

COAL AGE

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On the Keeping of Good Company

ANTHRACITE operators would do well to get out their musty copy books and read what is said as to the desirability of keeping good company, for a person is known by his associates, and if they betray him by their behavior no rectitude of the individual can possibly save him from censure and public reprobation.

The older companies of the anthracite region employ perhaps 1,000 persons to inspect their coal. They maintain their standards year in and year out. When the public can be induced to accept any coal not actually fireproof these companies, nevertheless, maintain their standards, sometimes at a considerable disadvantage because the condemnation of coal by their inspectors means running the coal back through the breaker and interfering with the flow of fresh coal from the mine.

Similarly the larger companies resist the opportunity to sell coal at the market price. When other concerns are making big profits the company coal is sold at the circular rate. The public may bid high, but, undisturbed by such possibilities of abnormal profit, the rates of the larger companies are unchanged except to accord with such variations as occur in the wage scale.

However, the public still condemns the anthracite industry for selling fire-proof coal at fancy prices, and the industry will not be able to avoid the aspersion unless it cleans house of all those who are guilty of dishonest practices. Honest men cannot mix with dishonest and retain a good name. Certainly honest coal and dishonest coal cannot be sold from the same bin by the same dealer and not bring dishonor on the man who provides the clean coal as well as on the man who has provided the fireproof article.

The anthracite industry cannot hide this fact from its eyes. It must drive out dishonest coal—coal loaded unwashed from rock piles, coal improperly cleaned after coming from the mine.

Seeing that one anthracite operator cannot compel another to clean his coal it is necessary or at least advantageous to get the U. S. Government to provide the necessary inspection. It would be costly for the federal authorities to do this properly. The U. S. Bureau of Mines could not afford to hire men to inspect every car of coal coming from the anthracite region—it would take a small army of 1,000 men—but every company could continue its own inspection and the federal tests could be supplementary and most diligent with those individuals who have no inspectional force of their own and who showed a disposition to put poor coal on the market.

The police force shows little interest in the conduct of reputable citizens and quite a keen desire to know what the crooks are doing. The U. S. Bureau of Mines would put most of its effort where it is needed—with the crooked fly-by-nights who buy a culm bank and not a washer or who erect a washer that merely pretends to clean the coal.

With the Bureau ready to fix the rating of any company according to the quality of the coal produced or ready to refuse to give its approval to coal that was below certain standards, the probability is that the companies would employ more inspectors rather than less and the result would be a more uniformly good product.

There are many difficulties, doubtless, and the plan is conceded to be only roughly outlined, but the anthracite companies should get behind some plan for putting the industry on a high plane. They should not so much be advocates of a high standard for any one company, though that is important, but rather press for a general high level that would clear the industry of fraud and deceit. Till that is done the public will laugh at propaganda and say: "Read their high sounding professions and burn their coal—if you can."

Let There Be Peace

A SENSE of injustice pervades the union mining field. The scales in the non-union regions prevent many union mines from working. Unfortunately, no lower wages can help that situation, for competing non-union fields can get a little lower scale merely by asking it—without asking it—if the union regions should obtain a reduction. Consequently a lower wage scale would not help matters.

Furthermore, owing to unsteady work, the miners are not making any too much money the year around with the wages they now have. The cost of living and the rising wages of others also do not favor a decrease in wage. Consequently a wage reduction does not seem possible.

The public would not stand for the profiteering that would follow a strike nor for any increase of price due to a wage advance, so a change in wage either way would be extremely unpopular. After all, in a democratic country we have to be bound by public sentiment, whether just or not, whether satisfactory or deplorable.

Mr. Lewis and his henchmen are taking the right course. Any opposition to their stand for the present wage would be looked upon as an incitement to strike and would bring public reprobation on those who attempted it, whether miners or operators. Let us keep the hands of Congress off the industry by going quietly about our business, lest the public try to make it theirs.

Whether Secretary Hoover is right or wrong in trying to induce the mine operators of western Pennsylvania to attend the meeting at Jacksonville, Fla., as expressed in his letter to C. J. Goodyear, acting commissioner of the Pittsburgh Coal Producers' Association, Jan. 26, certain it is that he is right in saying we should try to get a settlement with the union and that the sentiment of the public is not favorable to a suspension with all that it means to the common welfare.

