machine having a swing of only 180 deg. It is operated by steam and has a 2½-cu.yd. dipper. Being of the railroad type, much time is lost in moving up after each "bite," as well as in striking the bank several times in order to fill the dipper. Much of this time could be saved through the use of a caterpillar-mounted shovel.

Inasmuch as the quarry practically adjoins the company's cement plant an alternating-current transmission line is carried to the strip pit. As was stated earlier in this article, the incline is electrically driven. So is also the rock shovel which has a 1¼-cu.yd. dipper. The incoming alternating current of 440 volts is converted to direct current of 220 volts by a motor-generator set mounted directly on the shovel. A portable compressor unit which supplies air for drilling blast holes is also electrically driven.

The 2½-cu.yd. stripping shovel and the portable incline have about the same capacity when working with fairly heavy cover. This outfit has successfully stripped overburden as thick as 36 ft. Although the shovel boom is not long enough to reach the top of a bank of this height, it successfully handles heavy overburden by undermining and caving. It is believed that the incline is capable of handling cover 40 ft. thick. Larger inclines of course could be built to handle still heavier covers. Where shale occurs it is usually blasted.

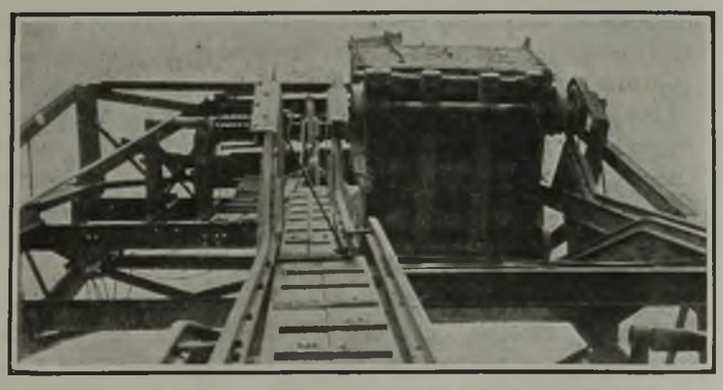

Fig. 3—Car Tilted Into Dumping Position

The dumping arrangements are extremely simple. The front wheels of the car follow a level track while the auxiliary wheels on the rear axle rise upon auxiliary inclined rails. By this means the car is up-ended to practically a vertical position.

When working in cover 35 ft. thick, this incline has handled 2,900 cu.yd. of shale and loose sandy material in 10 hr. Under extremely favorable conditions, it has transported to the dump as much as 185 cu.yd. in 13 min.

The number of men required to operate and move the stripping shovel and the incline depends upon the thickness of the cover being stripped. When working in light cover the labor charge per ton of material handled is comparatively high because the equipment must be moved up frequently. Where the cover is about 20 ft. thick eleven men comprise the stripping crew. Three of these operate the shovel, one attends the incline while the remaining seven lay track and perform the other duties incident to moving the shovel and incline.

This company is preparing to open a new limestone quarry not far from the nearly-depleted one now being worked. It has made a thorough examination of the property. Test holes show that the average thickness of the cover is about 20 ft., and that the overburden consists almost entirely of loose, sandy material. It is the intention, therefore, to strip with an electric shovel which will deposit the spoil material on a portable incline conveyor.

Rubber Conveyor Belt Will Supplant Skips

On this latter piece of equipment a 2-ft. rubber belt will be utilized in place of cars for carrying the spoil to the top of the incline. The shovel will deposit the

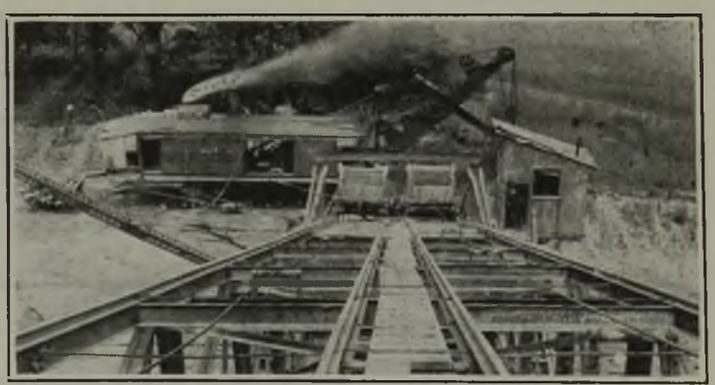

Fig. 4—Looking Down Incline Toward Shovel

There is nothing complicated about this equipment. The cables attached to the cars are led around sheaves at the top of the truss and thence beneath it to the tandem drums of the electric hoist.

stripped material in a small bin which will be covered by a grizzly to keep out large pieces that are liable to choke the throat of the bin. A steel-pan conveyor feeder will regulate the flow of spoil material from the bin to the rubber belt which will be housed in a gallery. The belt will be driven by a 20-hp. and the incline propelled by a 50-hp. motor. Both shovel and incline will be mounted on caterpillar trucks.

Though the reach of the cantilever truss on the conveyor incline will be equal to that of the car incline now in use, it need not be so heavy. The live load on the car incline is about 20,000 lb., and exerts its greatest force during the dumping of the car at the end of the cantilever. The overhang of the truss, on both car and conveyor inclines is about 100 ft. A 2-ft. belt will carry about 25 lb. of load per linear foot or a total of 2,500 lb. The conveyor also eliminates the stresses which are set up by the impact in dumping a car.

It is believed that the conveyor incline mounted on caterpillars, together with a 1¾-cu.yd. full-revolving

Fig. 5—Moving the Incline Forward

In order to keep the incline alongside the shovel it must be moved up periodically. This is done by means of a cable that is wound onto a small drum on the car hoist. A dead man or multiple-stake anchor forms an ample fastening for the snatch block.

electric shovel, similarly mounted, will handle as much material as the largest type of shovel now in general use. The stripping shovel will have a radius of 33 ft. at an elevation of 8 ft. Not only is this lighter equipment expected to handle as much material as a giant shovel, but it can be operated with one-third the labor or perhaps even less. It is reasonably certain that four men will be able to perform all the duties incident to the operation and movement of both the shovel and the conveyor incline.

In the stripping of coal the Dobbie incline should find many applications. Experience gained in several industries in handling a mixture consisting of exceedingly small-, and large-sized pieces precludes the utilization of rubber-belt conveyors. If the rubber-belt or steel-pan cannot be made to work satisfactorily reliance must be placed on a car-haul arrangement on an incline, the success of which has been convincingly demonstrated by nine years of service in the Middle Branch limestone quarry. In any event, the incline and also the shovels will probably work to best advantage when mounted on caterpillars. It seems likely that coal strippers have neglected a feasible piece of equipment that advantageously might be employed in stripping coal under cover ranging from 20 to 60 ft. in thickness.

Possibly the Dobbie portable incline, with a 100-ft. cantilever truss and 5-cu.yd. cars, working in conjunction with a small stripping shovel, might not handle as much material per shift as a machine with a 90-ft. boom and a 6-cu.yd. dipper; nevertheless, in the final analysis the combination of two small machines has several merits to recommend its use. The investment in a portable electric incline and a small electric shovel, both mounted on caterpillar trucks, is less than half that necessary for an eelctric shovel of a size sufficient to do the same work as the former equipment. It is believed by some that shovels weighing as much as 300 tons some day will be mounted successfully on caterpillars. Thus, far, however, this feat has not been accomplished, and until it is the comparatively light portable incline mounted on caterpillars, can be moved readily along the berm, thereby eliminating much lost time and considerable labor.

The Miner's Torch

On Regulating King Coal

"OLD King Coal, was a jolly old soul!"
Perhaps he was but he isn't now.

Everyone is agreed that he has no soul and furthermore he needs a super-king or something of the sort to make him behave. The only reason that he has not already been put under surveillance is that no two people can agree as to just how a super-king should act, in fact I rather think if the truth were known that they don't exactly know what a super-king is.

First, Congress as a body tried to visualize the Super-King myth; that got the President interested. The President appointed a Commission and they got interested. The Commission formulated a voluminous report which they gave out in installments and each installment interested an editor or two; by the time all of the installments reach the daylight of publicity all of the editors in the country will probably have become interested. Now, to make matters worse, some of our Congressmen have decided that their first guess was wrong so they are beginning all over again, armed with the information and suggestions brought out by the President's Commission and the newspaper editors who commented on the Commission's report.

It will take at least another year before all of the editors and the politicians who have become interested will have had a chance to talk and write themselves out; and in the meantime what will happen, in fact, has already happened? Only this:—One can buy all of the coal that one wants at a fair price and the quality is satisfactory. When this information becomes generally known the editors and the politicians will lose interest in King Coal and his dominions.

So far as I can discover no one is entitled to credit for bringing about these improved conditions in the coal industry. They are simply and wholly the result of circumstances beyond the control of kings and super-kings, to say nothing of politicians.

The miner who loaded dirty coal has had a change of heart because he knows that there are plenty of men ready to take his place if he is discharged. The operator who has been loading washer refuse and calling it coal has gone out of business because mines producing coal with a reputation as to quality are only running three and four days a week. The broker who made a practice of watching the coal cars in the railroad yards so that he might boost prices whenever a shortage was in prospect has given up in digust and changed his line of endeavor. And as for price of coal, it is, of course, higher than it was in pre-war days but it is so near to the actual mine cost that only the best equipped mines are now being operated on a profitable basis. Even the United Mine Workers have seen the light and have postponed indefinitely the next strike.

So long as the erstwhile King Coal is a pauper and furnishes all the coal the public wants he will be forgotten, but as soon as the market changes and Coal is once more King the public will dig up its wise saws about the eternal need that the producers of essentials serve the public at minimum profit and in adequate quantity without recoupment of losses.

Should Mines Be Subjected to a Yearly Valuation?

As the Probable Life of a Mine Changes with Development, as Market Requirements and Conditions Modify Profits and as Such Changes Demand Operating and Financial Reconstructions, Frequent Revaluations Are Desirable

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COAL, metal or non-metallic mines—it makes no difference—all are hazardous and swayed by the same gods of chance. Good business demands that all the knowledge and control possible be applied to the gamble that underlies such operations.

Whether operations were initiated under a fully detailed layout carried to the point of exhaustion or just a vague development scheme, upsetting agents are liable to enter year by year. Thus a continual investigation and readjustment is necessary to assure of an ultimate profitable conclusion. An annual survey of the entire mine is the check that will determine if ultimate success is assured.

All mines need a revaluation—a research to ascertain if their discounted worth is what it was at their last inventory less the extracted profits to date. This valuation, each time, should consider the mine as a new property, using the past operation as a guide. Such a survey is a forecast of succeeding operations. Then, if the previous planning does not fit in with this forecast of the final result it should be altered. Changes in the occurrence of mineral, changes in methods, equipment, labor, geological controls, grades of product, markets and economics are some of the factors that influence the new forecast and scrap those made in the past. On the other hand the operations should not be revised unadvisedly as a well-engineered initial plan will terminate more successfully if not tampered with or subjected to continual alteration. But an investigation of the mine in its entirety is the only way to check up these plans or the governing factors. This applies even more forcibly to enterprises the managements of which at starting did not attempt to construct a definite program.

Mines with a production of 3,000 tons per day and upward, whether run singly or in groups, are as vulnerable to these conditions as the little 200-tonner. In fact, more so, as their far-flung workings are more liable to run out of bounds than the easily overseen small operation. The large corporations with technical staffs employ them chiefly on the going production as this department is seldom overmanned. And in addition these technicians are often blocked by historic methods and the "practical man." But without a comprehensive look into the future that same great smooth running plant ultimately may tangle itself into a Gordian knot.

Small mines with only the fatherly hand of the operating man, intent on costs and the myriad daily details to direct its destiny are in dire need of this valuation. With no compensating operation to tide it over, many a constricted mine had much better shut up shop now if the future is all guesswork. Whether the company is large or small and has, or fails to have, its own experts, an outsider's viewpoint is likely to be enlightening as prejudice in favor of their past plans may warp the judgment of the company's engineers. The future may be held only too readily to fit into the past.

Few other industries fail to have periodical analyses made of their resources, producing conditions and prospects. Accountants are called in, inventories are taken, markets are investigated, adjustments are made for the trend of the times and the future is planned anew. Yet these businesses have known reserves and have a growing life. All the more reason then why a mine with its wasting assets should try in every way to safeguard its limited existence and apply all the certainties possible to its hazards.

A mine valuation may have many forms and be carried into wondrous detail according to the proclivities of the examining engineer and the demands of the client. But boiled down, a report should show the ultimate earnings and the present worth derived from a discounting of these profits.

To discover the ultimate earnings, the following main facts should be ascertained: (1) Reserves to date segregated into known, probable and possible tonnages, (2) sampling and grade of tonnage, (3) condition of the mine and plant, (4) possible yearly production, (5) costs, values and expected profits, deduced from operating plans and life and taken over a certain average period.

The present worth, which is the indicator and final figure for comparison, is derived as follows: (1) Operating plans based on reserves, grade and condition of the mine are devised or revamped or approved; (2) life of mine is ascertained from operating plans and in consideration of markets and desired financial return; (3) ultimate earnings are discounted over the derived life and based on desired financial returns, which give the amortization and the return on the investment, and thus determine the present worth. This is the climax of the story telling how profitable the operation

EACH MINE when opened should have some definite plan, not alone as to its engineering but also as to its financial future. On its projected life depend its present worth and the expenditures that may be profitably made in its development. As the mine is operated a clearer idea is obtained as to its mineral resources, as to the percentage of mineral that can be extracted, as to cost of production and the market price of the product. Many changes occur that make a revision of former estimates necessary. Are these revisions made? Mr. McCormack says they are not. In his belief they should be made yearly.

really is and how it compares with past ideas or what could be earned in other industries with same investment and risks.

The examining engineer in his field work accumulates the data on the reserves, grade and condition, paying due consideration to exploration, development and geological factors and to adjoining operations and history of the district. The balance of the items are gained from a study of the field data. All or a portion of this information may or may not have been obtained on the mining property before it was developed. If never procured no operation of the property should have been considered. If once possessed and never rechecked, then the enterprise is sailing on an uncharted sea with only a lucky star for a compass.

As has been said before, a valuation is a forecast and as no forecast can be absolute—as it is humanly impossible to look into untouched formations or foretell exactly the economics of years hence—then the more often a forecast is made the closer it approaches the truth. In a thirty-year life how much more accurate is the forecast made in the fifteenth or seventeenth year of what will happen on the twenty-seventh year than is the valuation of the fourth year. It is certain that any capital asked to invest in a mining operation will demand the value on the date of that request and no other. Therefore as the operator's money is of the same worth as the capitalist's, it is equally befitting that he know to the same degree just where his property stands.

NO CAPITALIST would invest money on the basis of an estimate of the value of a property made many years ago. He would want to know the value at the date of investment. Can the owner or owners of a property satisfy himself or themselves by trusting to a survey or a plan made many years ago when less was known as to the mineral resources, the capacity of the plant, the character of the market and a number of other factors, the character of which is more clearly revealed by the passage of time?

Even in the short interval of a year many changes may occur to crystallize the future for the property. Taking the main features of the report, as itemized above, into consideration the following are some of the influences constantly at work which will affect the welfare and profoundly modify the ultimate end of the venture:

(1) Knowledge of the deposit newly acquired from work at adjoining operations, from the development of the district or from the developments of the mine itself may change tonnages from probable into possible or may raise or lower the total reserves. As these are the primary assets of the company, any change in their totals is of vital importance. Simply deducting each year's production from an original estimate is by far too inexact a method in view of the yearly depletion of the known resources leaving the less definitely developed reserves as the sole resource of the future.

(2) Original geological inferences now may be so incorrect as to reapportion the probable and possible tonnages. As all mines at birth are regarded optimistically with reference to these estimated blocks, their alterations become serious.

(3) Explorations and developments recently completed should call for a revaluation because, whether they verify the original calculations or disprove them, a new basis for evaluation is created.

(4) Resampling may alter the expected grades and, in conjunction with new treatments, markets and economics of the industry, this changing of grades or consequent value is tremendously important. It is emphasized here that, if the mineral is closely and expertly sampled continuously and the information is kept plotted on analyses maps, the present and future condition of the mine will be judged with a greater degree of certainty.

(5) Pushing of one part of the initially planned harmonious operation ahead of another may breed difficulty later on. This calls for prompt rectification despite the fact that apparently the work may be progressing smoothly.

(6) Gouging of low-cost tonnage or "high-grading" may have skimmed the cream needed later on. The down-grade returns after the peak of the life are thus aggravated, and now is the time to ascertain if the candle is burning at both ends.

(7) The plant may be found to be too small for coming yearly production based on new market or reserve conditions. Hence a fresh investment is demanded, and a valuation shows what change in present worth this would occasion.

(8) Or the plant may be found to be so oversized that production should be speeded up to utilize its capacity economically, thus shortening the life and putting a new value on the discounted earnings.

(9) If the workings are so spread out that co-ordinated supervision has become difficult, the condition of the mine may have become so involved—yet unheeded—that larger losses ultimately will be sustained and the earnings will be decreased.

(10) New equipment or methods may now be successfully installed, with consideration of other factors, that will give better results. Or they may be thought ready to install when in reality the final conclusion does not justify them. Only a survey gathering all the parts together can prove this.

(11) Labor demands or man productivity are constantly changing and calling for other means to accomplish the desired results than those once thought adequate. How best obtained can only be ascertained from a detailed investigation as labor is the major consideration in every phase of the operation.

(12) Redetermined values and costs may differ so radically from those of the last valuation that the new figures will be astounding. The fair average period basis of one or two years ago may now be seen to be wholly wrong. As costs are fully as important as values, and more fluctuating, the expected earnings hinge on this more than on any other of the factors.

(13) Operating plans may be found to be incapable of producing the required tonnage and thus require alteration. A comprehensive survey will show whether other plans will be justified at higher cost but larger tonnage; or just what the ultimate cost of the new plans will be. If not warranted, then the life must be lengthened and the present worth decreased for the same reserves.

(14) Appreciable requisitioned expenditures are only

justified by a proven increase in the ultimate earnings. An expenditure of $100,000 on a plant or a new shaft may show a decrease in costs over a certain tonnage but it is guesswork to justify it unless there is enough surely proven tonnage that the profits will absorb the investment. Even then the proof may not be conclusive as co-ordinate operations are vital factors. Therefore a valuation of the entire operation is the only absolute guarantee that the expenditure is justified.

(15) Due to far-reaching influences and financial conditions, capital may now require other returns than it formerly did and only complete revaluation can be depended upon to devise the proper means.

It is clear that any one of the above factors or a combination of few or all are likely to be found in any mining enterprise and to be fundamentally important in determining the ultimate profits. As there is always the strong possibility that one or more of these agents will be working in various directions—sometimes unknown, sometimes unheeded—an annual valuation is a necessity. And mines have controlling peculiarities: one will be in danger of excessive costs though its reserves will furnish a safe and stable background; another's health depends on its preparation charges; the price of product raises or decreases the value of a mine which otherwise would be a world beater. In these cases too much interest may be centered on the governing trait, and a yearly valuation is needed to keep the rest of the house in order.

OPERATORS are often averse to facing the facts. They dread an inquiry by an accounting engineer as men have been known to postpone an investigation into their health, already undermined by a serious and insidious disease. In the case of health a knowledge of the existence of the ailment may enable measures to be taken to combat it. It is not otherwise with a financial disorder. Once definitely determined bankruptcy and loss may be averted.

The following example will illustrate how even two or three of these forces, quietly acting, affect the functioning of a mine and how the survey explores and corrects to the best possible degree these conditions:

A certain mine was being worked on room-and-pillar panel system on two adjacent, steeply pitching troughing seams outcropping at surface. The main haulageways were being extended on the strike in 300-ft. lifts. The original exploration had been made by drilling from surface and from the outcrop and the original estimates had been based on this exploration and on the bed as already developed. The mine was opened in 1914, was put into full producing shape in 1917 and had been operated to date. Costs and prices have been assumed for purpose of illustration.

The total reserves were 10,000,000 tons which at 90 per cent recovery gave a recoverable reserve of 9,000,000 tons. The maximum production being averaged at 500,000 tons annually a plant to assure that capacity was constructed. Accordingly the property was estimated to have an eighteen year life.

Product given average value of $6.50 per ton	Average basing period 1907–1917
Product given average cost of $5.75 per ton	
Netprofits accordingly estimated at $0.75 per ton	
Capitalizat.on	$2,500,000

The annual net profit was figured at $375,000 equalling 15 per cent dividend on capitalization. The amortization and capital return was figured at 4 and 10 per cent respectively, which for an eighteen year life would require a 14 per cent dividend. Thus estimated the dividend more than meets all requirements.

The total expected profits of $6,750,000 when discounted to present worth at 4 and 10 per cent for an eighteen year life equals $2,700,000.

During the operations of the last year, the workings up the pitch encountered numerous pinched-out areas and one end of the operation was cut off by a fault. Increased labor-and-material costs and demands of the market for closer and cleaner sizing drove costs up to $6.25, values meanwhile rising only to $6.85, thus leaving a net profit of $0.60 per ton. An off-market had only absorbed 400,000 tons, leaving the schedule 100,000 tons behind. From the recoverable reserves of 9,000,000 tons had been extracted 2,400,000 tons; therefore the future reserves were thought to be 6,500,000, allowing 100,000 tons for local pinches. The remaining life of the property was estimated to be at least 13 years. This would give the present worth of expected profit from date (still holding to original 75c. per ton profit as it was thought that the basis would return to normal) to be $2,330,000.