The story of the negro whose lawyer said he "could

not be jailed for that" and who, being already in jail with the doors locked on him, answered convincingly "But, here I is, boss; here I is," certainly is in point. We may prove our case to our own satisfaction. But the public, what does the public think, and what may the public do? The answer may have to be "But, here I is, boss; here I is," if a suspension ensues resultant on an ill-advised action of the operators or miners.

Complete Mechanization

SO LONG as the "worker" really has to labor and not merely direct the forces of nature to do his work we shall find slackers. So much work is today directional and not actual that the "man with the hoe" is disappearing. The time is coming when we shall say as we arise in the morning not "What must I do today?" but "What must I make steam, electricity or compressed air do for me today?" Time will make us all masters of machines, and what unrelenting masters will we be! We will set the governor, and our machine will do to a turn just what we have determined. We will run the motor at the speed for which it is planned. We will load the belt with all it will carry away.

We shall not slack, for we will be masters and not men. The psychology of the laborer often is to shirk but the idea in the mind of the master is to drive. How evident in the past has been that passion! Mechanize thoroughly, therefore, till all are drivers and none, or at least few, are among the driven. The day of the piece worker nears its end, for the machine will set the pace and not the man. The wage will depend not so much on the industry of the workman as on his intelligence, inventiveness and capacity for management. Complete mechanization will speed that happy day.

Here If Anywhere

GOOD management has made the large central-station power plant triumph in places over the isolated station though the latter has a considerable advantage at the mines. There, if anywhere, it should be possible to wage a successful competition against the encroachments of purchased power. At the coal mines no freight charges on the fuel have to be met, the inferior unsaleable coal can be utilized, plenty of water can frequently be obtained for cooling purposes, space can be found for impounding water and for all the other needs of a power house large enough for a mine.

It is easy to see why the isolated station fell before the onslaughts of central stations in cities where space was at a premium and boilers and engines had to be sunk into basements and buried a hundred feet underground. It can be readily realized how difficult it was to find space to stock fuel in urban regions, and where condensing water had to be obtained from city mains which led it in from points perhaps fifty miles away it was not difficult to explain why condensing was costly or imperfect and its efficiency low. When to this consideration is added the fact that the fuel must be transported in wagons on city streets or in the case of non-urban installations had often to be unloaded, stored and removed from storage by inefficient and inadequate equipment it is clear that the isolated plant away from the mines had a hard road to travel.

But at the mines the freight, land, water and storage

problems are all as a rule favorable. The central station sometimes has to pay freight and the operator's profit on coal and always has to meet the losses of main-line transmission to the mine and yet has to compete with isolated stations that pay no freight and have only the inevitable local transmission losses.

Nothing but bad management has made the isolated plant give way. Nothing but old-fashioned equipment, meager talent, bad mine management, failure to provide recording gages and a lack of operating statistics has rendered the blandishments of purchased-power salesmen successful. Had the plants been well managed they would have held their own and every now and again, as in this week's issue of *Coal Age*, we read of some fit plant well handled and hear that it more than holds its own.

Its stand is economically sound, as reasonable as that of the farmer. He doesn't take his potatoes all the way to market and buy another sack of spuds to bring back home with him. No, he consumes all the potatoes his family needs and the overplus and the better potatoes he sells in the market, thus saving transportation and distribution charges on his home consumption.

That many operators are not convinced that purchased power pays is evidenced by the report of the U. S. Bureau of Census. As recently as 1919, the stationary motors using purchased power aggregated 889,171 hp. and the aggregate of all the power around the mines was no less than 3,055,195 hp. or almost four times as great.

More Government Monopoly

A REPRESENTATIVE from Dayton, Ohio, R. G. Fitzgerald, has introduced into the U. S. House of Representatives a bill giving the government monopolistic control of workmen's compensation in the District of Columbia. No company, if the bill passes, may be a self-insurer nor may it cover its risks by insuring with any private insurance company. Its advocates hope that this bill will be the opening wedge for legislation of like kind in other states. It is true that seven states and Porto Rico likewise have such monopolistic measures and nine states have provisions under which the state insures those who desire state insurance. The latter, however, permit self and company insurance to compete with the government. Often, despite lower state rates firms prefer company insurance because of the better service afforded by such insurers.