Due to uneasiness on part of some of the principal stockholders, a valuation report was made which disclosed the following facts: Pinched-out areas and data on faults from this and surrounding properties proved that seams were cut off from outcrops and displaced and that the total recoverable reserves were now only 5,500,000 tons at a 90 per cent recovery, but it was estimated that if the present operations were continued the recovery would drop to 85 per cent due to mining losses along the pinched areas and the fault. Thus the recoverable reserves would be only 5,200,000 tons. The plant was not large enough to handle more than 500,000 tons annually, therefore off-year set backs could not be made up later. These off years should be expected to occur on the average about every sixth year. The costs and prices now obtained were shown to be more nearly normal for the life of mine as the old basis would never return. This gave only a 10-year life at an output of 500,000 tons annually and an annual profit of only $300,000 which was a 12 per cent dividend on the $2,500,000 capitalization, whereas 19½ per cent was now required. The present worth of total expected profits was now only $1,636,500, as compared with $2,330,000 before.

The report showed that by certain changes in mining methods, the recovery could be raised to 93 per cent (if installed at once) giving recoverable reserves of 5,650,000 tons. By changes in plant costing $100,000 the straight annual production could be raised to 650,000 tons with reserve capacity of 100,000 tons to make up for off years. This would cut costs to $6.10 including depreciation on the new $100,000 investment, thus leaving a margin of $0.75 per ton profit or a net annual profit of $487,500. This would be a 19½ per cent dividend on the capitalization, whereas 17 per cent would be required. The present worth of expected profits was now $2,100,000 after allowing for interest on the $100,000 additional plant.

Now, as the present worth of all expected profits determines the intrinsic value of a mine, a comparison

To Prevent Fouling, Swivel Mine-Car Hitchings Should Be Lubricated

By J. W. Powell
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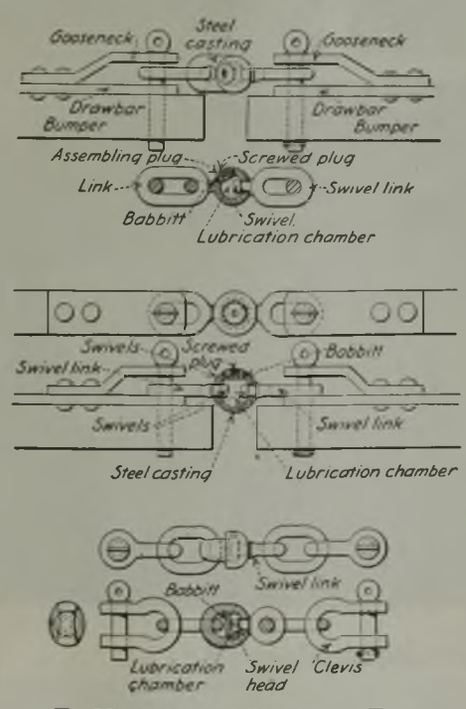
Welch, W. Va.

THE most important requisite of a swivel hitching is that it shall always function easily with no tendency to foul while a trip of cars is being dumped. In fact, the successful operation of a rotary dump depends in large measure upon the proper swiveling of the hitchings. I recall the experience of a large coal company that installed a rotary dump and equipped its cars with swivel hitchings, only to discover too late that they fouled so frequently that the cars had to be uncoupled before being dumped. Thus, one of the most important advantages of this type of dump was wholly lost.

Other important features of a good swivel hitching are that it should have maximum strength without excessive weight, a minimum of wear and friction, and that it should resist rust and corrosion, especially between the swivel head and its seat.

The swivel hitchings described in this article have been designed to assure these results and provide a coupling that will always function with a minimum of wear and friction, and no corrosion of the swivel head or seat as a result of the action of acids. This makes the hitching practically indestructible.

Referring to the drawings, it will be seen that the most salient feature of this hitching is the means provided for automatic lubrication of the swivel head and seat, the points of greatest wear. The swivel head in every case is completely inclosed in a metal chamber that can be packed with grease or other lubricant. This grease slowly works its way out of this container through the clearance space provided for the swivel shank, but in so doing, it thoroughly lubricates the swivel head and seat. This prevents the destructive action of rust and acids on the metal and reduces the friction and wear to a minimum. The metal chamber protects the swivel head from injury. Its spherical shape gives maximum strength and resistance to shock, distortion and crushing.



To Make Swivel Hitchings Turn

Three types of swivels, the top Type *A*, the middle Type *B* and the lower Type *C*. Type *A* is for round-bumpered cars and has only a single swivel. Type *B* has a double swivel and is also for cars with round bumpers. Type *C* is for square-end or double-bumpered mine cars.

Type *A* hitching is adapted to round-bumpered cars. It consists, as shown, of a hollow spherical steel casting provided with an eye to receive a link. It has one cored hole for the assembly plug and one for the swivel shank. In assembling, the link is installed in the usual manner by forging it in place after the swivel head has been formed. A thin paste of emery dust and oil or a similar abrasive is then placed in the chamber and the swivel head and seat ground together under tension.

All abrasive is then flushed out with oil after which the assembly plug is babbitted in place. The lubricant chamber is then filled and sealed with a small plug. Grinding can be omitted if desired, allowing the swivel parts to work in and seat themselves in service. In the largest size of this type of hitching, the swivel casting weighs about 7 lb. and the total weight of hitching ranges from 10 to 18 lb. depending on the distance between the coupling pins.

Type *B* hitching has a double swivel and is likewise adapted to round-bumpered cars. It is assembled in the same manner as Type A, but swivels somewhat more easily because of its double head. The weight of the swivel casting is about 6 lb. for the largest size, and the weight of the entire hitching is from 10 to 16 lb. depending on the distance between coupling pins.

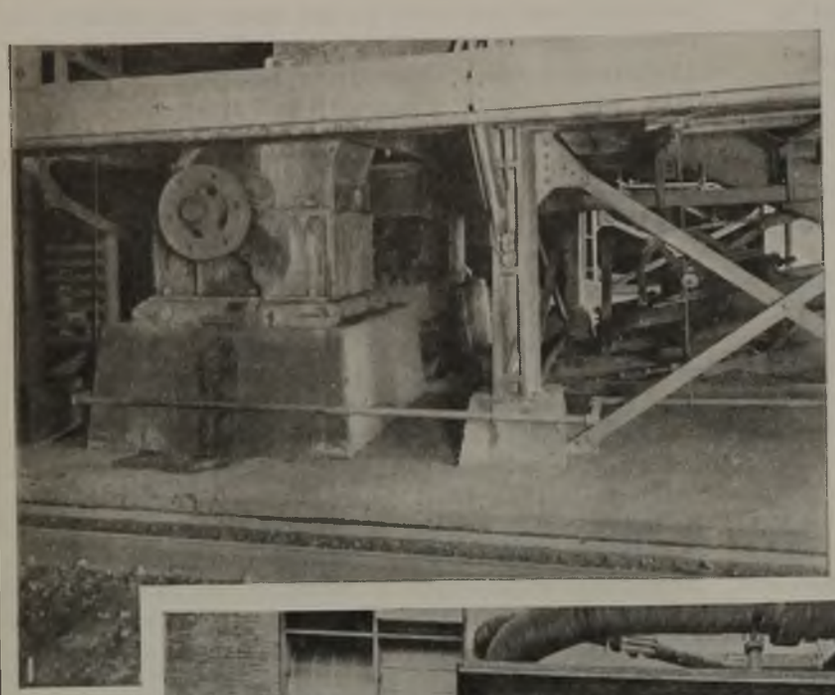
Type *C* hitching is adapted to square-end or double-bumpered mine cars and replaces the middle link in the plain three-link coupling. Its length has been reduced to about that of a plain link, so that the complete hitching is as flexible as that composed of three ordinary links. This has been accomplished without any sacrifice in strength or ease of swiveling. It is assembled in the same manner as types *A* and *B*. The weight of swivel in this type of hitching is about 5 lb. and the weight of the complete coupling is practically the same as that of a plain three-link hitching of a similar overall length.

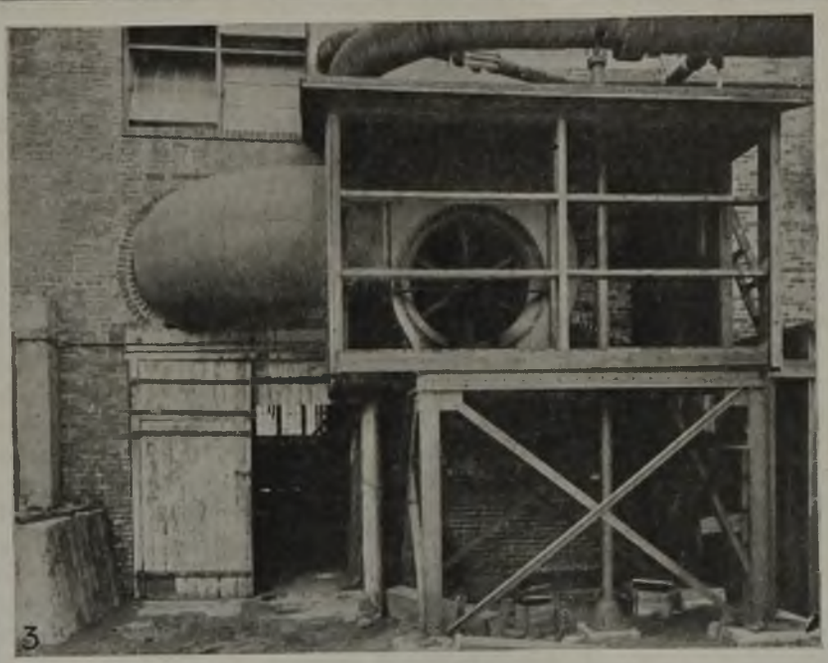
The lubricating principle embodied in these hitchings could be applied to almost any type of swivel, and would prevent the rapid wear which is caused by the corrosive acids or fumes found in mines. Application has been made for patent rights. In cost and weight the couplings described will compare favorably with types embodying a swivel.

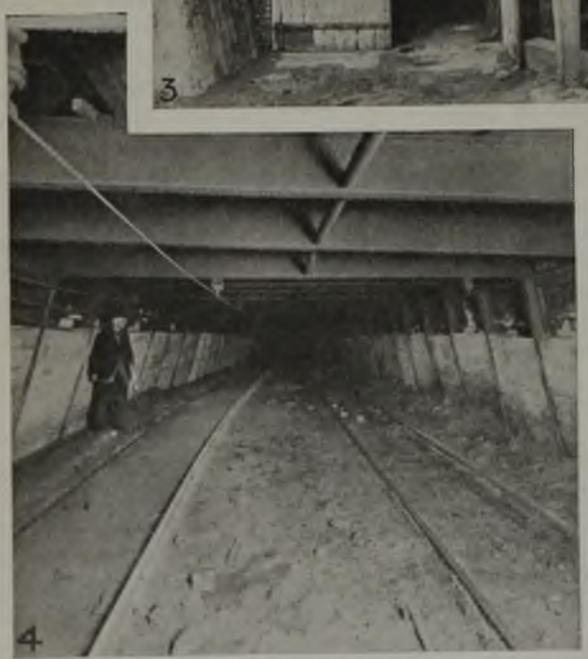
Test Zinc Chloride as Wood Preserver

Director E. R. Weidlein of Mellon Institute of Industrial Research of the University of Pittsburgh has announced the founding of an Industrial Fellowship on the treatment of timber. This research, which is being sustained by the Grasselli Chemical Co., of Cleveland, Ohio, and is conducted by Dr. A. M. Howald, will seek the best methods of applying zinc chloride to the preservation of wood.

Investigational work which was begun during 1923 will be continued throughout the present year. An experimental wood-impregnating plant is maintained for practical tests of processes. Under the supervision of Dr. Howald means are being sought of increasing the permanence of zinc-chloride treatments of timber by the addition of petroleum oils.

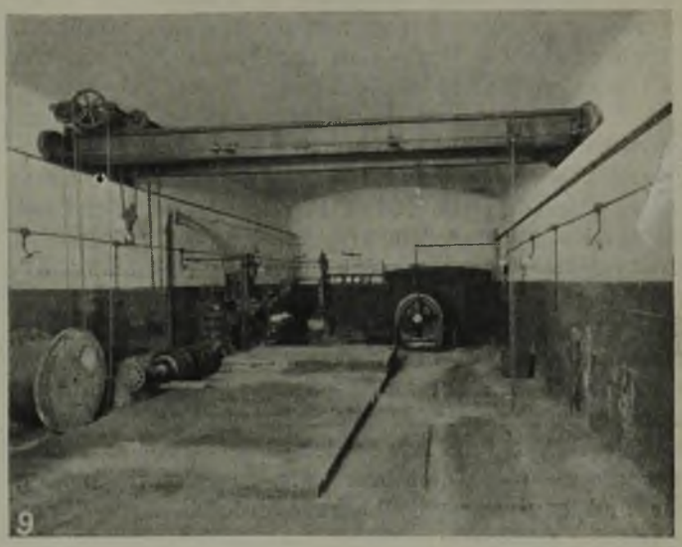


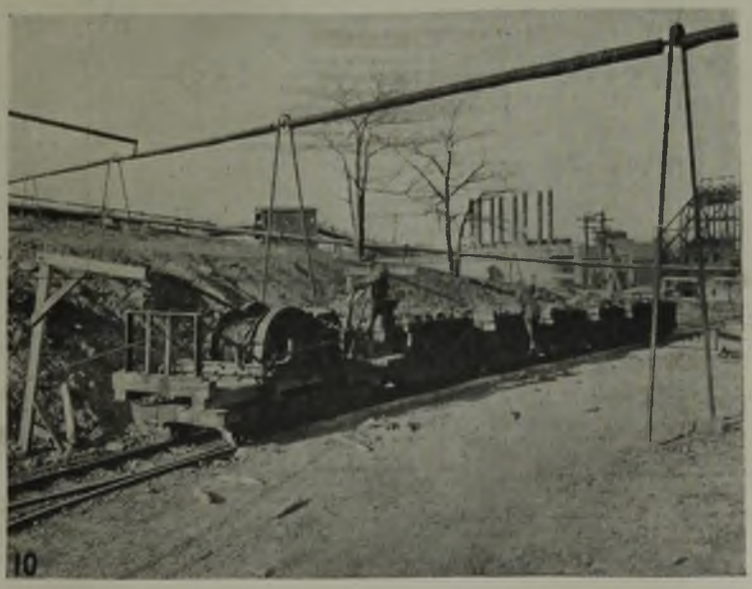




Outstanding Scenes In and Around the Glen Alden Mines—I

(1) Crusher under the Baker breaker. This, like most of the other crushers in the same breaker, rests firmly on the ground. (2) Automatic telephone in use underground at Truesdale Colliery which saves the attendance needed at a central station and also makes it possible to avoid the delays incident to calling on "central" to make the necessary connections. (3) Fan at Nanticoke boiler-house which ventilates the interior of the boiler-room in summer. Unventilated boiler-rooms in warm weather have temperatures comparable only to those in a ship's stokehold. (4) Efficiently steel-timbered haulway at Auchincloss Colliery. (5) Loading a car by scraper bucket at Truesdale Colliery. The scraper conveyor has made possible the operation of thin seams which otherwise could not be worked profitably.





Outstanding Scenes In and Around the Glen Alden Mines—II

(6) Glen Alden's largest lamphouse. This building has 1,000 flame safety lamps and 800 electric cap lamps on its racks. It supplies the Loomis Colliery. (7) Automatic water still for storage-battery supply. (8) Nanticoke pump which is moved up or down according to the stage of the Susquehanna River. (9) Room at Cuyaga shaft, Storrs Colliery, built to accommodate steam pump now occupied by an electric unit. Note the saving of space. The pump has an automatic control device designed by E. J. Falloon, hydraulic engineer of the Glen Alden. Room is about 25 x 76 ft. (10) New kind of locomotive at No. 17 Slope, Woodward Colliery, which operates on a heavy grade lowering loads and raising empties. It functions by winding in and paying out a cable. (11) Gasoline tractor hauling mine timber at Baber Colliery.

A Direct-Current Power-Distributing System That Keeps the Mine Equipment Working

Need for Higher Operating Efficiencies Has Created a Demand for Automatic Devices — Troubles in Power Circuit Are Localized so That Serious Delays Cannot Occur

By Raymond Howey
Electrical Field Engineer, Lehigh Valley Coal Co.,
Mount Carmel, Pa.

IN RECENT years the many labor and mining problems have made it almost absolutely imperative for every coal-mining company to turn to the use of electrically operated machinery. As a consequence, with amazing rapidity, a vast system of electric power-distributing lines has grown which must be kept under control and be protected against delays, overloads and many forms of danger. This in turn has presented a problem of providing adequate protection for large and small power-generating and power-using machines.

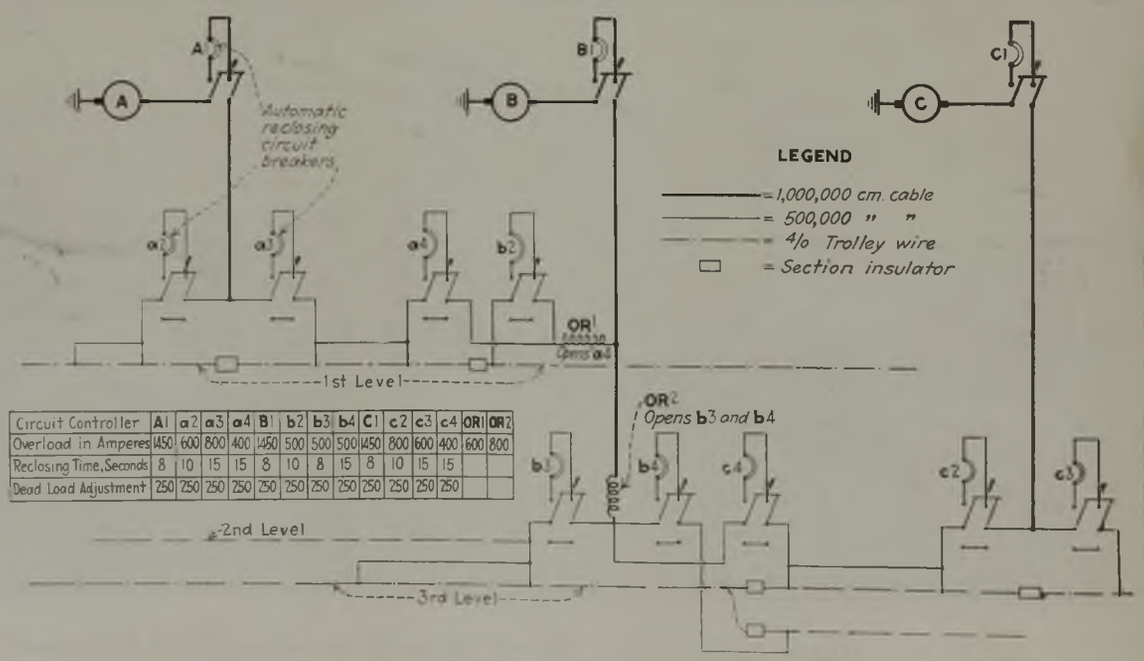
Much of the old equipment used in and around the mines was originally protected by fuses. As power loads increased, more important, larger and more expensive generators, converting apparatus, transformers, feeder lines and motors were installed. The dangers attending the use of heavier currents and the importance of power delays are now greatly magnified and have made necessary the application of many different forms of protective devices and switches.

Stress of economic problems has made it more and more necessary that every saving of power operation, maintenance and labor be effected. The necessities for continuity of service, for taking advantage of diversities of loads, for intricate feeder systems, for localizing power disturbances and overloads, together with high labor and equipment costs have created a need and demand for automatic control apparatus. Consequently, during the last few years its application has increased steadily. The development of apparatus which performs a given duty more cheaply than manual operation has given great impetus to this movement. But there is another factor which has been more potent. The manufacturers of automatically operated equipment have, in many cases, been able to design apparatus which operates more quickly, more accurately and more reliably than the human brain. Some of these devices act as feelers which detect, locate, measure, sectionalize and almost anticipate overloads, short-circuits and grounds.

Much of the progress which has been made is also due in a large measure to those mine electrical engineers who have spent time and effort to help the manufacturers perfect their apparatus and properly interpret the requirements of the industry. The history of most successful devices, used in mines, therefore, almost invariably includes a long chapter of co-operative effort between the man who uses the apparatus and the manufacturer. By this direct contact the manufacturer gets to know the adverse conditions of the mines and when he has developed his apparatus he can feel sure it is acceptable to the many engineers of the industry.

The success which the Lehigh Valley Coal Co. has had with automatic circuit-breakers and substations recently led it to install at the Centralia Colliery, Centralia, Pa., a carefully devised system for controlling and protecting the direct-current feeders. At this mine there are three substations for converting alternating current to direct current. Each machine is rated at 200 kw. and supplies 275-volt direct-current energy.

These machines are located on the surface at points about a mile apart. At *A* in Fig. 1 is an automatic synchronous motor-generator outfit, at *B* and *C* manually operated synchronous converters are used. All



Circuit Controller	A1	a2	a3	a4	B1	b2	b3	b4	C1	c2	c3	c4	OR1	OR2
Overload in Amperes	1450	600	800	400	1450	500	500	500	1450	800	600	400	600	800
Reclosing Time, Seconds	8	10	15	15	8	10	8	15	8	10	15	15		
Dead Load Adjustment	250	250	250	250	250	250	250	250	250	250	250	250		

Fig. 1—Complete Underground Power Distributing System Showing How Continuity of Service Is Made Possible by Use of Automatic Circuit-Controlling Devices

Three sources of direct-current supply are tied together by means of station and tie-feeder type circuit breakers. The main generator breakers are tripped open only under unusual conditions. When overloads occur special relays first relieve the generators of the less important loads so that the main circuits and the more essential mining equipment may operate almost continually. Repair and adjustment of the control devices may be made at any time. Bypass double-throw knife switches disconnect the breakers from the lines but maintain service. By the use of only two different type breakers, maintenance costs are greatly reduced and the workmen quickly learn how to make any necessary adjustments and repairs.

machines receive their alternating-current supply from the same transformer substation but through three different distributing lines running from the main transformer bank. The direct-current output of each machine passes through an automatic reclosing circuit breaker shown at A_1, B_1 and C_1. These breakers each have a normal rating of 800 amp. and are known as booster station panels.