The U. S. Chamber of Commerce is backing the bill introduced by Charles L. Underhill, which permits only of self and company insurance, for it has by referendum definitely concluded to oppose the entrance of the government into business. The backers of the Fitzgerald bill say that no private company should be allowed to make a profit on a matter so vital to the individual of small means as is workmen's compensation.

That sounds somewhat convincing till one reflects that the farmer, the doctor, and a number of persons are making a profit out of the vital needs of individuals of small means.

How far will the government go in the matter of monopolistic business? If this bill is allowed to pass we may find government bureaus, state and federal, monopolizing the main industries of the nation. This is an entering wedge to more than workmen's compensation insurance—a step indeed toward Sovietism in the Republic. The Fitzgerald bill should never be allowed to take its place in the statute books of this nation.



With Hand Shoveling 10 Tons per Man and 26 Tons per Loader Already Attained

One Panel Working 65 Men Will Yield 1,000 Tons of Coal per Day—Portable Conveyors Transport Coal from Face to Heading—Pillar Points Protect Faces and Projecting Roof Against Caves

BY ALPHONSE F. BROSKY

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ENTIRELY without any prior notification to the mining public the West Virginia Coal & Coke Co. answers conclusively the old question: How can the average daily output per man employed be increased? It has succeeded in increasing the efficiency of labor and in improving the equipment used in the mining of coal. It has concentrated operation and limited the activities of mining to small areas that accordingly are rapidly exhausted.

This it has done by introducing a modified longwall system of mining, by loading coal mechanically and using conveyors to afford a means of continuously transporting coal from the working face to the tipple. It purposes thus to eliminate much deadwork and many delays in mining, loading and transportation. That these changes offer excellent opportunities for reduced expense can be judged by what the company has obtained from them.

In one section of its No. 9 mine at Norton, seven miles from Elkins, W. Va., on the Coal & Coke division of the Baltimore & Ohio R.R., it has already succeeded in obtaining more than 10 tons per man employed for all operations from the face to the railroad car. According to the U. S. Coal Commission the highest daily output per man thus far obtained in all bituminous mines is 4.19 tons as of 1921. Depending upon conditions and with some changes in its new methods

When conveyors are used to carry coal to the railroad, no such complicated structure as the tipple at No. 9 mine of the West Virginia Coal & Coke Co., shown in the headpiece, will be needed. It will be changed to a light timber construction costing about one-seventh as much as an ordinary tipple.

of mining, this company expects, in varying degrees, to increase a miner's daily output to a maximum greater by several times than that now generally obtained.

FACE ARRANGED LIKE TEETH OF CROSS CUT SAW

No. 9 mine originally was opened up for room-and-pillar mining. However, a right section extending north from the main heading to the outcrop, composed of panels set off by cross and parallel headings, is now being won by a modified system of longwall mining. The plan of mining is called the "V" system because the faces constituting the working front of a panel are arranged in points as on a saw. As portable conveyors are used to transport coal from the working faces to the main panel headings and as it is the purpose also to use loading machines, it was decided several years ago that fairly long working faces should be used or the maximum advantage would not be obtained from this equipment.

Experiments have been made extending over a period of nearly three years. In some of these the faces have been laid out perpendicular to the direction of retreat and in others they have inclined at 45 deg. to each other in a saw-tooth front. Experience has proved to the satisfaction of the company that the last-mentioned arrangement of faces is best suited to the conditions that exist in this mine. Nevertheless the working layout should not be definitely fixed but should be modified with such flexibility as to meet with great nicety the varied conditions which other mines may present.

The "V" system proper, as used in this mine and shown in Fig. 1, is developed in the advance by single gallery entries which split the panel into pillars. These are drawn back on an even front, all the tooth points lining up at right angles to the direction of the galleries. Pillar drawing follows closely on the heels of gallery driving and these two practically simultaneous operations may be performed either "advancing" or "retreating," using those terms in a broad sense.

Toward each gallery two faces converge to form a "V" at an angle of 45 deg. As these faces are practically joined one to another, the resulting layout is like the cutting edge of a saw. Each gallery serves as an exit for the coal slabbed off a pair of faces. Single lateral entries are driven at intervals to connect the single gallery entries with a double entry, driven, as is customary, to provide means of transportation and ventilation to the panel. In a 6-ft. seam of clean coal the output per day will be about 1,000 tons.

A panel is 320 ft. wide and about 1,350 ft. long. Galleries are driven 8 ft. wide on 80-ft. centers and intersect lateral entries on 200-ft. centers. The working faces at 45 deg. to each other are about 87 ft. long. Three galleries and one panel entry, which serves the same purpose as a gallery, split a panel into four pillar units of eight working faces, each gallery giving access to two faces.

The length and width of the pillars are not limited to the dimensions already given. Their length is determined by the transportation needs, as in room-and-pillar or any other system of mining, and their width is decided by the length and number of faces desired, remembering that the portable conveyor units are

sectional and can be lengthened or shortened at will. Only a brief description of the conveyor will be given here, those points being mentioned that are necessary to explain its use in this system of mining. Details and applications of this conveyor will appear in a later article.

The Movor steel pan-belt conveyor is assembled into any desired length by joining sections which are generally 6 ft. long. Each section is composed of two distinct elements, a structural steel frame and a belt of steel pans joined by through axles, to which are fastened carrying wheels. These sectional elements are readily coupled to, or uncoupled from, the end of a conveyor unit.

Each element may be moved independently, and the elements are so light that two men can carry them from place to place. A drive section may be inserted at any point and is sufficient to actuate a 100-ft. conveyor unit. For greater lengths two or more drive sections are necessary.

Each face, gallery and lateral entry of a panel has its own conveyor unit. Face units may be shifted bodily sidewise toward the face or lengthwise to adjust their position relative to the gallery as the pillars retreat toward the lateral entry. In a single panel, eight face conveyors empty in pairs onto four gallery conveyors, which in turn connect with a common lateral conveyor leading to mine cars on the main panel entry.

Retreating faces and advancing galleries, each in adjoining panel blocks, move as a continuous process in the same direction at the same rate. It already has been pointed out that this general direction may be, in the broad sense of the terms, either that of advancing or retreating. In beginning to develop a panel, after the galleries have been driven from one lateral entry to the other, the faces start to retreat, and the galleries are driven on through the second block of the panel toward the second lateral entry at a rate equal to that of the retreat of the faces in the first block.

A 6½-ft. undercut, which is the depth now being used, will advance the faces 18 ft. in the direction of retreating. This means that as the faces retreat in the first block the gallery conveyors will be shortened 18 ft. each time a cut is made. Each section of the conveyor is 6 ft. long, so three sections are removed from each gallery. These are placed in the advancing galleries of the second block to extend the gallery conveyor units that are employed in their driving.

By the time the galleries in the second block are driven through to the second lateral entry, the first block is finished and the pillars in the second block are started on a retreat. Thereafter the gallery conveyors move toward the second lateral entry. The direction of travel of the conveyors is reversed simply by reversing the direction of the current through the motors. The