Before installing automatic breakers inside the mines the chief problem was to eliminate delays caused by interruption of power on the main feeders running from the various substations. High peak loads, short circuits and grounds were almost continually opening the main breakers in the substations. These delays were also caused by trouble with the wiring of some of the mine equipment, by falls of rock bringing the trolley or feeder into contact with the rails, by steel cars jumping off the track and touching the trolley, by overzealous locomotive operators starting trips of cars too quickly.

As a result of these difficulties the substation equipment was being overloaded almost continuously, throwing the whole generating capacity of the machines off the lines an average of forty times during an eight-hour day. Delays lasted from ten seconds to five or fifteen minutes depending upon the cause. Often the delays were much longer, especially when a short-circuit had to be located by the workmen and sectionalized by hand-operated switches. As automatic reclosing circuit breakers have been installed in the mines, as will be described, the main booster station breakers now open an average of once a day and that is usually only when the converting equipment is shut down for the night.

Breakers Do Not Try to Reclose on Overload

These booster station breakers operate as follows:

(1) Are closed by an electro-magnet, provided the generator voltage is of correct value and other conditions are normal.

(2) Open automatically in case of overload from any cause, voltage failure or reverse current.

(3) Remain open a definite time interval, regardless of cause for opening.

(4) At expiration of this time interval, reclose automatically provided the generator voltage is of correct value, correct polarity, and provided there is no short-circuit or overload condition on the load side.

These breakers make no attempt to reclose while the overload conditions exist, but reclose instantly upon removal of the conditions which cause or would result in overloads. A diagram of these breakers is shown in Fig. 2.

Each breaker is set to open when 1,450 amp. are flowing and reclose in eight seconds, provided the voltage at the center of the bridging resistance is about 250 volts. Depending upon conditions, the breaker can be made to reclose when a slight load remains on the circuit. This is to obviate the necessity for cutting off the dead load of lamp circuits and small motors which ordinarily stay connected to the lines when the breaker opens.

For inspection and repair purposes the breakers may be completely disconnected from the lines by means of a two-pole, single-throw 800-amp. enclosed knife switch mounted directly below on the same pipe-frame support as the breaker. One pole of the switch disconnects the main feeder from the breaker while the other opens

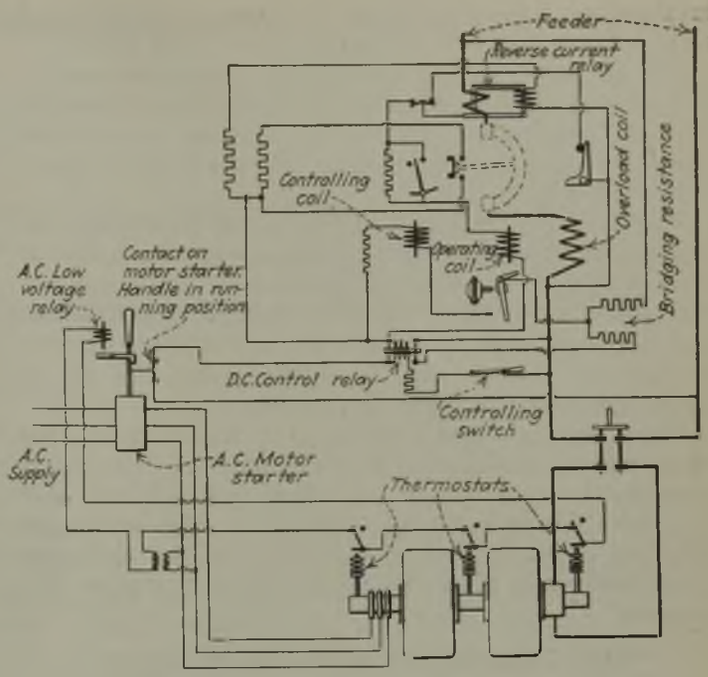


Fig. 2—Control Circuit of Booster-Station Panels

These breakers completely protect the generating machines and main feeders. Auxiliary equipment connected to the breaker makes the operation of the direct-current side of power-converting machines and direct-connected generators automatic.

the circuit from the machine; thus when the switch is opened the device is entirely de-energized.

At points a_2, a_3, a_4, b_2, b_3, b_4, c_2, c_3, and c_4, in Fig. 1, the current passes through 600-amp., 275-volt, tie-feeder type automatic reclosing circuit breakers, located inside the mines. This type of breaker is generally used in circuits supplied with energy from the different sources. It opens on overload, irrespective of the direction in which the current may be going at the time.

Its operating characteristics are as follows: (1) Breaker is closed by means of an electro-magnet. (2) Opens automatically in case of overload on either side, or voltage failure. (3) Remains open a definite time interval regardless of cause of opening. (4) At the expiration of time interval, if there is a short-circuit or overload on either side of the controller, it makes no attempt to reclose while the overload condition exists, but closes instantly upon removal of short circuit or overload condition. A wiring diagram of this breaker is shown in Fig. 3.

These breakers are disconnected for inspection or repairs by a two-pole 600-amp. double-throw enclosed safety switch. When the switch blades are in the upper position the breaker is in service. When the switch blades are thrown to lower position power is bypassed around the breaker. Inspection or repairs can then be made with perfect safety to those making them while power is still being supplied to the circuit to which the breaker was connected.

The output of machine C goes through a 1,000,000-c.m. cable down a shaft a distance of 350 ft. where it divides into two section feeders. Breaker c_2 is set to open at 800 amp. and c_3 is set for 600 amp., consequently the total overload settings of these two feeder-circuit controllers equals 1,400 amp. or 50 amp. less than the overload setting of the main breaker at c_1. It is obvious that the only time the main breaker will open on overload is when there is a current of 1,450 amp. passing through it, which can only be caused by a short-circuit on the main feeder between the machine and breakers c_2 and c_3, upon failure of one of the

breakers or when either one or both are cut out of service for inspection or repairs as described above.

The advantage of this method of connection readily will be seen, because when the controllers are in service the only section that will be cut off from a supply of power will be the one having the overload or short circuit on it.

The output of machine *A* is limited in exactly the same manner as machine *C;* the output of machine *B* is also limited by similar means with the exception that power from *B* first passes through two 600-amp. instantaneous overload relays, connected as illustrated at OR_1 and OR_2 in Fig. 1. These relays are set to operate at 600 and 800 amp. respectively.

When the combined load on breakers a_1 and b_2 becomes excessive relay OR_1 opens breaker a_1. This often prevents the main breaker, B_1, from opening and shutting down all the equipment close to it. Similarly relay OR_2 first opens breaker b_3 to relieve its load and later opens breaker b_4 if the overload condition or relay OR_2 persists.

Have Located Relays Near Controllers

Each relay is located near the controller or controllers it is desired to disconnect, the controller being disconnected when the relay operates on the overload current for which it is set. Normally closed contacts on the *OR* relays open the control circuit of the tie-feeder breakers.

The use of these relays means a saving of the purchase and maintenance of two additional automatic breakers and in turn also simplifies the system. This arrangement may appear complicated but it really is not. It provides continuity of service by the use of the minimum number of control units.

Machines *A, B* and *C* are tied together by means of a 500,000-c.m. feeder cable which runs along main haulageways inside the mines. Breakers a_3, a_4, c_1 and c_2 sectionalize any overloads which may occur along this line and any disturbance is localized within its particular section.

Breakers Are of Tie-Feeder Type

Breakers a_2, b_2, b_3, b_4 and c_3, although used for independent feeder service, are of the tie-feeder type and therefore are available to replace one of the more important tie-feeder controllers should the occasion arise. By using tie-feeder breakers throughout it is always safe to interconnect different sections should future mining development necessitate changes or an additional substation at the end of one or more of the independent feeder circuits.

With this arrangement there are only two different types of breakers to be familiar with, carry spare parts for and maintain. As the load shifts from one section to another it makes it possible to maintain a fairly balanced feeder system and to obtain the many advantages of power saving, continuity of service, etc. already enumerated.

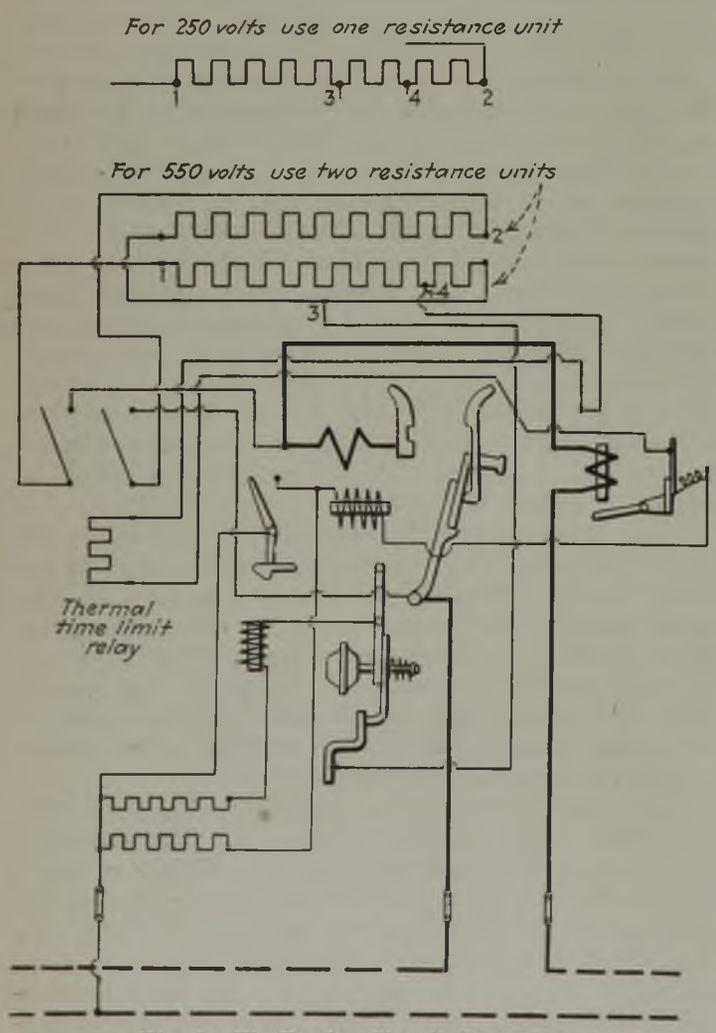


Fig. 3—Tie-Feeder Circuit Controller

Like the booster station breaker this device provides protection much better than that which could be accomplished by manual operation. It opens regardless of the direction of the current through the overload coil. Just as soon as the overload condition is removed it automatically recloses and re-establishes service.

Builds Two-Ton Mine Car in Five Hours

Joseph Martin, car repairman at Whipple, W. Va., for the New River Co., on June 11 assembled a mine car complete, including greasing, in five hours and eight minutes. And this is just a sample of his everyday work. The car has an average capacity of 3,800 lb. All the boards were sawed by Mr. Martin without assistance with the exception of the timbers used in the bottom. As this could not be done by one man, a blacksmith assisted him in cutting them. To bind the car together Mr. Martin bored 148 holes, inserted bolts and screwed on the necessary nuts making them tight. Mr. Martin has often built a car in the same approximate time. Of course, the irons of the car were shaped and drilled ready for assembling or building of the car, whichever is the more correct term.

May Feed Immunized Coal Dust to Hogs

The Department of Agriculture, says *The Explosives Engineer,* declares that a dust mixture of about 60 to 75 per cent limestone and 25 to 40 per cent coal is a good base from which to build a desirable food for swine, so we can feed the immunized floor dust in the mine to the hogs when we wish to replenish it with fresh limestone dust.

Dr. Davis, of the Bureau of Fisheries, welcomes rock dust, believing it will greatly reduce the acidity of mine drainage water and help to prevent the destruction of fish after a mine has been thoroughly and repeatedly dusted for many years. This will reduce the pressure for restrictive legislation. Departing from the authority first above mentioned it may be added that the presence of limestone may reduce pump and pipe corrosion and so may help to justify stone dusting as an economic measure altogether apart from its preventive value with regard to mine explosions.

News Of the Industry

World Conference at London Surveys Power Resources

All Authorities but New Zealanders and Some Canadians Favor Private Ownership—Non-Friable Coke Made by Low-Temperature Process—Hydrogenation Solution of Benzol Problem

After preparations of more than a year the World's Power Conference met at London, June 30 to July 12, with representatives of some thirty-eight countries present. As O. C. Merrill so well stated at the opening session, "Technology, economics and finance know neither politics nor parties and recognize no boundaries of race, nationality, language or creed." International comity is being established, men of different nationalities are becoming acquainted in the closest manner and the engineer is doing yeoman service in knitting a war-weary world.

The British did not fail to stage the conference well. The Prince of Wales, honorary president of the congress, addressed the opening session, and the Earl of Derby, the president of the conference, conducted the session. Sir Joseph Cook spoke for the British dominions, saying that today the world needs a balancing of accounts rather than a balance of power, which could be attained only by developing power to the fullest extent and by seeking to obtain it from new sources.

M. Guillaume, Director of Mines for France, and Guido Semenza, of Italy, replied for France and the other countries of Europe respectively. Dr. Kamo spoke for Japan and other Asiatic countries. O. C. Merrill, secretary of the Federal Power Commission of the United States, replied for the United States and South American countries, making a speech that was among the best at the conference.

Papers Cover World's Power

The scientific papers were delivered in the conference halls of the British Empire Exhibition, Wembley, London. In a few sessions the papers were read by title only; at others they were read at some length, hindering discussion. They covered the power resources of the world, the economo-financial, legal and government policies in regard to power, power development, water-progress, steam-power plants and equipment and the preparation of fuels. Fifty-five papers were presented relative to power resources.

J. P. Noonan, president of the organized electrical workers of the United States, representing the American Federation of Labor, stated that labor stands unequivocally ready to co-operate to the fullest extent in the development of power. The present labor movement, said Mr. Noonan, realizes that labor-saving machinery is really for labor's benefit. He urged a closer contact and a better understanding between labor and employer. Lack of understanding, said he, has caused both sides to be suspicious of each other and has caused labor to spend money and time in an endeavor to defeat legislation which when later examined proved to be for the good of labor and not for its detriment.

> World power conferences by introducing the developments of one country to the representatives of another will speed up the world's progress. Even the big advances travel but slowly from country to country. The smaller devices and less showy methods lie still longer untransported. Travel has been left largely to the idlers of the world. It is well that today the aggressive engineers are meeting in world congresses, the better guaranteeing that the world hereafter will dwell in peace.

Government ownership naturally had few adherents. Even in Italy the government has tired of railroad operation and would part with its railroads if it could find anyone who would buy and operate them. The Canadians connected with the hydro-electric power development of course defended government ownership, and the New Zealanders declared that only by such means could power have been distributed to the most distant farmhouse of their country, but they were little disposed to recommend their practice to others.

Dr. Arthur T. Hadley, president emeritus of Yale University, said that experience had shown that an industry not completely developed and standardized—and few, it may be added, are of this character—could not be handled satisfactorily by the government. Sir Philip Lloyd Graeme, of Great Britain, declared that the function of the government with regard to power development was to make laws that would attract capital to development, and that at times of stress it may go further and use its credit and even its cash to make possible developments that otherwise would be retarded. Dr. George Otis Smith, director of the U. S. Geological Survey, advocated "public regulation always; government operation never."

Discusses Steam Power Plants

Two interesting sessions dealt with steam-power plants. Pulverized coal and boiler construction were the leading subjects. One session was devoted to turbines. Four papers were presented on illumination.

Three sessions were devoted to preparation of fuels. Prof. H. E. Armstrong exhibited Coalite manufactured from Kent coal and showed that it was far from friable. He said that it was made from finely powdered coal by carbonization in iron retorts at a temperature of 600 deg. and in about four hours. The yield of coke was about 80 per cent, but the yield of oil was low. Dr. R. Lessing declared that we can hope to convert the whole of the coal substance into liquid only by hydrogenation. He said that we could not expect to get the needed supplies of oils from coal except by some such process and that Dr. Franz Fischer's paper gave only a limited promise of success.

Sufficient Oil from Coal Unlikely

The presence of oxygenated compounds in coal made it unlikely that we would ever get such large quantities of oil from coal as we desired. The oil described by Dr. Fischer was not made by the Bergius process but synthetically from carbon monoxide and hydrogen by polymerization. Dr. C. H. Lander said that some fifteen or twenty different ways of distilling coal at low temperatures had been tried, some of which the government had financed. Some had resulted in making good coke, good oil and sufficient gas, but the experiments had been unsuccessful because the plants had depreciated so rapidly or because the initial and maintenance costs were so heavy that they could not be a financial success.

Mr. Orrock, United States, said that the gas works could do little in the way of low-temperature carbonization so long as the load factors were only 30 to 35 per cent. The process was advantageous only where the load factors reached 40 to 50 per cent. Higher factors than these were found

nowhere except at a few metallurgical works running 24 hours a day and seven days a week. Byproduct recovery could be applied readily to a power station, but it was extremely expensive and many plants that had been started as byproduct plants ultimately restricted themselves to the making of gas and coke only, as the market for sulphate of ammonia and for tar was altogether too uncertain. The manufacture of oil from coal would not be profitable till the price rose considerably.

B. F. Haanel, of Canada, said that the central Canadians had accustomed themselves to the use of anthracite, and their stoves were adapted for the burning of that fuel. Consequently the Canadian Fuel Board was endeavoring to find a Canadian product that would be a good substitute for United States anthracite. It was making investigations into the possibilities of erecting coke-oven plants at strategic points where the Nova Scotia coals could be coked into a domestic fuel that would substitute for anthracite and produce gas for domestic and industrial purposes.

Canada's Problem in Lignites

Hydrogenation of coals seemed to him a far cry, for the natural oils would not be exhausted for years. The problem for Canada was the use of low-grade lignites which were not suitable in the raw state for steam or domestic purposes. Important especially was the question as to what could be done with it for railroad purposes. Though experiments had been proceeding with Saskatchewan and Manitoba lignites for five years no commercial success had been attained. It appeared that the logical way to deal with lignite was to pulverize it. A central heating plant was being installed in Winnipeg at which these lignites would be pulverized and used for the generation of steam.

A. E. Douglass, the Fuller-Lehigh Co., Fullerton, Pa., said that the average cost of pulverizing at twenty-six of the most recent plants in America was 45c. per ton, where 100 tons were used per day. This figure embraced everything except fixed charges. It covered labor, repairs, power and lubrication, cost of cleaning buildings and supervision. Where the consumption was 150 tons a day the cost was 41c. a ton; with a consumption of 200 tons per day the cost fell to 40c.; with 250 tons to 38c.; with 400 tons to 36c.; with 500 tons to 34c., whereas for plants using over 1,000 tons per day the coal could be pulverized for slightly under 32c. per ton. These figures were averaged for anthracite, lignite and bituminous coals. With anthracite the cost was higher than with bituminous, probably owing to cost of repairs and increased power for pulverizing.

Mr. Douglass said that in most cases where proper storage bins had been installed the pulverized coal had given no trouble. The temperature should not exceed 200 deg. F., and the moisture content should not be too high. To show how powdered fuel can be stored, Mr. Douglass instanced a case in Seattle where pulverized coal had been stored for seven months, from the hot season to the fall. He did not advocate the manufacture and use of pulverized coal at small industrial plants where good quality coal was at hand. As a matter of fact he was turning down several hundred inquiries a year from small industrial plants.

Mr. Douglass said that in Australia pulverized fuel is being made from brown lignite having 22 to 28 per cent of moisture. It is used in locomotives.

In western Canada coals having 18 per cent of moisture and 30 per cent of ash were being pulverized for fuel, and he added that where similar coals were being used in sugar-refining plants in British Columbia an efficiency of 83 per cent has been obtained. Similar fuels had been pulverized and were being used for railway purposes in Italy, Holland, Brazil and Manchuria.

Powdered Coal Highly Efficient

David Brownlie, discussing the papers on fuel economy, said that with pulverized fuel an efficiency of 90 to 92 per cent, and with mechanical stokers of 88 per cent, could be attained, but the methods of testing were so varied that the recorded efficiency might vary 3 per cent. There were three methods of testing boilers, those of the American Society of Mechanical Engineers, the Continental Code of the German Society of Engineers and the British Code of the Institution of Civil Engineers. This last, Mr. Brownlie declared, was a disgrace to British technicians.

Wheat Crop to Help Coal Business in Southwest

One of the handicaps of the coal business during the past year in the great agricultural belt of the Midwest was the farmer's inability to pay his bills because of low prices for his crops. This year the prospect is brighter, according to a bulletin of the Colorado & New Mexico Coal Operators' Association just issued by its secretary, F. O. Sandstrom, of Denver. Wheat, which sold well under $1 last year, is now trading in Chicago, Kansas City, St. Louis and Minneapolis at around $1.30 and the Southwest is about to harvest a bumper crop.

Mr. Sandstrom's figures show that the combined yield of Kansas, Nebraska, Oklahoma, Texas and Colorado was 177,288,000 bushels last year and will be approximately 241,000,000 bushels this year, making a net increase of 63,000,000 bushels, or about 35 per cent. The carriers serving that territory, he finds, are well equipped to move the crop, as indicated by ample supplies of cars in uniformly good condition. "This," writes Mr. Sandstrom, "should naturally be reflected in an increased coal tonnage to this consuming territory."