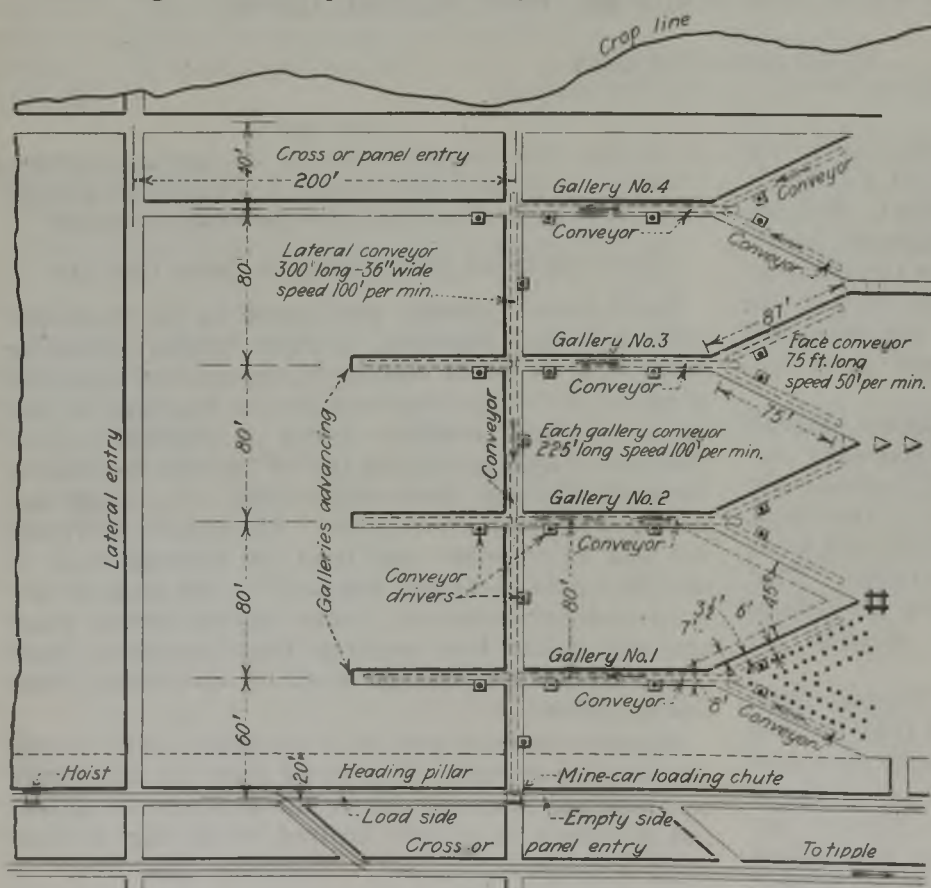
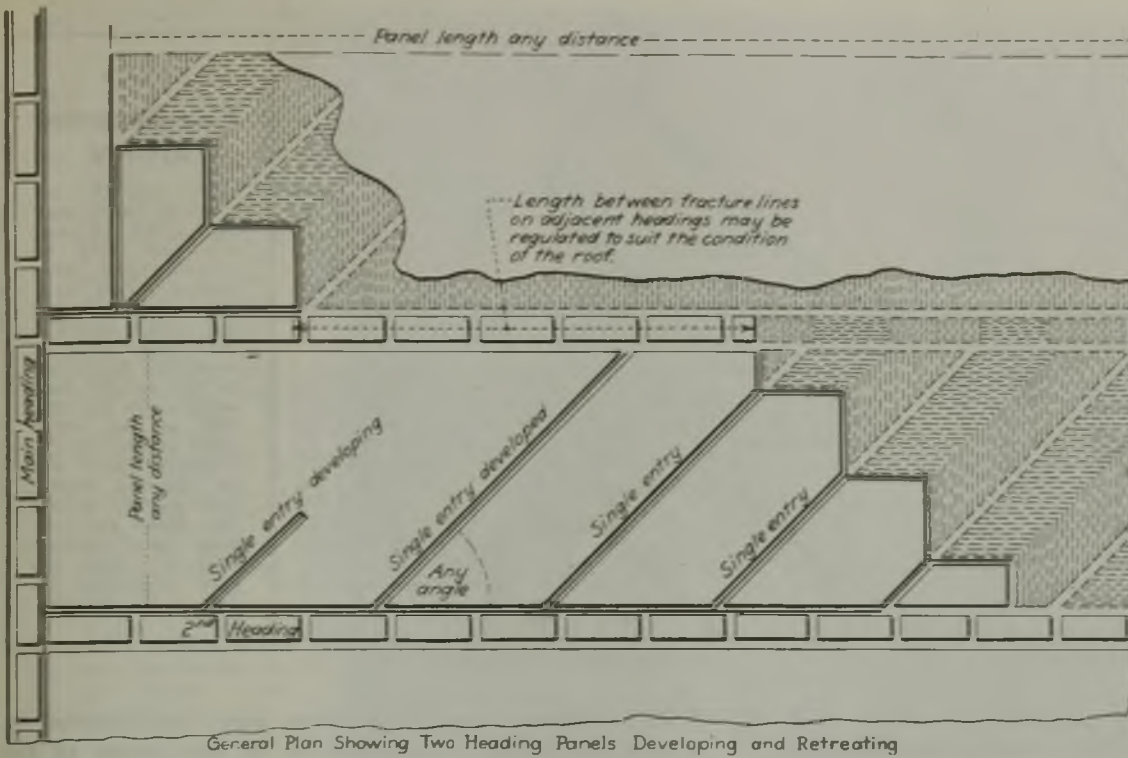


Fig. 1—Working Method, Pillar Protection and Conveyor Layout

When the roof settles it caves, but fall is kept from the pillars by timbers and stumps of solid coal. Conveyors not only take coal away from the faces but are used also in developing the galleries shown. The equipment required is one lateral conveyor, 300 ft. long, four cross conveyors aggregating 800 ft. in length and eight face conveyors of a total length of 600 ft. The aggregate length of conveyor needed is 1,700 ft. On the lateral conveyor are five drive sections, on the cross conveyors eleven drive sections, on the face conveyor eight drive sections, or 24 in all.



General Plan Showing Two Heading Panels Developing and Retreating

FIG. 2
Another System

Though the angle between the faces in No. 9 mine is 45 deg., that angle may be opened or closed to meet any particular condition. The more fragile the roof, the less the angle between the faces. The length of the retreating faces may be varied to suit the needs of the roof. In each case the point of retreat for the men, if retreat indeed should be necessary, is in a recess in the face well protected on either side by solid pillars.

cycle is repeated until the panel is extracted. The success of the "V" system of mining is dependent on the use of these portable conveyor units, which also may be used in connection with other systems of mining.

A development which would produce only a small tonnage with the room-and-pillar system will with the "V" system afford a large output. Consequently a large tonnage per panel can be obtained in a short time and at low cost. The following account will illustrate this point:

At 5 p.m. on Dec. 12 of last year No. 1 panel in the right section of No. 9 mine reached its mining limit, having been worked to the crop. A panel in another section of the mine had already been prepared for mining by this system. The development that had been done in it consisted of the driving of the customary double entries by which it was flanked, the driving of the first lateral entry and of four galleries. This second panel, as described above, was ready for operation when the first panel was mined out.

Beginning at 5 p.m. on Dec. 12 the conveyors at the faces and in the lateral entry and those in the

galleries of the first panel at the time the latter was completed were moved a distance of 2,500 ft. and set up in the second panel. On the morning of Dec. 14, forty hours later, these conveyors were in operation in the second panel, where eight faces were started off four galleries.

On that day 200 tons of coal was mined. By Dec. 18, four days after starting the panel, the production had grown to 916 tons, the average daily production for the week following that day being 930 tons. Truly that is a remarkable feat—finishing one panel on Dec. 12, moving the conveyor equipment 2,500 ft. to another panel and in one week's time getting out a daily output in excess of 900 tons! This feat probably is without parallel in the history of coal mining.

Within and between the points at the end of two adjoining pillars is an open triangular area, the roof above which must be supported by timbers. Their size and the centers on which they are placed depend, of course, upon the tendency of the roof to fall. Especially is that true under conditions met in No. 1 panel, which was recently completed, where the cover decreases

FIG. 3

Cut Shot Down

Sometimes small lumps roll out and bury the conveyor, but the latter is capable of digging its way out. Note the arrangement of conveyor and timbers with respect to each other and the face. Experience has shown that the timbers need not be as large as those shown in the illustration. At present no timbers are recovered. They are cut with an ax and allowed to break when no longer needed.