Ten Men Die in Second Gas Explosion at Gates Mine

Ten miners were killed on July 25 at 7:30 p.m. by a gas explosion of unknown origin in the Gates shaft mine of the H. C. Frick Coke Co., at Gates, Fayette County, Pa. It is said that 120 men on the night shift were in the mine, but as the explosion was local in nature all but the ten men who were killed reached the outside safely and little property damage resulted. In February of 1922 an explosion ignited by a blown-out shot in this mine killed 25 men.

Whether the explosion originated at the face of an entry or in a room has not been determined definitely, nor is the agent of ignition known. It is not likely that a blown-out shot ignited the gas, as shooting had not yet begun when the explosion took place. In view of the fact that electric cap lamps are worn exclusively by the workers and electric drills were not in use, it is possible that a defective cutting machine was the agent of ignition. The Gates mine has been working every day.

The H. C. Frick Coke Co. is so well equipped and otherwise prepared for mine-rescue work that it did not require the aid of the U. S. Bureau of Mines rescue car and crew located at Pittsburgh. Gas analyses taken soon after the explosion showed that the oxygen content of the air in all parts of the mine was sufficient to support life, for which reason gas masks were worn extensively by the rescue crews. All the bodies of the victims were recovered soon after the explosion.

The explosion, according to Coroner Baltz, was discovered in a most unusual manner. John Kelly, a Gates miner, was returning to Gates from Palmer, three miles away, when he noticed a peculiar settlement of dust on his shirt. Kelly stopped to investigate and found that it was coal dust.

Knowing that the dust from a mine very rarely reaches the surface, he glanced toward the mouth of the Palmer mine and saw a cloud of smoke and dust floating from the shaft mouth.

Kelly ran to the Palmer foreman's office and sounded the alarm. Ten rescue crews donned helmets and, believing that the Palmer workings were on fire, they went into that mine.

Their search was fruitless. Kelly recalled that an old tunnel connected the Palmer and Gates mines and he suggested that the trouble was in the latter working. Within a few minutes the rescuers were on their way to the Gates pit. As they reached the shaft they met a crew of miners coming out.

These miners, at work two miles from the scene of the explosion, knew nothing of the blast. But the rescuers went down and soon found the cave-in, behind which ten bodies were located.

S. Pemberton Hutchinson, president of the National Coal Association, will return from his European trip Aug. 15. While in Europe Mr. Hutchinson has been making some general observations as to the possibilities of increasing the exports of American coal.

Stocks Nearly Worked Off, Better Demand and More Work Soon, Says Brophy

Altoona, Pa., July 30.—"Much of the surplus stock of coal has been worked off, and we have every reason to believe that within the next few weeks there will be some improvement in demand and more work at the mines," said John Brophy, president of District No. 2, United Mine Workers, at union headquarters in Clearfield, when asked by *Coal Age* to make a statement regarding the immediate outlook for the coal industry in his district.

Many of the operators in the district are non-committal as to possible developments in the early autumn while several agree with President Brophy and have not hesitated to predict at least a partial resumption of mining following a long period of inactivity.

It was pointed out that some of the collieries are now making preparations which would indicate that they expect to operate on a more extensive scale at an early date. It also was ascertained that some of the leading operators are anything but hopeful.

The spring and summer of 1924 have been the dullest in the history of the district, and not only have the miners and their families felt the depression but every industry directly or indirectly affected has suffered. Merchants report heavily decreased sales and hundreds of young miners have departed from the mining centers and found employment in other lines of industry, thus lessening the purchasing forces of the coal communities.

Extreme pessimism has prevailed, especially in those communities which depend wholly or largely on the coal trade.

Many Mines Closed Down

From operator sources regarded as authoritative it was ascertained that of the 191 mines on the Tyrone and Clearfield branch of the Pennsylvania R.R. and its feeders, 141 mines are now closed down entirely. Thirty-five of the remaining 50 are operating on an average of five days a week and 15 only two days a week.

At Morrisdale, normally a good coal town, there was mine work one day during the week ended July 19. No. 1 shaft and No. 2 shaft of the Morrisdale Coal Co. are closed down entirely and there is little or nothing doing at the Cunard Coal Co.'s slope.

Operators are quite generally of the opinion that a lower wage scale, which would enable them to produce at a lower cost, would partly solve the problem, a contention that is not admitted by President Brophy, nor is it admitted by many well-informed miners of the district. But the operators' view is fairly well expressed in the answer given by one of the leading producers in the Philipsburg region when asked to diagnose the situation.

"There is nothing the matter with the coal business," said he, "except that there isn't any and no prospects of getting any. There can be no coal business to amount to anything in the Clearfield region as long as the costs of production are in excess of those in competitive regions. The union wage scale does not permit the operator to dispose of the product of his mine at prices which the operators in the non-union fields quote. The buyers of fuel purchase at the lowest quoted prices, other things being equal."

James L. Cooney

Recently chosen president of the Scranton Coal Co. in succession to the late Frank E. Platt. He was general manager just previous to his accession to the presidency.

The manager of one of the leading coal corporations operating in the central Pennsylvania field, speaking of conditions and prospects, said:

"Operators of long experience know that April generally is the low production month of the year. Operators were, therefore, of the opinion that the low output last April was characteristic of past performance, and they expected that business would improve during each succeeding summer month. This hope was badly shattered when the month of May showed no improvement over April and when June production was lower than May. The indications are that July will be worse than either, both as to price and production."

Of the operators disposed to take a more cheerful view of the near future in mining is James Wilson, brother of William B. Wilson, Secretary of Labor in the late President Wilson's Cabinet. He is associated with the Conestoga Coal Co., in Irvona, and the Acme Coal Co., of Philipsburg, two organizations that might quite properly be classed among the big body of smaller operations whose combined output shows up large in production totals. Mr. Wilson takes the stand that the extreme dullness in the coal trade is nearly certain to be followed by a movement in the opposite direction. The cooler weather, he states, will bring a demand for coal.

One of the disquieting developments of the situation is the growing impression that the operators are engaged in a freeze-out game. One hears of it frequently in conversing with miners. Like views have been expressed by persons not engaged in the mining industry in any capacity. It is charged that the operators after entering into an agreement with the union miners have apparently made no effort to obtain orders or run the mines, but are themselves quietly but none the less effectively on strike. Such a view, however, is not held by Mr. Brophy, who maintains overdevelopment is the chief reason for the depression. His statement, in full, follows:

"The coal trade is unusually dull in this district. That is admitted. But we do not agree to the claim of many of the operators that this district alone is affected by slack work. All bituminous districts, union and non-union, are alike affected, as shown by the report of the Geological Survey for the week ending June 28, which gives the percentage of full time output for central Pennsylvania at 41.1; Maryland, which is operated non-union, 39.1 per cent, while the New River field of West Virginia, also non-union, which is so often referred to by the operators of this district as an active competitor, 48.5 per cent.

"Overdevelopment is the reason for bituminous coal being a part-time industry. With double the mine development necessary to take care of the market needs of the country, slack work is chronic. This condition has been intensified by some slowing down in business during the last twelve months, and the further fact that large surplus stocks of coal were accumulated during last winter and the three first months of this year in anticipation of a possible strike.

Much of Surplus Worked Off

"When the strike did not materialize, the stocks of coal had to be worked off before the users would buy, even in quantities equal to current consumption. Much of the surplus stock has been worked off by this time, and we have every reason to believe that within the next few weeks there will be some improvement in demand and more work at the mines.

"Lowering the union scale would not benefit the coal trade any, because the non-union operators could and would promptly reduce wages so as to maintain a lower rate than the union rate. Each union reduction would be followed by a non-union reduction. The demand for coal would be unchanged and the miners would have no more work and would be reduced to abject poverty.

"The mine worker is entitled to a decent livelihood. The consumers are entitled to ample fuel at reasonable prices. If the present managers, the operators, cannot bring the industry to a basis of efficiency that will assure these two things, the operators must expect the people ultimately to demand legislation that will regulate the coal industry."

Northern Cambria County is in practically the same straits as the Clearfield and Philipsburg region. The Pennsylvania R.R. has discontinued hauling coal over the Bellwood division and all coal must get to the main line by way of Cresson. In the Johnstown district there is a little more activity due to the Bethlehem Steel operations and railroad contracts at South Fork and other points along the main line.

Somerset County is shipping most of the coal from the district by reason of a lower or non-union scale. Business in Indiana and other counties in the district continues in the dull class.

P. & A. Photos.

C. W. Bryan's Municipal Coal Yard

As Mayor of Lincoln, Neb., Charles W. Bryan, now Governor of Nebraska and nominee for Vice-President on the Democratic ticket, established a municipal coal yard to protect the public against "coal barons." The gentleman in the foreground is E. H. Shroder, a real estate operator and friend of Mr. Bryan, who lent his co-operation to make the plant possible.

Consumer Can Remedy Coal Troubles by Initiative in Storage, Says Hammond

In heavier storage lies largely the solution of the difficulties of the coal industry, according to the foreword which John Hays Hammond prepared for the report of the Coal Storage Committee of the American Engineering Council. The consumer, Mr. Hammond thinks, should take the initiative in bringing about a remedy.

"This report on an engineering survey of the possibilities of improving the method of procuring and storing coal should appeal to producers, carriers and consumers as the key to the solution of many of their troubles," says Mr. Hammond, who was chairman of the U. S. Coal Commission.

"The President's Coal Commission, learning of the purpose of the American Engineering Council to make such a study, assigned to it the task of conducting an extended engineering survey of the storage of coal. The commission and other government departments have collaborated with the American Engineering Council extensively, the survey has been conducted by over 400 engineers in leading industrial centers, and the report has been formulated by a committee of prominent engineers recognized authorities in each branch of the subject covered.

"The operation of the coal industry probably is beset with more difficulty than any other of the great American industries, due to prevailing intermittence of operation. If this evil could be removed it is plainly evident that a tremendous step would be taken in regularizing the coal industry and in helping other industries which are partially or wholly dependent on coal.

"The solution undoubtedly lies in greater storage. A reasonable accumulation in storage will permit of more even production throughout the year, deflation of the coal industry, continuous employment of labor, relief of congestion on railroads during their maximum demand season, removal of the coal 'feast or famine' conditions among consumers and many other allied troubles that are now felt as coal takes its course from mine to point of combustion.

"The fears of loss by the consumer have been studied by the committee and largely dispelled.

"In the past the operators have said that storage is the duty of the railroads, whereas the carriers have contended that it is the duty of the consumer, and as a result storing has been neglected. This cycle must be broken, and a unified, economically sound practice established. The report wisely recommends and urges that the consumer, potentially the largest benefactor, should apply the needed balance wheel through himself initiating storage."

Strike at Loader Mine In Illinois Continues

The strike of cutting-machine runners in Orient No. 2 mine of the Chicago, Wilmington & Franklin Coal Co. runs its steady course without a sign of break. This is the mine in which the first Illinois machine loader scale of $10.07 a day was agreed to by men and company and which took effect July 16. The mining-machine men struck on that day, asking 14.6c. a ton instead of the 13c. agreed to in the new contract, and objected to the system of territory assignments besides registering other kicks at the new order of things in the mine. The men who operate mechanical loaders were ready to work under the contract but the cutting-machine operators have tied up the property.

Wages of Hard-Coal Miners Rise Faster Than Those of Any Other Basic Industry

The average hourly earnings of all groups of wage earners in anthracite mining are now at the highest point since June, 1914, according to an investigation made by the National Industrial Conference Board, New York City. The renewal of the two-year agreement between the miners and the operators, providing for a 10 per cent wage increase, the board states, shows that the increase in average hourly earnings is 190 per cent above the rate of June, 1914. The composite figure of average hourly earnings in the industry covering all groups of wage earners, that is, common, semi-skilled and skilled labor, both inside and out, as well as contract miners, increased from 27.8c. in June, 1914, to 80.7c. in December, 1923. That the wage contract is closely adhered to by the various operators is shown by the fact that since December, 1923, further figures denote practically no change in the average earnings up to May, 1924, the general trend remaining at as steady a level as it did under the old contract.

The highest percentage of increase took place in the case of common outside labor, 218 per cent. The next highest recorded was for semi-skilled inside labor, 207 per cent, closely followed by common inside labor, 205 per cent. Semi-skilled outside labor increased 188 per cent. The lowest per cent of increase for both inside and outside labor was noted for skilled work, being 181 and 170 respectively. The percentage of increase of contract miners was 188.

At the present time the board's index figures reveal that anthracite mining wages have risen to a higher peak since 1914 than those of any other basic industry.

Drum Deposed as President Of District No. 16

F. J. Drum, president of district 16, United Mine Workers, whose office is at Cumberland, Md., has been requested to resign his office effective July 25, according to James E. Jones, national union organizer, who is temporarily in charge of the district's affairs. No official reason for Drum's dismissal was given.

Drum, who has been president of the district more than ten years, led a mine strike which lasted over twenty months, and finally was given up by the national organization on Nov. 22, 1923. This strike was said to have cost the United Mine Workers over $750,000 and to have caused the disruption of the union in the George's Creek and upper Potomac fields.

Jones will be assisted in the administration of the district's affairs by William P. Murray, of Pittsburgh, brother of Phil Murray, vice-president of the United Mine Workers' national organization.

District 16 embraces mining regions in Maryland, Pennsylvania and West Virginia.

Adoption of Illinois Loader Scale Hailed In Washington as Progressive Step

Government Officials Foresee Spread of Machine Mining with Marked Cut in Production Costs—Far-Reaching Effects on Market Expected—Pickup in Union Fields Likely

By Paul Wooton
Washington Correspondent of *Coal Age*

Illinois' loader scale came as an unexpected but highly gratifying surprise to official Washington. It is regarded as a progressive step of outstanding importance. Opposition to the employment of machinery in coal mines long has been regarded as one of the sinister things which could be laid at the door of the union. The Illinois membership of the United Mine Workers has been regarded as the most reactionary element in that organization. That it should be willing to take this progressive step is regarded as making certain the universal application of this policy.

On the assumption that this agreement soon will apply to the entire Illinois field, it is predicted that there will be an appreciable lengthening of the radius which marks the limit of the territory in which Illinois coals can compete. This step toward lowering production costs in Illinois did not came too soon, as the mines in that state have been operating at 25 per cent of capacity for four months.

Markets May Be Affected

It is recognized that this action in Illinois, in conjunction with the acceptance of what is practically equivalent to a reduction in the deadwork scale by the miners in southern Ohio and with the informal understandings at individual mines, will have far-reaching effects on the market situation. The fact that the union fields suddenly find themselves in a position to reduce production costs just at the time when everybody believes the market is turning definitely upward, means that the union fields are going to supply more of the country's requirements for the coming winter than anyone had anticipated.

The southern Ohio agreement is of particular significance to the coal mines of that region, since production for five months has not exceeded 10 per cent of capacity.

Union Reverses Position

One of the most notorious ways in which labor influence was used to limit output was in the Illinois agreement, where a special clause provided that only fourteen loaders could follow a cutting machine. The fact that the union apparently has reversed its position with regard to machines is expected to increase the amount of machine-mined coal in Indiana and Illinois. particularly, to the point where those states will have as large a percentage of machine-mined coal as West Virginia and Kentucky. No figures for machine-mined coal later than those for 1922 are available, but in that year 67 per cent of the Illinois output was machine-mined as compared with 79 per cent in Kentucky. In 1922, 50 per cent of the Indiana production was machine-mined, whereas 77 per cent of the West Virginia output was produced in that manner. It is known that the West Virginia and Kentucky output of coal mined by machine is now somewhat higher, but a rapid narrowing of the difference is expected under the new conditions.

Battle Grows Hotter Against Northwest Rate Boost

The battle to prevent the rate increase Sept. 10 on Illinois and Indiana coal going into the Northwest grows hotter daily. All sorts of petitions to the Interstate Commerce Commission to reopen the lake-dock case have been filed. And now comes the Illinois Commerce Commission with a resolution July 24 asking the state Attorney General to take such action, "by injunction or otherwise," as he may think necessary. The state commission takes an interest because it believes the 28c. increase on Illinois coal into the Twin Cities will cut seriously into Illinois business, thus directly affecting the prosperity of the state's mining industry and the people in it. The depression in Illinois is keen enough already.

The whole course of the adjustment of rates to the Northwest has been tempestuous. The case was bitterly contested in long hearings before the Interstate Commerce Commission more than a year ago. When the decision was finally made in June, leaving rates from the Lake Superior docks to the Twin Cities unchanged and increasing the rail rates from the southward, practically everybody was displeased, even the Northwest dock operators, who had hoped for a reduction in their own haul as well as a larger increase in the Illinois, Indiana and Kentucky haul.

The effective date originally was set for Aug. 21. The carriers protested that there was not time to rearrange and publish the new tariffs within the time limit, which ended July 21, the customary 30 days before the effective date. So they asked for an extension of 30 days. This was refused. Then they asked that the date of publication be set only 10 days before Aug. 21.

Before any decision was made on this a new complication set in. Some of the originating lines, notably the Chicago & Eastern Illinois, which is mainly dependent on coal for its revenue and therefore foresaw a great decrease in business when the coal traffic to the Northwest was reduced, found a loophole. It pointed out that the commission in the decision had directed only the specific respondent lines in the case to increase rates. Since the C. & E. I. was not one of those lines, it announced that it would not increase rates on Northwest coal which it originated.

This caused great confusion among the other roads until the commission sent that line a telegram couched in pregnant phrases, reminding it that even though it was not specifically mentioned, it was making a bed of thorns for itself if it did not publish rates identical with the other roads. The C. & E. I. gave up.

Then came the commission's order deferring the effective date of the new rates from Aug. 21 to Sept. 10. This helped the railroads some in the matter of time for publishing.

But all this time various protests against the new rates and petitions for a reopening of the whole case were filed by various traffic and shippers' associations throughout the Northwest. The Illinois coal operators filed a long one shooting the commission's order as full of technical holes as possible and suggesting new evidence that of itself would justify a rehearing. The pressure brought upon the commission from all these sources was heavy before the Illinois Commerce Commission adopted its resolution July 24. The state commission enters the case probably with more weight than that exerted by all of the petitioners, because they are directly prejudiced, while it is speaking officially for the whole people of the state.

It is not freely predicted in Illinois what action, if any, may be expected from the Interstate Commerce Commission as a result of all of this, but there is definite hope among coal producers that the commission will not make it necessary for the rates to be dragged into court for a decision. That course, however, might be preceded by an injunction which would maintain the present fabric of tariffs for the whole length of a battle through the courts.

Of course there is no assurance that the Illinois Attorney General will ask an injunction or do anything else. Edward J. Brundage, who holds that office, was operated on for appendicitis last week and probably will take no part in this or any other official action for a few weeks. What his assistants may do is entirely problematical. But the state Commerce Commission has shot its bolt with the adoption of its resolution, and there the matter rests.

Bacon and Beans!

The United Mine Workers' attempt to stem the tide now flowing toward non-unionism in western Kentucky included a recent tour of the field by President John L. Lewis. He addressed some hungry crowds down there, for there has been no work in union mines in that territory for months and there is little prospect of any. However, Mr. Lewis tried to instill courage into the wavering ranks by offering them the stone of prospective victory when they really want bread. Said he at Central City on July 18: "I wish I was as sure of going to heaven as I am of winning this strike." An old woman piped up: "Well, if you-all got any hopes of gittin' into heaven yo' bettah supply mo' bacon 'n' beans."

Lewis Probe Averts General Strike at Glen Alden Mines

The recent investigation of numerous strikes among local unions in the anthracite region made by the special committee commissioned by John L. Lewis, International president of the United Mine Workers, is credited with preventing a general strike of the 22,000 employees of the Glen Alden Coal Co., which was called off by general consent July 19 after a meeting of the general grievance committee.

As a result of the meeting all of the Glen Alden workers, including 1,800 employed at the Woodward colliery, who had been on strike for a week, were back at work on July 22. The threat of a general strike came about because of the action of the district officials in revoking the charter of the Woodward local for violation of both the district and international constitutions of the miners' union in calling a strike without the authorization of the district officials.

Restrains Companies in Use Of Term "Mount Olive"

The Interstate Fuel Co. and the White Ash Coal Co., both of St. Louis, Mo., are ordered by the Federal Trade Commission to cease and desist from making use, by advertisements or otherwise, of the words "Mount Olive" alone or in combination with other words in connection with the sale or offering for sale of coal in commerce, unless the coal so designated is produced at mines located at Mount Olive, Ill., or within a small district contiguous thereto, including Staunton, Ill.

In its investigation of the case the commission found that the respondent companies marketed coal mined in districts other than what is known to the coal trade and to others as the Mount Olive district. Such coal was termed by the respondents as "Guaranteed Mount Olive Coal" and "Coal, Mount Olive Grade."

The findings state that for more than forty years the Mount Olive coal district has produced a coal which has become known to the trade and a substantial part of the consuming public as "Mount Olive Coal." This coal has been extensively advertised under the title "Mount Olive Coal," and has become favorably known because of its high quality and has a higher market value than the coal sold by the respondent companies.

Southern Ry. to Build Cut-Off

The Interstate Commerce Commission July 17 issued a supplemental order authorizing the Southern Ry. to construct a cut-off outside the city limits of Knoxville, Tenn., about four miles northeast of the location originally planned. This line, as now proposed, will extent from a junction with the Southern's Bristol-Chattanooga line at Caswell to Beverly. About four miles from the latter point connection will be made with the Southern's line extending from Coster yard to Middlesboro, Ky. The new extension will be completed within a year.

Illinois Town to Hold Mass Meeting Over Coal

Just exactly how black is the future for Illinois coal? The town of Herrin and the county of Williamson, Illinois, want to know. The whole community, in the southern Illinois coal field, is so worked up over the matter that it is to hold a public mass meeting Aug. 20. It has invited the coal operators of the state and the state officials of the United Mine Workers to be present prepared to set forth the case from all angles. The whole southern Illinois region is suffering from all the economic ills which general shutdown and unemployment in its main industry naturally would bring upon it. Although the movement is engineered by the Lions Club of Herrin, it is expected that a great turn-out of miners will be present and everybody is going to have a chance to say his say. This is the first mass meeting of its kind in Illinois.

N.C.A. Committee to Reduce Waste in Use of Soft Coal

With the idea of developing means and methods which will eliminate waste in the burning of bituminous coal, reducing the smoke nuisance and making bituminous coal a more desirable domestic fuel, the National Coal Association has appointed a research committee to go into those problems. The members of the committee have pledged themselves to attack these problems vigorously. They hope to induce builders to pay as much attention to the heating equipment in a home as they do to the plumbing. Even in large buildings, it is known that too little attention frequently is given the problem of heating them most effectively at the lowest cost.

This action of the National Coal Association follows a recommendation emphasized by Harry L. Gandy in his annual report submitted to the Cincinnati convention. He believes the coal operators will be more than repaid by interesting themselves in consumers' problems. In connection with the work the committee will do, the National Coal Association, will issue a printed booklet dealing with the problems of combustion. The research comittee is composed of the following members of the association:

J. C. Brydon, (chairman), president, Quemahoning Creek Coal Co., Baltimore, Md.; L. G. Ball, president Dawson Coal Co., Philadelphia, Pa.; Geo. R. Harrington, president, Chicago, Wilmington & Franklin Coal Co., Chicago, Ill.; J. C. Layne, Jr., vice-president, Marrowbone Mining Co., Cincinnati, Ohio; Louis C. Madeira, 3d, assistant to the president, Madeira, Hill & Co., Philadelphia, Pa.; W. A. Marshall, president, W. A. Marshall & Co., New York City.

Main Island Creek Co. in Big West Virginia Merger

The West Virginia Coal & Coke Co., of Elkins, W. Va., and affiliated companies in Logan County have acquired the holdings of the Main Island Creek Coal Co., one of the largest producers in the southern part of the state. The amalgamation gives the new concern 58 mines, 225,000 acres of land and between 5,000,000 and 6,000,000 tons of coal as an annual output, making the company the largest in West Virginia. About $25,000,000 is understood to be involved.

The Main Island Creek company was controlled by the Dalton-Kelly interests of Huntington, with 21 mines in Logan County, and the West Virginia Coal & Coke is affiliated with the Hutchinson Coal Co. of Fairmont. C. N. Hutchinson, of Fairmont, president of the latter company, it is understood, will head the new concern.

Castlegate Mine Opens Safely

Castlegate mine No. 2, owned by the Utah Fuel Co., of Salt Lake City, Utah, and inactive since early last March as the result of an explosion which cost the lives of 171 men, was reopened on July 21. The mine, it is asserted, has been brought to a high standard of safety. It has been completely equipped with electric lights and rock-dusting and electrical shot-firing devices, as required in the recent amendments to the safety code of the State Industrial Commission.

It is stated that no accumulations of gas were found and but a few indications noted. Analysis of air return showed but 0.12 per cent of methane with a volume of 175,000 cu.ft. of methane in 24 hours. Perforated sprays arranged in circular form have been installed at all partings for sprinkling loaded trips. Other provision has been made for sprinkling cars and loading operations are to be thoroughly wet down.

Pending decision as to the type of rock dust to be used, Chief Inspector of Mines B. W. Dyer recommended the use of gypsum. The shooting system is complete and the company will take away all shooting operations from the miners, drilling and firing by company men when all miners are out of the workings. Certain recommendations are made for further steps in the interest of safety, but in practically every case they are of a character that will permit the mine to continue operation while they are being acted upon.

Strike Cuts Ruhr May Output

Coal production in the Ruhr during May, according to the *Frankfurter Zeitung*, amounted to 1,310,000 tons, as compared with 7,780,000 tons in May, 1923, and 8,970,000 tons in May, 1913.

Production of coke was 570,000 tons as compared with 1,890,000 in May of last year and 1,920,000 tons in May, 1913. The decline in last May's output was due to the strike.

Problems In Underground Management

Few Superintendents Know What Risks Are Run with Explosives

If They Did They Would Increase Supervision, Thus Preventing Accidents and Getting a Higher Percentage of Lump Coal

"PERMISSIBLE explosives and dynamite deteriorate with time. They are perishable products. Do you keep them fresh by using the old stock first or do you pile the new explosives on the old and use the new stocks first?" said W. J. German, technical representative, E. I. Dupont de Nemours & Co., at the West Virginia Coal Mining Institute. The Consolidation Coal Co. uses its explosives in the order in which they are received. The old stocks are moved first.

Mr. German said that in his travels he had found a dozen or more fuses as short as 6 to 7 in. long already furnished with caps ready for use. The practice of using such short fuses is not only extremely dangerous, it is wasteful of explosives, it produces an excess of fine coal, but still it goes on. The only sure way to eliminate the dangers of the short fuse is by introducing electric blasting.

As for crimping caps on fuse with knives, files, nails or teeth instead of a crimper, Mr. German said that in so doing the user is taking risks such as the men who manufacture the detonators never take. The men who handle explosives should be as careful as those who make them.

Insert Detonator at End

Miners often make a primer in such a way that the detonator, or cap, extends through the side of the cartridge. When thus arranged the dangerous end of the cap protrudes so that when the latter is pushed back into the hole, the loaded end of the cap bumps and rubs against the side of the hole and it may thus be caused to explode. The safe way is to place the detonator in the center of the cartridge parallel to its length and pointing toward the bulk of the explosive.

If the wires of electric detonators are allowed to drag over the tracks a premature explosion may occur, for a locomotive or a cutting machine may be grounded in a nearby place causing stray currents to pass through the tracks. To tamp a hole and prepare a shot when electric drills and cutting machines are running in the same place is most unwise. This practice is common where the shooting is done at night.

Mr. German graphically described a trip made into a mine in a car with six miners. The roof was low and cleared the tops of the cars by about 4 in. The miners each had three sticks of explosive in each back pocket and electric detonators in their front pockets with the wires projecting. The rails were poorly bonded. Sparks were flying from the couplings and from some of the bolts in the bottom of the car. The miners were turning and twisting in their uncertain seats causing the ends of the wires to touch the iron work on the car botton. What would have happened had a stray current passed through the detonator wires? In some of our "well-managed" mines such carelessness is common, and mine superintendents should travel the man trip and note these facts.

Store Permissibles Separately

The storing of explosives and detonators in a mine by miners is a source of great danger. Often when the men are cleaning up preparatory to starting pillar work they come across explosives and detonators hidden in the gob by miners who have left and failed to remove them from their hiding places. It is hazardous to store explosives and detonators together. A fall of rock, a lighted match or a spark may set off the detonator and detonate the explosives. Permissible powder stored by itself is not dangerous. Mr. German said he could not imagine any way in which permissibles could be exploded without detonators.

Many a shotfirer with pipe in mouth will open a box of caps, regardless of the danger of exploding the whole box should some of the burning tobacco fall into it. Should he bump his head he may well precipitate pipe and contents into the box. Even a spark from a pipe may fire detonators.

Mr. German closed by calling attention to the unsafe and inefficient tamping of shots due to the failure of the company to provide clay, to the miners' unwillingness to make paper cartridges for the clay, and to the desire to use short fuse. When a man is going to use a skin'emback he usually is wise enough not to stay so long that it will go off before he has had time to get back a sufficient distance, but in his haste the proper tamping of the shot is overlooked.

When holes are bored with electric drills the holes are apt to be drilled deeper than the undercut. This is more common in mines where the coal is shot and drilled by crews at night. In one mine the shooting crews had drilled, tamped and charged as many as fifty holes before the places had been completely cut. Under such conditions the depth of the hole and the quantity of explosives used was a matter of guesswork. This slapdash way of shooting is often the cause of the small percentage of lump coal obtained. The company tries to remedy the matter by changing the powder, but the trouble usually is not in the explosive but in the way in which it is handled.

Kinloch Miners Never Work With Defective Lamps

By R. C. Hiteshue
Master Mechanic, Valley Camp Coal Co., Parnassus, Pa.

The Valley Camp Coal Co., at the Kinloch slope, Parnassus, Pa., finds it advisable always to send into the mine about thirty extra electric cap lamps to replace any of eight hundred in use that develop imperfections during the working shift. The extra lamps, in numbers from two to five, are carried in a box built expressly for the purpose, as the accompanying illustration shows. These

Nest for Five Electric Lamps

Every motorman is supposed to replace any defective lamps in his district and for this purpose carries a supply on his locomotive.

boxes are loaded onto a supply car and lowered down the slope; then they are distributed, one to each locomotive. When gathering locomotives visit the working place of a miner who has a defective lamp, he exchanges it for one in good condition taken from the lamp box on the locomotive. Several additional boxes are kept at the slope bottom to make sure that a sufficient number of good lamps are available at all times to exchange for those that are defective.

Practical Pointers For Electrical And Mechanical Men

Will Set Pump in Operation or Stop It Automatically as Need Requires

Rise of Water Causes Ball to Roll from End to End of Runway and Establish or Break the Current, thus Starting or Stopping the Pump

At many mines water collects either in sumps prepared for its reception, or in dips, swags or swales in either old or active workings, but from which it must be pumped out periodically. The capacity of the pump or pumps serving such places is greater than the average influx of water, so that these machines are not kept running continuously. The usual practice in some cases at many mines is for the pumpman to make periodic inspections of the various sumps and start and stop the pumps serving them by hand. This is never satisfactory, and the sump is liable to overflow or the pump to run dry if the pumpman doesn't happen to be on hand at exactly the proper time.

In order to overcome this difficulty, the automatic device shown in the accompanying illustration has been devised and has given good results. This device consists of a float *C* hinged to a post at *A*, and so arranged that it may rise or fall through a considerable arc. On top of this float a closed runway containing a steel ball *E* is hinged at *B*. On the forward end of this tilting runway is placed the contact of a switch *F*.

As shown in the illustration, this switch is open and the pump, of course, shut down. Suppose now that the water in the sump, which in this case is a portion of an old roadway, rises 17 in. This will tilt the whole float and the runway upon it to such an angle that the steel ball *E* will roll to the opposite end of the runway. This completes the circuit, starting the pump which will continue to operate until the level of the water has fallen to such a point that the runway *D* is inclined to such an angle that the ball will roll to the end at which it is shown in the illustration. This will break the circuit and stop the pump.

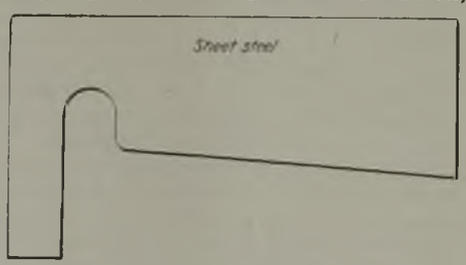
Regulates Pump Operation

The rise of the water tilts a runway *D* resting on the float *C* causing the ball *E* to roll to the opposite end of the guide. In its new position it completes the circuit by which the pump is operated.

A contrivance of this kind can be built by anyone fitted to take care of pumps in the mine. The materials employed in its construction are largely odds and ends that may be picked up about any mining plant, and when properly constructed this device will govern the pump perfectly and without any attention whatever on the part of the attendant. Furthermore, the use of a device of this kind removes the human element from the operation of the pump, holds the water in the sump definitely between predetermined levels and saves much power in pump operation.

Shape Gage to Be Used on Locomotive Wheels

One of the chief causes for locomotive derailments is defective track. Often the tracks are in bad condition, because locomotive wheels are allowed to operate with high false flanges. Almost every time mining men meet and discuss their difficulties, locomotive derailments prove to be the most interesting topic. At a recent meeting one mining man said that some of his derailments were due to the fact that newly turned-down wheels are not always properly shaped. He added that his company is now using a steel gage patterned from the shape of a new factory wheel. In turning down old wheels this gage is used as a templet, and in this way the company is sure that all wheels are properly shaped. This gage is shown in the illustration. It will, no doubt, aid in reducing accidents and delays in other mines when generally adopted.



Gage for Wheel Tread

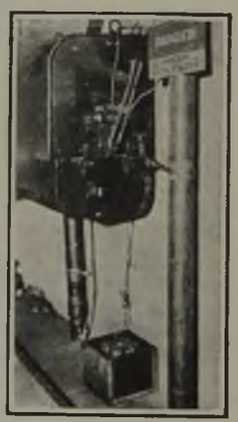
Every mine machine shop should be equipped with a gage to be used when old wheels are turned down. Unless the tread is properly shaped, accidents and derailments will occur frequently.

Another interesting feature in connection with this subject, is the necessity of having all wheel treads alike so that the brake shoes and brake rigging will operate satisfactorily. A turned-down wheel improperly shaped does not afford a brake shoe of standard shape a proper grip. This is no doubt another cause for derailments.

Bell Sounds When Fan Stops

By Ed Gunia
Master Mechanic,
Monarch Fuel Co., Rural Ridge, Pa.

Simultaneously with a power failure or a short in the wiring or control equipment in the fanhouse, a warning should be sounded to notify the electrician or some other plant attendant of this condition. Immediate steps can be taken then either to remedy the existing electrical condition or else switch over to an auxiliary drive unit for operating the fan. In our fanhouse at the Rural Ridge mine of the Monarch Fuel Co., near Pittsburgh, Pa., I rigged up a simple door-bell circuit, with a warning bell in the hoist house, to accomplish this purpose.



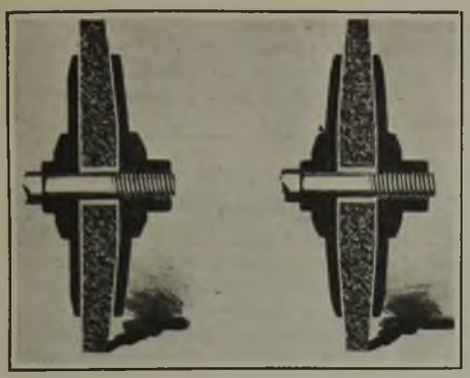
Watch the Fan

Some years ago a fan stopped running. Fifteen minutes later the mine blew up and killed everyone in it. This illustration shows how the starter box is made to give warning.

Details of the arrangement are shown in the accompanying illustration. To the operating lever of the starter box I attached a copper contact leaf, and another to the box, these forming two terminals of the circuit. When the lever is in running position, the circuit is open; but when the lever jumps back into neutral, following a power failure or a short, the contact leaves are brought together and the circuit is closed and an alarm is sounded.

Safe Practice When Using Grinding Wheels

Much has been written about the causes of grinding-wheel accidents. Mishaps do happen occasionally and it is, therefore, the best practice never to operate grinding wheels without the wheel being properly enclosed in a



Protection Flanges

To safeguard the workman every wheel used on the stand should be adequately protected. The operator should also be required to use goggles.

hood. Protection flanges for safeguarding grinding wheels are shown in the figure. A pair of goggles to protect the eyes should also be used. The mine-repair shop operator should take advantage of the safety regulations followed in commercial machine shops. To use the right wheel at the right speed, properly protected, will make it possible to do more and better work.

G. H. RADEBAUGH.

Keep Underground Machine Shop High and Dry

Did it ever occur to you that when driving a room that is later to be made into an underground machine shop it should be arranged so as to rise and attain such an elevation for the working floor that the bottom of the pit will be higher than adjoining workings? By so doing you are sure to have a machine shop that is always dry, one in which tools and parts are not likely to rust quickly, and where the workmen do not develop rheumatism.

In building the shop all the coal and 10 or 12 ft. of the roof may be removed. With this arrangement the floor can be elevated and still the necessary headroom will be afforded. The machine shop will be approached in this case by an inclined track resting on bents. Some will prefer to leave most of the coal in place and grade up on it.

The first of these schemes was used in constructing the underground machine shop shown in the accompanying illustration. Both present fire hazards if concrete is not used extensively. The safest and best way is to take out all the coal and brush as much of the roof as is needed to give the necessary headroom, using the roof material in grading to the desired elevation.

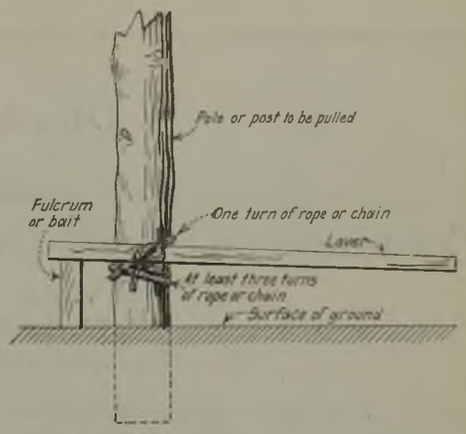
Chain Round Pole Enables Levers to Lift It

Every once in a while about the mines it becomes necessary to pull up a pole, post, stake or pile. Of course several devices such as a jack or tools made especially for the purpose may be employed. As a rule, however, simpler and more inexpensive means may be used.

In the accompanying illustration is shown an extremely simple way of getting a firm hold on a pole with a lever. The attachment to the pole consists of three or more continuous loops of rope or chain. The end of any convenient lever may then be passed through one of the loops. A pull on this loop will tend to tighten the others and prevent their slipping. Of course the lever may be arranged as shown or the fulcrum may be placed between the operator and the pole so that a downward pressure on the end of the lever is required to lift the pole.

If many poles are to be pulled it may be advisable to make, say, two levers, two chains and a series of fulcrums or baits. On the other hand two levers may be used on the same pole simultaneously, one hitching being placed below the other. When the pole has been raised as far as the levers and hitchings will permit it may be held in position by one lever while the other hitching is slacked off and slipped down for a new hold. The pole may then be held by the other lever while the second hitching is readjusted.

As a rule, chain is to be preferred to rope for making the hitchings. This may be of either the curb or "log chain" type, some people preferring one and some the other. An old wagon tongue makes an excellent lever for pulling large poles, and for ordinary fence posts or those of similar size a crow bar or piece of drill steel answers every purpose. In wet or marshy land punching a hole down through the ground close beside the post with a crowbar or rod will let the air down to the bottom of the post and make the pulling easier.



Gives Firm Grip on the Pole

At least three turns of rope or chain are taken around the pole. Two of these are pulled up tight and the lever is passed through the third. Lifting on the lever tightens the parts on the pole causing them to grip it securely.

Let Batteries Ventilate and Pump Idle Mine

"The old story that a fleet of storage batteries during a suspension is a liability is certainly not true," states Joseph A. Long, assistant general superintendent and electrician of the Madison Coal Corporation at Glen Carbon, Ill., "for they are proving to be a great asset to us as our monthly payroll shows."

The Madison Coal Corporation, owning one of the largest fleets of battery-equipped locomotives in the country, recently found that, due to a shutdown of one of their mines, sixteen sets of their batteries would not be required for locomotive work.

In most mines, some work must be done whether they work or are idle. Pumps must be operated, the fans must be kept revolving and lights are needed here and there. In the sixteen sets of batteries, which were idle at this particular time, there was an abundance of electrical energy available. All that was required to utilize this energy was proper connection of the cells in series multiple to obtain the required voltage. The batteries were thus connected and this power was harnessed to the machinery which had to be kept running during the shutdown.

Mr. Long states that this unusual application of storage batteries has enabled him to close down the steam plant for 20 days at a time effecting a saving of hundreds of dollars. During this period the batteries, without requiring any recharge, furnished sufficient current to operate all pumps, fans and lights.

Underground Repair Shop with Good Drainage

In this instance the coal was removed and an incline with bents was used for the approach to the repair shop. Any water that may enter the repair pit readily drains out and the shop is kept dry, thus preserving the tools and making the place more healthful for those working in it.

Discussion

Commenced Rock Dusting Six Years Ago

Dust Still Visible Though Not Renewed—In Winton Have No Water and Have Used Adobe Dust for Three Years

The use of dust began in an experimental way in the mines of the Union Pacific Coal Co., about six years ago, when the manway at Reliance No. 1 was heavily dusted with adobe. Since that time, no additional adobe has been placed in this manway, but the result of the original treatment is much in evidence, the dust having been carried on down the manway for nearly a thousand feet by the traveling of men and mules.

For the past three years at this company's mines at Winton, Wyo., it has been necessary to resort to the use of adobe dust as a protection from coal dust, for there is no water at Winton and the adobe dust is our only defense. In the summer of 1923, Eugene McAuliffe instructed the local management in Rock Springs to see that dust barriers were placed in all mines. This work has been carried on from that time, the barriers being filled with air-dried adobe dust, 50 per cent of which will pass a 200-mesh screen.

It has been a general practice for many years in the mines of this company to sprinkle haulage-ways, and in the gaseous mines at Hanna and Cumberland, sprinkling was carried into the faces, men being constantly employed on this work alone. At Cumberland, closed lights have been in use for nearly ten years due to the experience encountered in the operation of the property. At Hanna, closed lights have been placed in service during 1923 and 1924, at present all operations at Hanna being under closed lights.

Dusting Schedule Arranged

The experience of the bituminous mines in the United States during the past year brought about serious consideration of a general dusting and dust barrier program in the mines of this company, and for the past two months we have been engaged in a general application of sprinkling, dust barriers and adobe dust.

The arrangement of a schedule is now complete. By Nov. 1, of this year, the schedule calls for complete protection of all the mines.

1. In the panel and cross entries, water is to be used on all cutter bars on mine machines and faces are to be wet down. This wetting is to be carried to the mouth of the panel entries and to a distance of 600 ft. from the face of cross-entry work.

2. At the mouths of all panels and cross entries dust barriers containing adobe dust are to be placed. Dust barriers are also to be placed on cross entries between panels and on slopes between entries. This, of course, contemplates a barrier in haulage ways, air courses, and manways.

3. Slopes and cross entries are being and will be covered with adobe to the depth of from one to two inches, the ribs and roof being washed down in advance of the adobe application, air courses and manways being washed down and then dusted with adobe by means of blowers. These blowers are driven by either direct connected or belted motors.

We have arranged that a specified quantity of the work be performed each month, in order that the mines will be properly protected by Nov. 1, of this year.

Analyses are being made by the Bureau of Mines' laboratory at Pittsburgh, Pa., of the adobe dust we are using. This is done that we may be sure that we are introducing no additional hazard to the health of the men underground.

A. W. Dickinson,
General Superintendent,
Union Pacific Coal Co.
Rock Springs, Wyo.

Longwall for Streaky Coal

In the discussion of July 3, a West Virginia operator writes asking for a method of working splint coal of the following average cross section: "Hard slate top, drawslate, 10 in.; fine grade of coal, 48 in., soft slate, 4¾ in.; coal, 4¼ in.; mixed slate and coal, 5¼ in.; coal, 11 in.; sandstone bottom. The soft slate immediately underlying the 48 in. of coal will not support the weight of an under-cutting machine of the short-wall type without the aid of steel skids, and the loader cannot be permitted to use his shovel on the bottom."

A mine having such a bed of coal should be worked by the longwall-advancing system, using the slate for the building of packs, timber cribs being inserted at short intervals. In a section of the mine, a face 100 to 150 ft. wide should be opened and the 4¾-in. streak should be cut out by day-wage men with picks as far as they can reach.* Sprags should be set every 4 or 5 ft. apart. The 4¼-in. coal below the slate could then be wedged up, so as to permit the men to increase the depth of the undercut, until it is about 5 or 6 ft. in from the face of the coal. The slate should then be cleaned out, entry and gob packs should be built and the coal shot down and loaded out before the mixed bed of slate and coal is disturbed. By having long faces the cut can be made more readily in the slate seam and it will be easier to lift the mixed slate and coal.

William Barlow, Sr.
Landgraff, W. Va.

*Why not use a machine?—Editor.

Walsh Does Not Oppose Trolley Locomotives

I request the courtesy of space in *Coal Age* to correct a wrong impression that may be created by the special dispatch from Scranton, Pa., June 27, published in the issue of July 3 of *Coal Age* in which reference is made to the report of the mine inspectors who investigated the explosion at the Loomis Colliery of the Glen Alden Coal Co., June 6.

The writer of the special dispatch states that:

> Among local coal-mining men it is thought that the inclusion of the electric trolley locomotive as a cause of the explosion may have been written into the report by the mine inspectors to aid Secretary Walsh in his campaign against the use of electrically operated machinery in underground workings. Mr. Walsh has time and again protested against the operation of such equipment as electric trolley locomotives.

I desire to say most emphatically that I am not against the use of electrically operated machines in underground workings, but what I do oppose is the use of trolley locomotives or any other open type of electrically operated motor in sections of mines where the atmosphere may become highly explosive in a short time as a result of an interruption of the air current.

The report to which reference has been made was written by some of the best qualified men in the anthracite region, and in that report they put their own independent judgment.

Joseph J. Walsh,
Secretary of Mines.
Harrisburg, Pa.

Should Air Space Be Used With Black Powder?

We use black blasting powder at our mines. Would it be safe to use the air-space method or to place a loose dummy on the charge? Experiments by J. F. Burgone showed that with a 2-in. drillhole 20 in. of tamping are required. I have always found that black blasting powder would give good results when tamped tight and hard. Of course with a high explosive a better quality of coal is produced by this method of charging, but would it be equally available with black blasting powder? John W. Jones.
Altoona, Ala.

Although the reports on the cushioned method of blasting with black powder are rather limited, the Hercules Powder Co. can advise you that the few reports it has received indicate that the cushioned method of blasting is effective also with black blasting powder. The air space between the powder and the tamping probably should not be as great as with high explosives, but it would be well to try out its effectiveness in every instance.

J. H. Horlick, Jr.
Manager Service Division.
Hercules Powder Co.,
Wilmington, Del.

Production And the Market

Strong Tone Prevails in Bituminous-Coal Trade Despite Small Volume of Business

Save for occasional nibbles in the way of scattered inquiries, tangible evidence of an early pick-up in the bituminous-coal trade is as hard to find as ever; nevertheless the unquenchable optimism evinced in certain quarters of late will not down. Actual orders are few and far between, working time at the mines is short, yet several mines in the eastern Ohio field have opened recently and preparations are going forward for further resumptions. Despite the absence of visible support for the favorable sentiment, most centers report an improvement in undertone, attributable probably to the certainty that the longer the depression lasts the more inevitable it becomes that there will be an upturn and that it will not be an evanescent flurry. Considerable strength has been imparted to this feeling of confidence by the prosperity of the agricultural industry, fine crops and increasing prices being the rule.

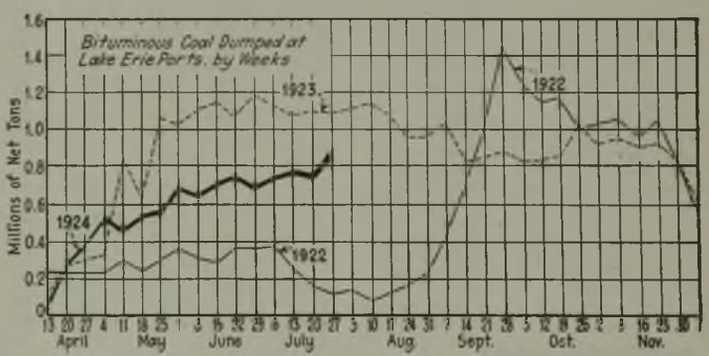
Loader Scale Means More Union Coal

The signing of a machine-loader scale in Illinois was the outstanding event of recent weeks, presaging as it does keener competition from union operations by reason of the resultant decrease in production costs. Although a strike of cutting-machine runners has delayed operation under the new scale, it is confidently believed that an adjustment will soon be reached, when the effect on market conditions will be watched with interest.

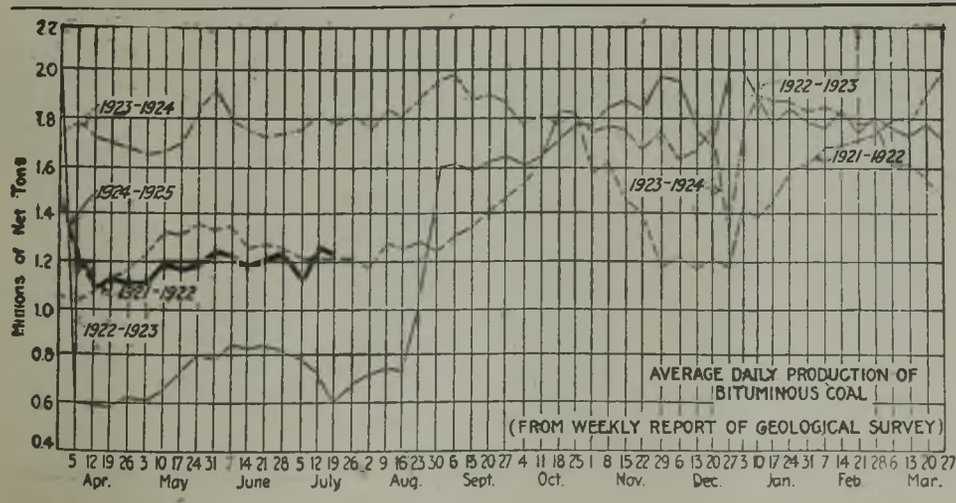
Coal Age Index of spot prices of bituminous coal registered no change during the last week, standing on July 28 at 163, the corresponding price being $1.98.

There has been a falling off in activity at Hampton Roads, dumpings of coal for all accounts during the week ended July 24 totaling 343,060 net tons, a decline of 30,540 tons from the preceding week, when 373,600 net tons was handled. The movement of coal to the lakes is proceeding pretty much in its accustomed groove for this season, dumpings at Lake Erie ports during the week ended July 27, according to the Ore & Coal Exchange, being as follows: Cargo, 785,317 net tons; fuel, 43,443 tons. The totals for the previous week were 733,634 net tons of cargo coal and 41,667 tons of fuel coal.

Production of bituminous coal reacted slightly during the third week in July, output during that period, according to the Geological Survey, totaling 7,403,000 net tons, compared with 7,502,000 net tons during the preceding week, according to revised figures. Anthracite production also fell off during the week ended July 19, 1,840,000 net tons having been turned out, a decrease of 31,000 tons from the previous week.



While anthracite production is holding up well not much of it is finding its way to the consumer's bin, as the demand in the leading markets is sluggish for both domestic and steam sizes. A fair movement to New England is aiding materially in maintaining independent prices, though concessions have been necessary in some instances to keep tonnage moving. Stove continues to command top prices, 25 to 50c. being lopped off when egg or chestnut is taken with it. Pea moves slowly, if at all, much of it going into storage piles, and buckwheat is markedly draggy. Retail yards are well filled, consumers evincing scant interest in next winter's coal requirements.



Estimates of Production

(Net Tons)

	1923	1924
BITUMINOUS		
July 5	8,742,000	5,738,000
July 12 (*a*)	10,925,000	7,502,000
July 19 (*b*)	10,676,000	7,403,000
Cal. yr. to date (*c*)	301,154,000	246,859,000
Daily average to date	1,772,000	1,453,000
ANTHRACITE		
July 5	1,580,000	1,296,000
July 12	2,051,000	1,871,000
July 19	2,005,000	1,840,000
Cal. yr. to date	56,805,000	50,632,000
COKE		
July 12 (*a*)	366,000	106,000
July 19 (*b*)	361,000	105,000
Cal. yr. to date (*c*)	11,105,000	6,387,000

(*a*) Revised from last report. (*b*) Subject to revision. (*c*) Minus one day's production to equalize number of days in the two years.

Midwest Improves Slowly

No great change in the coal market was noticeable throughout the Midwest region during the past week. A slight but steady improvement of tone, especially in the country trade, made itself felt here and there. The main disadvantage of this is that it makes too many operators hanker to reopen closed-down mines, thus killing the new flower with overcultivation. This has been going on so persistently for several days that the contemplated increase in the price of Illinois domestic sizes Aug. 1 has been given up. There is very little likelihood of any change in circulars. Smokeless and anthracite domestic business continues sluggish.

Railroads continue taking a little coal steadily on low-price contracts—many of them short-time agreements—but other steam business is slow.

Running time throughout the fields of southern and central Illinois has been so short during the week that "no bills" have increased somewhat. Southern Illinois screenings now hardly ever top $1.75, although not much moves at less than that. There is much suffering among miners and their families. No field in Illinois is in even fair condition. A little railroad and small industrial and domestic trade are all there is.

In St. Louis domestic trade is still flat. Anthracite and coke storage, usually definitely on the pick-up by this time of year, remain slow. There is a little tonnage moving in the cheaper grades for current use where gas is not available. Steam business in the city, both wagonload and carload, is quiet. The only life is shown in country domestic, and this is little enough. There are no changes in prices worthy of note.

"Slightly Better" in Kentucky

The coal trade in Kentucky is admitting slightly better business, but kicking on prices. The retailers are buying sparingly, for immediate needs only, and total production of prepared coal is still low enough to prevent any overproduction of screenings, which means that there is no cause for advancing prepared prices or lowering screenings. The fact that lake movement hasn't been as heavy as anticipated has curtailed overproduction of eastern Kentucky screenings. However, eastern Kentucky has been producing a considerable amount of coal in the Elkhorn or Northeastern fields, along with the Hazard and Harlan regions, all of which show good operating time.

Although there has been a good deal of wage reduction in eastern Kentucky fields, it must be admitted that prices are quite low for this season of the year. Peak prices are

Current Quotations—Spot Prices, Bituminous Coal—Net Tons, F.O.B. Mines

Low-Volatile, Eastern	Market Quoted	July 30 1923	July 14 1924	July 21 1924	July 28 1924†
Smokeless lump	Columbus	$5.85	$3.85	$3.85	$3.75@$4.00
Smokeless mine run	Columbus	3.00	2.20	2.20	*2.00@ 2.25*
Smokeless screenings	Columbus	2.80	1.30	1.30	1.20@ 1.40
Smokeless lump	Chicago	6.10	3.60	3.85	3.75@ 4.00
Smokeless mine run	Chicago	3.60	1.85	1.85	1.75@ 2.00
Smokeless lump	Cincinnati	5.75	3.75	3.75	**3.75@ 4.00**
Smokeless mine run	Cincinnati	3.35	1.80	1.80	**1.75@ 2.00**
Smokeless screenings	Cincinnati	3.00	1.35	1.35	1.25@ 1.50
*Smokeless mine run	Boston	5.45	4.30	4.30	4.25@ 4.40
Clearfield mine run	Boston	2.35	1.80	1.85	**1.45@ 2.30**
Cambria mine run	Boston	2.85	2.20	2.15	**2.00@ 2.60**
Somerset mine run	Boston	2.60	1.95	2.00	**1.65@ 2.40**
Pool 1 (Navy Standard)	New York	3.35	2.70	2.70	2.50@ 2.90
Pool 1 (Navy Standard)	Philadelphia	3.45	2.80	2.80	2.60@ 3.00
Pool 1 (Navy Standard)	Baltimore				
Pool 9 (Super. Low Vol.)	New York	2.75	2.10	2.05	1.90@ 2.25
Pool 9 (Super. Low Vol.)	Philadelphia	2.60	2.15	2.15	1.95@ 2.35
Pool 9 (Super. Low Vol.)	Baltimore	2.40	1.85	1.90	**1.90@ 2.00**
Pool 10 (H.Gr. Low Vol.)	New York	2.25	1.80	1.80	1.65@ 2.00
Pool 10 (H.Gr. Low Vol.)	Philadelphia	2.15	1.75	1.75	1.65@ 1.90
Pool 10 (H.Gr.Low Vol.)	Baltimore	2.25	1.65	1.70	1.65@ 1.75
Pool 11 (Low Vol.)	New York	2.00	1.55	1.55	1.35@ 1.75
Pool 11 (Low Vol.)	Philadelphia	1.85	1.45	1.45	1.35@ 1.60
Pool 11 (Low Vol.)	Baltimore	2.00	1.55	1.55	1.50@ 1.60
High-Volatile, Eastern					
Pool 54-64 (Gas and St.)	New York	1.80	1.50	1.50	1.35@ 1.65
Pool 54-64 (Gas and St.)	Philadelphia	1.80	1.50	1.50	1.40@ 1.60
Pool 54-64 (Gas and St.)	Baltimore	1.70	1.45	1.45	1.40@ 1.50
Pittsburgh so'd gas	Pittsburgh	2.65	2.40	2.40	2.30@ 2.50
Pittsburgh gas mine run	Pittsburgh		2.10	2.10	2.00@ 2.25
Pittsburgh mine run (St.)	Pittsburgh	1.95	1.85	1.85	1.75@ 2.00
Pittsburgh slack (Gas)	Pittsburgh	1.45	1.20	1.25	*1.20@ 1.25*
Kanawha lump	Columbus	3.00	2.10	2.10	2.00@ 2.25
Kanawha mine run	Columbus	1.85	1.50	1.45	1.35@ 1.60
Kanawha screenings	Columbus	1.10	1.00	1.00	**1.00@ 1.20**
W. Va. lump	Cincinnati	3.10	2.10	2.10	2.00@ 2.25
W. Va. gas mine run	Cincinnati	1.55	1.35	1.35	**1.25@ 1.60**
W. Va. steam mine run	Cincinnati	1.55	1.35	1.35	**1.25@ 1.60**
W. Va. screenings	Cincinnati	.85	.95	.95	*.75@ 1.00*
Hocking lump	Columbus	2.75	2.45	2.45	2.25@ 2.65
Hocking mine run	Columbus	1.85	1.70	1.70	1.60@ 1.80
Hocking screenings	Columbus	1.15	1.35	1.15	1.10@ 1.25
Pitts. No. 8 lump	Cleveland	2.50	2.35	2.40	2.00@ 2.85
Pitts. No. 8 mine run	Cleveland	1.80	1.85	1.80	**1.80@ 1.90**
Pitts. No. 8 screenings	Cleveland	1.25	1.10	1.00	**.95@ 1.15**

Midwest	Market Quoted	July 30 1923	July 14 1924	July 21 1924	July 28 1924†
Franklin, Ill. lump	Chicago	$3.65	$2.75	$2.85	$2.75@$3.00
Franklin, Ill. mine run	Chicago	2.85	2.35	2.35	2.25@ 2.50
Franklin, Ill. screenings	Chicago	1.65	1.70	1.70	1.60@ 1.80
Central, Ill. lump	Chicago	2.60	2.35	2.50	2.50
Central, Ill. mine run	Chicago	2.10	2.10	2.10	2.00@ 2.25
Central, Ill. screenings	Chicago	1.35	1.65	1.60	1.60@ 1.65
Ind. 4th Vein lump	Chicago	3.35	2.60	2.60	2.50@ 2.75
Ind. 4th Vein mine run	Chicago	2.60	2.35	2.35	2.25@ 2.50
Ind. 4th Vein screenings	Chicago	1.60	1.70	1.70	1.60@ 1.80
Ind. 5th Vein lump	Chicago	2.85	2.35	2.35	2.25@ 2.50
Ind. 5th Vein mine run	Chicago	2.10	2.10	2.10	2.00@ 2.25
Ind. 5th Vein screenings	Chicago	1.45	1.55	1.55	1.50@ 1.65
Mt. Olive lump	St. Louis	3.00	2.85	2.85	2.75@ 3.00
Mt. Olive mine run	St. Louis	2.00	2.50	2.50	2.50
Mt. Olive screenings	St. Louis	1.75	2.00	2.00	2.00
Standard lump	St. Louis	2.55	2.15	2.15	2.00@ 2.35
Standard mine run	St. Louis	1.85	1.80	1.80	1.75@ 1.85
Standard screenings	St. Louis	.90	1.45	1.45	1.40@ 1.50
West Ky. lump	Louisville	2.25	2.10	2.10	2.00@ 2.25
West Ky. mine run	Louisville	1.60	1.60	1.60	1.50@ 1.75
West Ky. screenings	Louisville	1.05	1.25	1.25	*1.10@ 1.25*
West Ky. lump	Chicago	2.10	2.05	2.05	1.90@ 2.25
West Ky. mine run	Chicago	.95	1.60	1.60	1.50@ 1.75
South and Southwest					
Big Seam lump	Birmingham	3.25	3.20	3.20	3.10@ 3.30
Big Seam mine run	Birmingham	1.95	1.80	1.75	1.50@ 2.00
Big Seam (washed)	Birmingham	2.35	2.00	2.00	1.75@ 2.25
S. E. Ky. lump	Chicago	2.85	2.10	2.10	2.00@ 2.25
S. E. Ky. mine run	Chicago	2.10	1.50	1.50	1.25@ 1.75
S. E. Ky. lump	Louisville	2.90	2.10	2.10	2.00@ 2.25
S. E. Ky. mine run	Louisville	1.75	1.55	1.55	1.35@ 1.75
S. E. Ky. screenings	Louisville	1.00	.95	.95	.85@ 1.10
S. E. Ky. lump	Cincinnati	3.10	2.50	2.50	*2.00@ 2.50*
S. E. Ky. mine run	Cincinnati	1.55	1.45	1.45	**1.25@ 1.75**
S. E. Ky. screenings	Cincinnati	.85	.90	.90	.75@ 1.10
Kansas lump	Kansas City	4.00	4.50	4.50	4.50
Kansas mine run	Kansas City	3.25	3.50	3.50	3.50
Kansas screenings	Kansas City	2.60	2.50	2.00	2.00

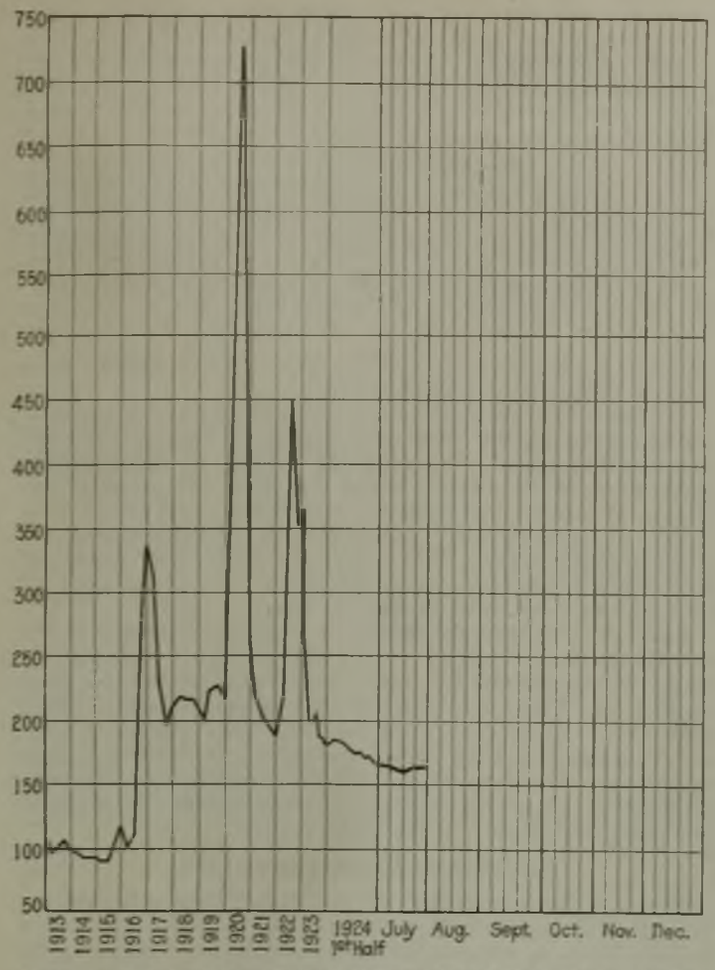
* Gross tons, f.o.b. vessel, Hampton Roads.

† Advances over previous week shown in **heavy type**, declines in *italics*.

Current Quotations—Spot Prices, Anthracite—Gross Tons, F.O.B. Mines

	Market Quoted	Freight Rates	July 30, 1923 Independent	July 30, 1923 Company	July 21, 1924 Independent	July 21, 1924 Company	July 28, 1924† Independent	July 28, 1924† Company
Broken	New York	$2.34		$7.75@$8.35		$8.00@$8.95		$8.00@$8.95
Broken	Philadelphia	2.39		7.90@ 8.10		8.80@ 8.95		8.80@ 8.95
Egg	New York	2.34	$8.50@$12.75	8.00@ 8.35	$8.50@$9.00	8.55@ 8.95	*$8.50@$8.75*	8.55@ 8.95
Egg	Philadelphia	2.39	9.25@ 11.00	8.10@ 8.35	8.90@ 9.60	8.90@ 8.95	8.90@ 9.60	8.90@ 8.95
Egg	Chicago*	5.06	8.50@ 12.00	7.25@ 7.45	7.99@ 8.10	7.94@ 8.00	7.99@ 8.10	7.94@ 8.00
Stove	New York	2.34	8.50@$13.00	8.00@ 8.35	9.00@ 9.25	8.55@ 9.20	9.00@ 9.25	8.55@ 9.20
Stove	Philadelphia	2.39	9.25@ 11.00	8.15@ 8.35	9.25@ 9.90	8.95@ 9.10	9.25@ 9.90	8.95@ 9.10
Stove	Chicago*	5.06	8.50@ 12.00	7.25@ 7.45	8.30@ 8.40	8.24@ 8.34	8.30@ 8.40	8.24@ 8.34
Chestnut	New York	2.34	8.50@ 12.75	8.00@ 8.35	8.50@ 9.00	8.55@ 9.05	*8.50@ 8.75*	8.55@ 9.05
Chestnut	Philadelphia	2.39	9.25@ 11.00	8.15@ 8.35	8.75@ 9.70	8.90@ 8.95	8.75@ 9.70	8.90@ 8.95
Chestnut	Chicago*	5.06	8.50@ 12.00	7.25@ 7.45	8.08@ 8.23	8.18@ 8.24	8.08@ 8.23	8.18@ 8.24
Range	New York	2.34		8.30		8.80		8.80
Pea	New York	2.22	6.75@ 8.00	6.00@ 6.30	4.50@ 5.25	5.50@ 6.00	4.50@ 5.25	5.50@ 6.00
Pea	Philadelphia	2.14	7.00@ 7.50	6.15@ 6.20	5.75@ 6.25	5.75@ 6.00	5.75@ 6.25	5.75@ 6.00
Pea	Chicago*	4.79	7.00@ 8.50	5.30@ 5.65	5.13@ 5.45	5.36@ 5.91	5.13@ 5.45	5.36@ 5.91
Buckwheat No. 1	New York	2.22	2.75@ 3.50	3.50@ 4.15	2.00@ 2.50	3.00@ 3.15	*1.75@ 2.50*	3.00@ 3.15
Buckwheat No. 1	Philadelphia	2.14	2.75@ 3.50	3.50	2.50@ 3.00	3.00	2.50@ 3.00	3.00
Rice	New York	2.22	2.00@ 2.50	2.50	1.50@ 2.15	2.00@ 2.25	1.50@ 2.15	2.00@ 2.25
Rice	Philadelphia	2.14	1.75@ 2.50	2.50	2.00@ 2.25	2.25	2.00@ 2.25	2.25
Barley	New York	2.22	1.25@ 1.50	1.50	1.00@ 1.50	1.50	1.00@ 1.50	1.50
Barley	Philadelphia	2.14	1.15@ 1.50	1.50	1.50	1.50	1.50	1.50
Birdseye	New York	2.22	1.40@ 1.60	1.60	1.00@ 1.50	1.60		1.60

* Net tons, f.o.b. mines. † Advances over previous week shown in **heavy type**, declines in *italics*.



Coal Age Index of Spot Prices of Bituminous Coal F.O.B. Mines

	1924			1923
	July 28	July 21	July 14	July 28
Index	163	163	162	196
Weighted average price	$1.98	$1.98	$1.96	$2.37

This diagram shows the relative, not the actual, prices on fourteen coals, representative of nearly 90 per cent of the bituminous output of the United States, weighted first with respect to the proportions each of slack, prepared and run-of-mine normally shipped, and second, with respect to the tonnage of each normally produced. The average thus obtained was compared with the average for the twelve months ended June, 1914, as 100, after the manner adopted in the report on "Prices of Coal and Coke, 1913-1918," published by the Geological Survey and the War Industries Board.

around $2.50 a ton, while the lowest quotations available are on eastern Kentucky screenings, at a low of 85c.

The western Kentucky market continues firm, with slightly better demand reported. It is said that such companies as are operating union mines are getting better production for their wage scale than at any previous time in years. It also is asserted that in some of the operating mines there are indications of private agreements and slight cutting of wage scales, while in some other mines full wage scales are paid, but only on private agreements relative to increased production per day.

Smokeless prices show signs of weakening, particularly in Western markets. Production has not been affected perceptibly, however. The price of high-volatile lump and egg also has receded in inland markets. The market for domestic coals is extremely sluggish. Upper Potomac conditions are such that there has been no change in prices on the various grades.

Northwest Looks for Action

Little life was shown in the Duluth market during the week, except a general better feeling and a firming of prices, which is particularly noticeable. The selling movement is no better than it has been, in fact the dock men are living on hopes for the future, but they believe that two or three weeks will see an end to the inactivity. The majority of the coal which is moving from the docks now is railroad coal, and it is thought that the railroads will have their own supplies well out of the way before winter.

Anthracite is being shipped to Winnipeg from the three Duluth docks which have rail connection with the Canadian Northern. In fact Canada is the best hard-coal customer in this market at present.

The movement to the docks picked up this week, when 37 cargoes were received, of which seven were hard coal, and 20 cargoes are reported on the way, of which five are of hard coal.

Warm weather at Milwaukee serves to check what little business the coal men have been doing of late, and the market is very dull. Country dealers are evincing some disposition to lay in stocks, but the industries are out of the market at present. Prices continue unchanged. Lake receipts have slowed up considerably. Thus far this season 347,238 tons of anthracite and 844,318 tons of soft coal have arrived at Milwaukee.

West Does Fairly Well

A steady though slight increase in business through the Southwest presages the opening of the fall demand. Kansas strip coal, which has been selling for $3.75 for lump, $3.50 for nut and $2.75 for mine run, again is quoted at the same price as shaft coal. The price of Henryetta (Okla.) coal, slashed during a recent fight among Oklahoma operators for business, has been advanced 50c., as the market improves. It now is quoted at $4.50 for lump, $3.75 for nut, $3.25 for mine run and $2 for screenings. Some operators already have increased their price for Arkansas semi-anthracite. The increase is expected to become general early in August. As a result of the uneven advance, Arkansas coal is quoted $5.50@$7 for lump, $3.25@$3.75 for mine run and $1.75@$2 for screenings. Kansas coal is $4.50 for lump, $4 for nut, $3.25@$3.50 for mine run and $2.50@$2.75 for screenings.

Reports on the Colorado coal market activities show very little change from last week. There is little demand for anything. Mines worked on an average of only sixteen hours last week and a number of them report unbilled loads on track. The operators' weekly reports show more than 50 per cent of the working time lost was attributed to "no market."

In Utah more coal is being mined and sold than a few weeks ago, but mines are still working less than three days a week. Lump is moving for domestic storage, but so are most other sizes. The principal industries buying coal are cement plants, sugar companies and metal-mining companies. Railroads are taking very little, but they are not entirely out of the market.

Cincinnati Market Drags

Little change is to be noted in the dull and draggy condition of the Cincinnati market. Even the slack market, which showed signs of coming to life with the continued reduction in the make of prepared sizes, has settled back again. The one bright spot in the bituminous list is run of mine, which, in spite of some rough knocks recently, holds consistently and with an evidence that this, at least, has struck rock bottom. Smokeless business is of the in and out order. The end of the month finds prices hardening a little. Inquiries from steel plants and concerns with malleable requirements begin to show a better vista ahead. Retail prices are unchanged and in keeping with the mid-summer inactivity. Specialized coals are quoted as follows: Egg, $2.25@$2.75; block, $3@$3.75.

A better feeling is developing at Columbus. This is more psychological than real, as few operators or jobbers note any increase in business. While some steam consumers still have fair stocks, the amount of fuel above ground has been reduced materially. There is still a considerable quantity of demurrage coal and consequently some low quotations are heard. Contracting is not active, although an occasional agreement is being renewed. Domestic consumers are still playing a waiting game and dealers' business is rather light. Coal is moving in larger quantities to schools and municipal and county institutions. Lake trade is quiet although reports show a congestion of loaded cars between Columbus and Toledo. West Virginia mines are supplying the main tonnage for lake shipment.

A slightly improved tone has developed during the past ten days in markets served by eastern Ohio mines, output having increased. Cleveland industries, however, continue to work less than half time in many instances, and consumption of steam coal is more or less restricted. The additional tonnage consists of miscellaneous lots placed

here and there. Several mines have resumed operations in the eastern field, and retailers are becoming a little more active.

Dullness persists in the Pittsburgh market. Production is chiefly under special conditions, the coal not moving through the open market. Slack is a regular commodity, and in consequence it shows occasional slight price changes. The industrial outlook in the district appears somewhat improved.

Little improvement is noted in mining conditions in the central Pennsylvania field. For the week ending July 19 the loadings were 11,172 cars, as compared with 10,804 cars in the previous week. There are 2,000 no-bill cars reported in the district.

Trade at Buffalo is still pretty quiet. Nothing would produce good prices except a car shortage or a strike, and neither is in sight now.

Inquiry Light in New England

In New England the outlook for steam coal continues anything but favorable. Prices are as low as, and in certain instances even lower than, at any time this season, and inquiry is relatively so light that forcing coal is still indulged in by several of the agencies. Steamer rates from Hampton Roads are about 75c. to Boston, and with this added to $4.25 per gross ton f.o.b. vessel at Norfolk or Newport News it is easy to account for a range of $4.35@ $4.40 per gross ton on cars for inland distribution. The territory is being scoured for spot orders, and there is enough business to absorb what tonnage arrives.

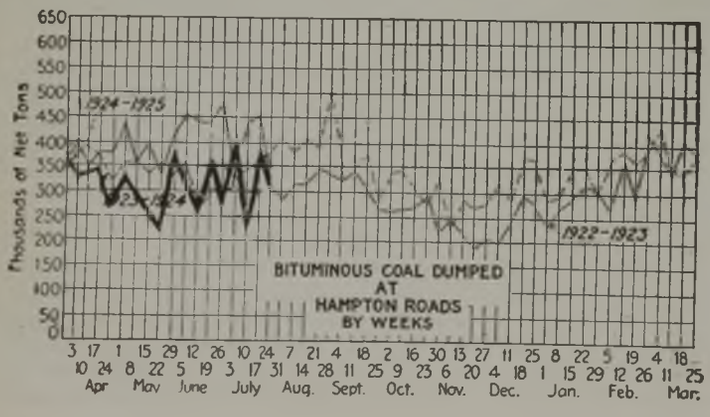
Moderate accumulations are the rule at Hampton Roads. In some quarters there is really drastic curtailment, but in others there is a disposition to chase rainbows and open the gate on the strength of sporadic sales. There are occasional commitments being made off-shore, and these together with certain staple tonnage are sufficient to keep the average movement up to the May and June level.

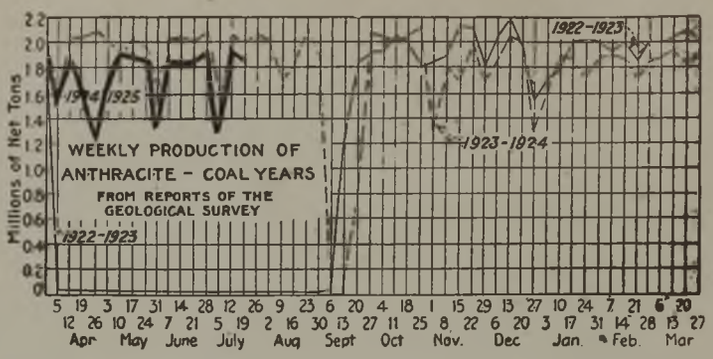
All-rail there is no material change. In certain of the non-union sections of central Pennsylvania there are renewed differences with labor over the wage scale and incidental problems. The undependable market is responsible for fluctuations in output, a situation that is difficult for all concerned. Prices are about as low as they can go without cutting too deeply into actual costs, and even the highest grades are being offered at figures little above those quoted for ordinary Beech Creek coals. Dumpings over the Philadelphia and New York piers continue extremely light, and except for specialties there is only a most restricted outlet for steam grades via this route. Hampton Roads shippers have very much the advantage both as to base cost and marine rates.

Atlantic Seaboard Consumers Indifferent

Lack of interest features the New York market. There is comparatively little buying, most of the coal coming to tidewater already on contract. More coal is being shipped to the local piers than is really necessary to meet requirements, owners letting it go at figures below current quotations in order to save demurrage charges. Fading reserves and an increase in inquiries give some hope that better buying is close at hand.

Inquiries are comparatively plentiful at Philadelphia, but it is another matter to translate them into orders. Industrial conditions have not improved, yet reports are plentiful of certain textile concerns expecting to operate more fully, and some of the iron concerns also are showing hopeful signs of improvement. Prices remain firm and





practically unchanged. Tide conditions have eased again after a little flurry a week ago.

The situation at Baltimore continues dull and uninteresting, there having been practically no change for over two months, except for spasmodic periods of inquiry. The betterment of conditions hoped for with the gradual depletion of stocks has failed to materialize, and from practically all sources come complaints of general flatness in home trading. The records for the first three weeks of July show that the export trade is well in advance of that of the first three weeks of June.

Lack of a supporting market has brought production in the Birmingham district to the lowest figure recorded in many weeks, 308,000 net tons being reported for the week of July 19. There is a mere dribble of spot business being taken on. Industrial conditions are very unsatisfactory, and consequently only fuel necessary to a very restricted operation is being provided. Much of the contract domestic tonnage is being held up, as the retail market is sluggish and little coal is moving from the yards.

Anthracite Trade Lacks Life

Demand for anthracite at the New York tidewater is almost lifeless. Retail yards are nearly filled, consumers being either on vacation or not showing any desire to fill empty bins if they are without next winter's coal supply. One shipper, commenting on the local situation, said that he had sold more than 10,000 tons of hard coal within the last week, all of which was to line customers, and that during the same period he had not sold anything at tidewater. New England continues to take its share of anthracite and this has helped to maintain quotations for independent coal on something like last week's basis, although some shippers have found it necessary to quote lower figures in order to keep tonnage moving. The better grades, however, bring the maximum prices quoted. Straight lots of stove coal are bringing top prices, but when this size is taken with either egg or chestnut, from 25c. to 50c. is taken off. Pea coal moves slowly and is being stored by nearly all operators. Producers find it difficult to dispose of the smaller coals. Buckwheat is particularly hard to move and only the very best grades bring the highest prices. Rice and barley move easier.

Philadelphia dealers' yards are filled to saturation, and many producers will find it a problem to operate in August. Buying is so slow that during the past week the lightest tonnage was moved for any similar period in the past seven years. The steam trade also is still slow, and independent shippers are moving output only at cut rates.

It is difficult to perceive any change in the hard-coal situation at Baltimore. The trade reports a dull demand, and there is little expectation of a material change for some time to come.

The Connellsville coke situation shows no change of consequence. Demand and production are extremely limited. Production of beehive coke during the week ended July 19, according to the Geological Survey, totaled 105,000 net tons compared with 106,000 tons during the previous week.

Car Loadings, Surplusages and Shortages

	Cars Loaded — All Cars	Cars Loaded — Coal Cars
Week ended July 12, 1924	910,415	146,177
Previous week	759,942	111,458
Week ended July 12, 1923	1,019,809	193,922

	Surplus Cars — All Cars	Surplus Cars — Coal Cars	Car Shortage	
July 14, 1924	355,720	169,697		
Previous week	359,191	169,607		
July 14, 1923	84,210	5,865	4,574	2,700

Foreign Market And Export News

British Coal Markets Unsettled; Output Passes 5,000,000 Tons

The Welsh steam coal market is still very unsettled and business on the whole is poor. Buyers both at home and abroad are extremely cautious and a state of great uncertainty is plainly evident. A depreciation in the reparation currencies is reflected in a falling off of the European demand, and business in South America is getting more and more difficult to obtain. Many domestic buyers and coaling stations are buying very slowly, anticipating a fall in the prices of the best coals.

The inquiry in Newcastle for best steams and gas coals has improved a little over last week, but the remainder of the market is stagnant. Supplies are abundant and many pits in the Durham area are on short time in consequence. There are no contracts worth reporting. Buyers who desire prompt deliveries are obtaining concessions.

The output of the British coal mines during the week ended July 12, a cable to *Coal Age* states, was 5,002,000 tons, according to the official reports. This compares with 4,988,000 tons produced during the week ended July 5.

Trade at Hampton Roads Weak In All Branches

Business at Hampton Road is poor, with the market weak and buyers rare. The Raleigh Smokeless Coal Co. has renewed its old contract for South American shipments, chartering vessells to make deliveries, which were figured about $4.25-$4.35 f.o.b. piers.

Spot export business is almost nonexistent and bunkers and coastwise trade have reached a low level. The trade had expected dullness in bunkers and coastwise, but there is some disappointment at the falling off in foreign business.

Movement of South American coal constitutes the bulk of the activity, although a few cargoes are going to Canada and other nearby countries. The tone of the market is weak, and the trade is not optimistic over the immediate future.

United States Domestic Coal Exports During June

(In Gross Tons)

	1923	1924
Anthracite	418,594	349,134
Value	$4,504,939	$3,785,798
Bituminous	2,418,769	1,513,899
Value	$12,653,967	$6,145,836
Coke	63,841	48,238
Value	$680,325	$391,569
TWELVE MONTHS ENDED JUNE		
Anthracite	3,733,714	3,930,794
Value	$40,691,885	$43,173,035
Bituminous	15,953,879	17,200,245
Value	$97,623,225	$85,160,910
Coke	967,272	713,546
Value	$10,645,522	$6,582,238

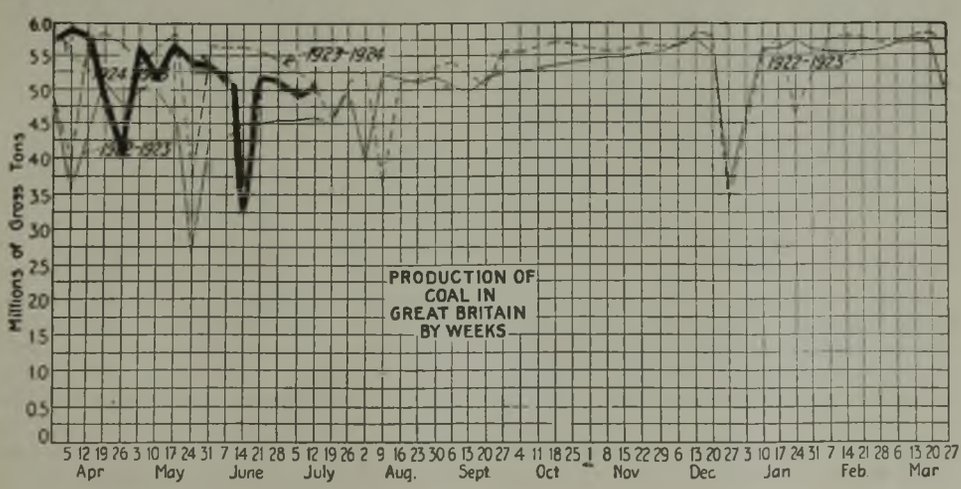
Industrial and Domestic Trade Slow in French Coal Market

Industrial coal is plentiful, due to slackening of demand. British coals, although weaker at the shipping docks, are more expensive than the French product on account of the rate of exchange. The volume of orders for household coals at the mines is good, but dealers report the consumer demand weak save for a slight flurry toward the end of the month.

Deliveries of indemnity fuels during June to the Office des Houillères Sinistrées for France and Luxemburg consisted of 201,970 tons of coal, 537,517 tons of coke and 26,908 tons of lignite briquets, a total of 766,395 tons. Receipts were larger than during the previous month but still much lower than before the strike.

The O.R.C.A. is receiving coke at an average rate of 16,174 tons daily. The price of coke remains at 150.75 fr. frontier station Sierck (all O.R.C.A. charges included).

Production by French mines during May consisted of 3,615,910 tons of coal, 76,890 tons of lignite, 220,100 tons of coke and 242,732 tons of patent fuel, a total of 4,155,542 tons. This compares with April output of 3,565,225 tons of coal, 75,572 tons of lignite, 215,056 tons of coke and 250,908 tons of patent fuel, making a total of 4,106,761 tons.



Export Clearances, Week Ended July 26, 1924

	Tons
FROM HAMPTON ROADS	
For Brazil:	
Br. Str. Polcevera for Rio de Janeiro	11,220
Jap. Str. Chifuku Maru for Rio de Janeiro	6,900
Br. Str. Tritonia for Rio de Janeiro	6,240
Br. Str. Atalaia for Para	5,863
For Italy:	
Ital. Str. Stromboli for Naples	7,289
Span. Str. Aritz Mendi for Porto Ferrajo	7,205
Ital. Str. Kamarima for Savona	3,816
Ital. Str. Vincenzo Florio for Genoa	9,330
For Newfoundland:	
Nor. Str. Betty for Argentina	3,418
For—	
Nor. Str. Marita for Boca Chica	495
Nor. Str. Tosto for Boca Chica	488
For Porto Rico:	
Amer. Str. Margaret for San Juan	4,793
For Nova Scotia:	
Fr. Str. Libourne for Three Rivers	5,825
Ital. Str. Volturno for Three Rivers	7,273
For Dutch Guiana:	
Amer. Schr. Charles Whittemore for Paramaribo	1,023
For Prince Edward Island:	
Br. Str. Maraval for Georgetown	1,044
For Cuba:	
Br. Str. Ryburn for Cienfuegos	2,541
For Panama:	
Nor. Str. Fram for Guanico	3,921
For West Indies.	
Nor. Str. Dea for Port Castries	2,732
FROM BALTIMORE	
For Italy:	
Ital. Str. Pollenzo	8,853
Ital. Str. Giovanni Florio	7,316
FROM PHILADELPHIA	
For Newfoundland:	
Dutch Str. Ubbergen, for St. John's	—

Hampton Roads Pier Situation

N. & W. Piers, Lamberts Pt.:	July 17	July 24
Cars on hand	1,228	1,228
Tons on hand	75,026	73,424
Tons dumped for week	139,975	124,979
Tonnage waiting	20,000	5,000
Virginian Piers, Sewalls Pt.:		
Cars on hand	1,429	1,516
Tons on hand	99,450	107,100
Tons dumped for week	109,560	75,513
Tonnage waiting	7,086	2,500
C. & O. Piers, Newport News:		
Cars on hand	2,164	1,947
Tons on hand	105,830	97,353
Tons dumped for week	84,037	105,811
Tonnage waiting	4,260	7,430

Pier and Bunker Prices, Gross Tons

	July 19	July 26†
PIERS		
Pool 9, New York	$4.75@$5.00	$4.75@$5.00
Pool 10, New York	4.50@ 4.75	4.50@ 4.75
Pool 11, New York	4.25@ 4.50	4.25@ 4.50
Pool 9, Philadelphia	4.70@ 5.00	4.70@ 5.00
Pool 10, Philadelphia	4.45@ 4.70	4.45@ 4.70
Pool 11, Philadelphia	4.30@ 4.50	4.30@ 4.50
Pool 1, Hamp. Roads	4.20	**4.20@ 4.25**
Pool 2, Hamp. Roads	4.10	**4.10@ 4.15**
Pools 5-6-7 Hamp. Rds.	4.00	4.00
BUNKERS		
Pool 9, New York	5.00@ 5.25	5.00@ 5.25
Pool 10, New York	4.75@ 5.00	4.75@ 5.00
Pool 11, New York	4.50@ 4.75	4.50@ 4.75
Pool 9, Philadelphia	5.00@ 5.30	5.00@ 5.30
Pool 10, Philadelphia	4.75@ 4.95	4.75@ 4.95
Pool 11, Philadelphia	4.50@ 4.70	4.50@ 4.70
Pool 1, Hamp. Roads	4.25	*4.20@ 4.25*
Pool 2, Hamp. Roads	4.10	**4.10@ 4.15**
Pools 5-6-7, Hamp. Rds.	4.00	4.00

Current Quotations British Coal f.o.b. Port, Gross Tons

Quotations by Cable to *Coal Age*

	July 19	July 26†
Admiralty, large	28s.@28s.6d.	28s.@28s.6d.
Steam smalls	18s.	*16s.6d.@17s.*
Newcastle:		
Best steams	19s.@19s.6d.	**20s.6d.@21s.**
Best gas	23s.@23s.6d.	*21s.6d.@22s.6d.*
Best bunkers	19s.@21s.	**21s.@21s.6d.**

† Advances over previous week shown in **heavy type**, declines in *italics*.

News Items From Field and Trade

ALABAMA

Several of the big coal-mine owners of the Birmingham district are contemplating the general use of limestone dust for sprinkling in the mines to minimize the dangers of coal-dust explosions.

Preparations are under way for the fall meeting of the American Institute of Mining and Metallurgical Engineers, which will be held in Birmingham, Oct. 13-15. Several interesting papers are being prepared by coal-mine executives and engineers covering mining methods used in this district and the process of washing and preparing coal for the market and for use in coke manufacture.

COLORADO

The Alamo Coal Co. is about to begin the erection of 21 buildings at its plant near Walsenburg.

The Three Pines Coal Co., of Vallorso, employing about 80 men, has filed with the State Industrial Commission a notice that it purposes cutting wages 25 per cent Aug. 1. The men were expected to file a protest which would result in a commission hearing.

ILLINOIS

The Sunnyside mine near Herrin is shut down again. This time the tie-up is because of an argument over the payroll. The Burton Coal Co. took over the mine during June after Anderson & Roberts had failed to meet payrolls during May. The miners claimed a total of $51.000 was due them. The Burton Coal Co. made an agreement with the men and the mine resumed. But after July 15 the men refused to work longer, asserting that the Burton company had not fulfilled the agreement.

Practical tests of Prof. S. W. Parr's process of coking Illinois coal have been started at the University of Illinois, at Urbana. First-run tests, it is believed, will demonstrate the effectiveness of his low-temperature process and prove that Illinois coal can be made into coke by that method.

The movement for greater mine safety in Illinois may be advanced by the activity which grew out of a regional safety meeting held in St. Louis, Mo., in June under the direction of the National Safety Council. A committee appointed then by D. D. Wilcox, of the Superior Coal Co. of Gillespie, met July 17 in Springfield to plan the next step toward a new state-wide safety council. The Governor will be asked to call an Illinois mine safety meeting in November. An executive committee to be in charge of the meeting is headed by Martin Bolt, director of the State Department of Mines and Minerals. W. D. Keefer, of the National Safety Council, is secretary. Mr. Bolt has not yet appointed the other members.

Fire of unknown origin recently caused damage of approximately $15,000 at the Kelly No. 4 mine of the United States Fuel Coal Co., located east of Westville, and about ten miles southeast of Danville. The fire destroyed the boiler room, engine room and the tipple. This mine has been a big producer for nearly twenty-five years. The mine was sunk in 1901 and operated continuously, except for brief shutdowns, until May 22, 1924, when the mine was closed. The mine for years gave employment to about 650 men.

INDIANA

The coal properties of the New Discovery Coal Co. and the Parke County Central Coal Co., both located in Parke County, will be sold at a receiver's sale soon. The properties consist of leases on more than 500 acres of semi-block coal, shafts, tipples, buildings, boilers, engines, machinery, cars, scales, tools and other mine equipment. The Rockville National Bank is receiver for the two companies.

The controversy between Terre Haute miners and the Chicago, Milwaukee & St. Paul R.R. over the Blackhawk miners' train will be heard soon by the Indiana Public Service Commission. The trouble began four years ago, when the service commission issued a ruling regarding a miners' train to be run between Terre Haute and Blackhawk to accommodate miners. The ruling then said when a train should leave each terminal. The railroad followed these instructions until work became dull, when it attempted to change the schedule to three days a week. The union lodged a complaint. Three weeks ago the railroad issued an order that the train be discontinued altogether and that the miners' coaches be attached to the early morning and evening trains operating between these points. Again the miners objected.

Stripping mines in Pike County are being worked nearly every day while the shaft coal mines are operating only two and three days a week. The Indiana strip-pit operators are said to be meeting Kentucky competition successfully. It is reported that more than 2,000 miners in Pike County, unable to work sufficiently at their regular vocations, have turned to others, saying they intended quitting the mines for all time.

A total of 12,289,296 tons of coal was mined in Indiana in the first half of the fiscal year of 1924, according to a report by Cairy Littlejohn, chief state mine inspector. The report shows that $20,932,231 in wages was paid to Indiana miners during this period. The total amount of wages for all the last fiscal year was $45,920,877. The number of employees for the first six months of the present year, as shown in the report, totals 23,861, as compared with 31,189 for all of last year, a sharp reduction reflecting the low output of the Indiana fields.

KANSAS

William S. Anderson, vice-president of the McGrath Coal Co., suffered a fractured arm, several fractured ribs and severe bruises when he slipped and fell from the top of a 12-ft. tank at the company's mine near Pittsburg July 15.

Two of the large companies of the Kansas coal field have departed from the long followed custom of paying the miners cash. The Western Coal & Mining Co. and the Clemens Coal Co. are now paying by check to avoid the danger of payroll robberies. Checks are distributed two or three days earlier than the regular pay day.

The Western Coal & Mining Co.'s Mine No. 20, West of Arma, set a new state record for shaft-mine coal production July 15 with 1,529 tons for an eight-hour period. J. D. Delaney, superintendent of the Western, said he hopes to climb to the 2,000-ton mark. The former high mark in this district for an eight-hour period was 1,446 tons, held by a mine of the Central Coal & Coke Co. Western No. 20, which is 215 ft. deep, is equipped with the latest machinery and employs about 300 men.

MINNESOTA

The Great Northern Ry. has started a series of tests of the use of lignite used in powdered form and dried and blown into the firebox all at one operation. The tests are being made at the Dale Street shops in St. Paul, Minn. Including all in one operation, eliminates the need of storing the pulverized fuel and does away with the danger of explosion. If the tests prove a success, the method probably will be adopted at the company's shops in North Dakota and eastern Montana. The tests may include locomotives.

Courtesy U. S. Distributing Corp.

Mining Village of Dietz, Wyo., Sheridan-Wyoming Coal Co.

An unusual quantity of foliage for Wyoming is to be seen in yards of these houses, which as will be noticed have only one story.

MISSOURI

The St. Louis office of the Bureau of Mines was discontinued on July 1, 1924. C. E. Van Barneveld, superintendent of the Mississippi Valley Station, Rolla, Mo., with which the St. Louis office was connected, has resigned. B. M. O'Harra is acting as superintendent of the Rolla Station.

The Missouri Public Service Commission on July 21 issued an order denying the application of the West Missouri Power Co. for authority to purchase stocks and bonds of the Fort Scott & Nevada Light, Heat & Power Co. and coal mines and equipment belonging to the Clinton Coal & Mining Co. It proposed to purchase $800,000 par value common stock of the Fort Scott & Nevada company and $450,000 par value of its first mortgage bonds for $645,000 and the mines, equipment, etc., of the coal-mining company for $200,000. The commission held that the purchase price was excessive compared with the value of the property to be purchased.

NEW YORK

The Pennsylvania Coal & Coke Corporation reports a deficit before federal taxes, for June of $54,595, as compared with net earnings of $32,685 for June, 1923. The deficit, before federal taxes, for the six months totaled $141,108, as against net earnings of $582,000 for the corresponding period last year. The six months' gross was $3,030,855, as compared with $4,558,389. The company declared the regular quarterly $1 dividend, payable Aug. 11 to stock of record Aug. 5.

The Virginia Iron, Coal & Coke Co. reports a net loss of $51,199, after interest and taxes for the quarter ended June 30, 1924. This compares with a net income of $5,792, equal to 11c. a share, earned on the $5,000,000 preferred stock in the preceding quarter and a net income of $114.984, or 52c. a share, earned on the common stock in the second quarter last year. For the first six months of 1924 the net loss amounted to $45,406, as compared with a net income of $358,543, or $2.33 a share on the common stock, in the first half of the previous year.

OHIO

The Southern Ohio Coal Exchange reports for the week ending July 12 an output of 79,370 tons from 439 mines in the southern Ohio field. The full-time capacity was 645,430 tons which leaves a shortage of 566,370 tons. Labor shortage caused a loss of 3,995 tons; strikes, 8,580 tons; mine disability, 4,180 tons and "no market" 549,305 tons. During the same week the eastern Ohio field ordered 10,650 cars and loaded 7,739 cars.

The M. A. Hanna Co., Cleveland, which operates iron-ore mines, anthracite and bituminous-coal mines, announces the issue as of Aug. 1 of $7,000,000 ten-year sinking-fund gold debentures. This is part of an authorized issue of $15,000,000 and will be a direct obligation of the company. The debentures are being marketd by Dillon, Read & Co., New York City, and the Union Trust Co., Cleveland. The introductory price is 98½ and accrued interest, to yield more than 6.20 per cent.

Plans are being formulated for the state safety meet at Bellaire, Aug. 16, when a campaign will be started to eliminate accidents in coal mining and allied industries. Manufacturers are invited to attend the demonstrations, and invitations are being prepared by the Bellaire Chamber of Commerce, the city's mayor, the United Mine Workers of America and Joseph A. Holmes Safety Association. Exhibits in safety and accident prevention work deal not only with the coal-mining industry, but will be of interest to all employers of labor.

The Hocking Valley R.R. was compelled on July 22 to place a temporary embargo on the movement of lake coal onto its lines, owing to the fact that between Columbus and Toledo there are over 5,000 loaded cars awaiting handling at the Toledo docks. The congestion of the coal, an unusual condition for this season of the year, is due to the withdrawal of several boats ordinarily used in transporting coal to the upper lakes. This coal is coming from the non-union mines of West Virginia and Kentucky. Practically no coal is moving from southern Ohio mines to the upper lakes.

PENNSYLVANIA

The H. C. Frick Coke Co. is very materially increasing output from the three Colonial mines at Grindstone and Smock, from which plants the coal is transported on a five-mile belt conveyor system to the Monongahela River. The Hillman Coal & Coke Co. has closed down indefinitely the Pike Mine, a union operation near Brownsville, on the edge of the coke region, but is increasing shipments from its non-union operations, where the wage scale has been reduced.

The departure of S. J. Phillips, of Scranton, for a trip abroad makes five vacancies among mine inspectors in the hard-coal fields, four having died. Mining companies, asked by the Governor and the state mine chief to cut down accidents, will not get the same inspection precautions from a depleted corps.

Because the officials of the Evans Colliery Co. at Beaver Meadow refused to dismiss Frank Satechick, of that town, a locomotive engineer, who, it is alleged, refused to pay a union fine of $50, two hundred men went on strike.

Increased taxes paid by the Quemahoning Coal Co. for the year 1922 on mineral holdings in Jenner township, Somerset County, will be refunded under a decision of the Pennsylvania Superior Court handed down on July 3, in which the Somerset County Court was reversed. The decision also affects a number of other coal companies holding land in Jenner township. Two years ago, in making the triennial assessment, valuations on coal holdings were materially increased. Some 1,500 appeals were taken and subsequently the County Commissioners revised the assessments downward. The road supervisors and school directors, however, used the higher valuations as certified by the County Commissioners. Legal proceedings were started to prevent the collection of the higher taxes and the Somerset County Court decided in favor of Jenner township. The superior court has reversed this decision. The decision in the Quemahoning case will affect a large number of other cases in Jenner and other townships.

The Haddock Coal Co., composed of Schuylkill County, Philadelphia, New York and Wilkes-Barre capitalists, will expand its operations, it is announced. The company is the lessee of the Silver Brook workings, where an output of 3,000 tons a day is predicted when extensive development work now in prog-

Traffic News

B. & O. Seeks Federal Injunction Against Indiana Rate Cut

Alleging that reduced rates on coal established by the Indiana Public Service Commission in an order last February are unreasonable and unjustly discriminatory and in violation of the act of Congress to regulate commerce, the Baltimore & Ohio R.R. and more than twenty others have filed suit against the commission in federal court in Indianapolis seeking an injunction restraining the commission from enforcing the order. The railroad companies also seek an order restraining the commission from enforcing or attempting to enforce any fines or penalties for failure to comply with the commission's orders.

Indiana Wants Lower Rates on 56 Central West Roads

Reductions and adjustments in freight rates on coal from Ohio, Kentucky and West Virginia mines have been asked in a complaint filed by the Indiana State Chamber of Commerce with the Interstate Commerce Commission against fifty-six railroads in central Western states. The complaint seeks to adjust rates from the mines to practically all Indiana points. The railroads named as defendants serve what is known as the Central Freight Association territory. It alleges that rates now in effect do not take into consideration competitive conditions and are discriminatory compared with rates in surrounding territory.

Cuts in Eastern coal rates were obtained for Indiana consumers last year and early this year, and the action just taken seeks to harmonize central Western rates. The new action alleges that present coal rates from the three states named were not made in accord with the conditions which exist in competitive fields, and do not take into proper consideration mileage tables and distances. An adjustment with various reductions for various sections of the state is sought.

Hears Evidences in Tell City and Cannelton Rate Case

Arthur Mackley, Interstate Commerce Commission examiner, has just heard evidence in the Tell City and Cannelton coal-rate case against the Southern Ry. The case was filed on behalf of the Cannelton Sewer Pipe Co., of Cannelton, Ind., the United States Brick Co., of Tell City, Ind., and others. The petition seeks an order from the commission to give the Indiana Public Service Commission authority to pass on certain reduced rates. W. W. Webb, traffic manager of the sewer pipe company, testified regarding rates. He said the petitioners are seeking to have coal rates of $1.12 a ton from Oakland City, Winslow and Francis County, Ind., and 98c. from Boonville and Chandler. The companies also are seeking reparations amounting to about $8,000 on rates which were fixed by the commission and defeated by an injunction issued by Judge A. B. Anderson in federal court in Indianapolis. The injunction order prevented any interference with certain rates which were in effect during the period from March 15, 1921, to April 7, 1922.

Rates Cut to East St. Louis From Southern Illinois

Rates on coal from the "inner group" mines of southern Illinois to East St. Louis, Ill., have been ordered reduced from 90c. to 71c. and from 90c. to 80c. by the Public Service Commission of Illinois. The commission has divided the mines in the group into two zones. The 71c. rate will apply to shipments from mines within thirty miles of East St. Louis and the 80c. rate to inner group mines beyond the thirty-mile limit. There are approximately 135 mines in the inner groups and 80 per cent of the bituminous coal used in St. Louis and East St. Louis and environs comes from these mines. The mines are served by twenty railroads.

Cut in Indiana Rates Postponed

The Indiana Public Service Commission has postponed from July 25 to Aug. 1, the date for the taking effect of the new low intrastate coal rates. The postponement was made upon the suggestion last week of Judge Samuel Alschuler, in the federal court at Hammond, Ind., in whose court the railroad companies asked an injunction against the order. Judge Alschuler suggested that if the date were postponed, he would not have to issue a restraining order to be in effect until a hearing could be held before three judges. That hearing is now in progress.

Coming Meetings

Western Canada Fuel Association. Convention Aug. 5 and 6, 1924, Brandon, Manitoba, Can. Secretary, W. H. Morrison, Winnipeg, Man., Can.

Rocky Mountain Coal Mining Institute. Summer meeting, Aug. 7-9, Rock Springs, Wyo Secretary, Benedict Shubart, 521 Boston Bldg., Denver, Colo.

New York State Coal Merchants Association, Inc., 14th annual convention, Sept. 4-6, Stamford-in-the-Catskills, N. Y.: headquarters Churchill Hall. Executive secretary, G. W. F. Woodside, Arkay Building, Albany, N. Y.

American Chemical Society. Fall convention Sept. 8-11, 1924, at Ithaca, N. Y. Secretary Gas and Fuel Section, O. O. Malleis, the Koppers Co., Pittsburgh, Pa.

Oklahoma Coal Operators' Association. Annual meeting Sept. 11, 1924, McAlester, Okla. Secretary, A. C. Casey, McAlester, Okla.

Association of Iron and Steel Electrical Engineers. Annual meeting and exposition at Duquesne Garden, Pittsburgh, Pa., Sept. 15-20. Secretary, John F. Kelly, 1007 Empire Bldg., Pittsburgh, Pa.

National Safety Council. Thirteenth annual safety congress Sept. 29 to Oct. 3, Louisville, Ky. Managing director and secretary, W. H. Cameron, 168 No. Michigan Ave., Chicago, Ill.

American Institute of Mining and Metallurgical Engineers. Fall meeting, Birmingham, Ala., Oct. 13-15. Secretary, F. F. Sharpless, 29 West 39th St., New York City.

American Institute of Electrical Engineers. Fall convention, Pasadena, Calif., Oct. 13-17. Secretary, F. L. Hutchinson, 29 West 39th St., New York City.

New Equipment

Electric Grinding Outfit For Heavy Shop Work

The Cincinnati Electrical Tool Co., Cincinnati, has added to its line a 5-hp. heavy-duty floor grinder, which has been designed for use in shops where heavy grinding is required.

The motor is mounted on ball bearings and is fully inclosed to prevent emery dust and dirt from getting into the bearings and windings. The ball bearings are locked to the shaft in a manner intended to provide for end thrust and also to eliminate wear and friction. The machine will carry wheels

Heavy Electrically Driven Grinder

up to 18-in. diameter and having 3-in. face. The wheel guards are of the exhaust type complying with safety standards and are adjustable for wear of wheels. Removable covers are bolted to the guards completely inclosing the sides of the wheels, flanges and nuts to assure safety to the operator at all times.

The starting switch is of the magnetic type, push-button control and is mounted accessibly on a separate panel within the column. The grinder is available for alternating current 220 and 440 volts, 25 to 60 cycles, two or three phase.

Gasoline-Driven Compressor For Small Open-Air Jobs

It is amazing what a multitude of jobs about the mine can be performed more efficiently by the use of compressed air than by any other means. In order to meet the need for a small self-contained compressor plant capable of furnishing enough air for many of the operations about mine surface works the Ingersoll-Rand Co. has recently placed upon the market the outfit shown in the accompanying illustration.

Essentially this outfit consists of a four-cylinder, four-cycle, tractor-type gasoline engine direct-connected to a 4¼x4 in. duplex air compressor having a rated capacity of 60 cu.ft. of free air per minute. Both engine and com-