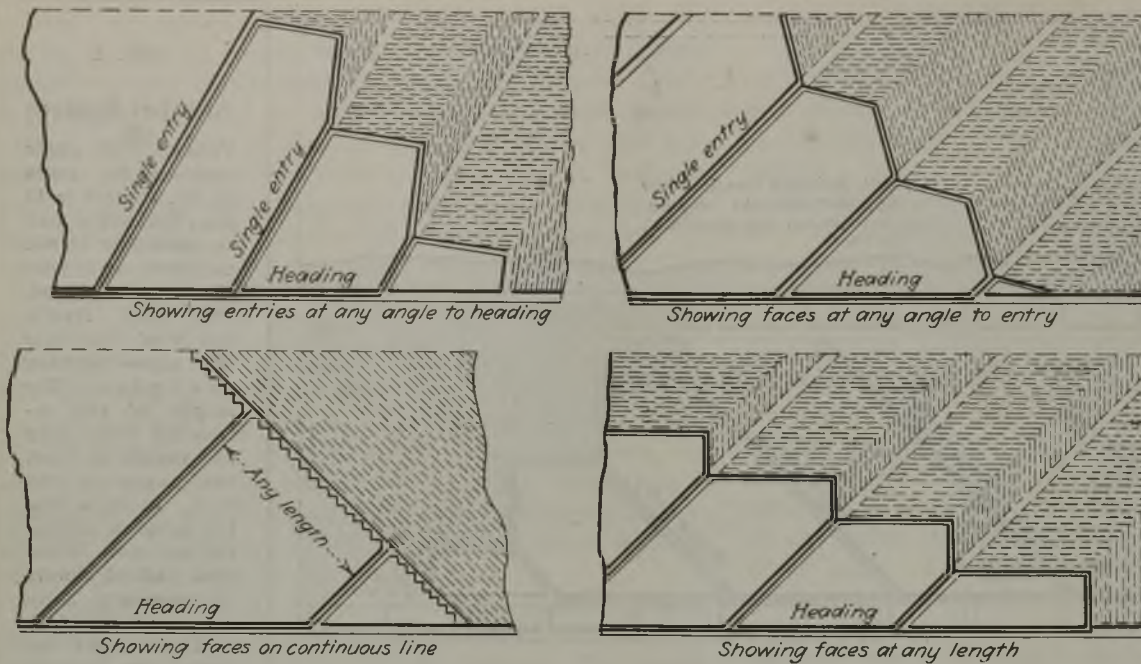


FIG. 4

Four Suggested Systems

Here also the retreating faces may be varied so that the roof may be adequately supported. One system in the lower left corner shows a continuous face with conveyors delivering to the gallery conveyors. In the system in the lower right corner the retreating faces are of unequal length. Each gallery having one short and one long face feeding coal to it and one face delivering direct to the heading.

from a thickness of 150 ft. above No. 1 gallery to 25 ft. above No. 4 gallery, the latter being near the crop.

Several of the illustrations show rather big timbers for holding the roof, but experience has taught that these are a necessity only under unusual roof and that small props are sufficiently strong for most purposes. Generally a split post equivalent to a 6-in. round post is placed on 3-ft. centers. The last rows of timbers are placed alongside and nearly touching the face conveyors.

Cribs have not been effective as a protection of pillar points in this mine. Being brittle and following the laws of caving, the roof breaks without letting the cribs take the weight gradually. For the same reason packwalls are of little value.

The average depth of undercut, with a 7½-ft. cutter arm, is about 6½ ft. A fall occurs about every four cuts, or every 72 ft. of advance or retreat of the gallery leading to the face. During the first and last cuts of a cycle great care must be exercised to keep the timbers as close as possible to the face to protect men and equipment from dangers incidental to a fall, which, however, never occurs without ample warning.

No attempt is made to recover timbers. At the end of a cycle of four cuts, when a fall is desired, a closely supervised crew of timbermen cut notches in as many of the timbers as possible between the line where the next break is desired and the last fall. In this and other work performed in connection with this system of mining over a period of nearly three years no accidents of any kind to employees have occurred.

When the roof falls it may break at, or encroach slightly on, the saw-tooth point of each pillar. At least that has been the experience in the No. 9 mine. In such cases no traveling way is kept open at pillar points where the two adjacent working faces meet.

One of several schemes may be adopted, as in Fig. 1, to stop the fall from encroaching any appreciable distance past the points of the pillars. The roof may be such that it can be controlled by a "breaker" row of timbers. In that case the recovery is about as near 100 per cent as can be attained by any method of mining. The management anticipates more easily controlled roof in a section of this mine where the cover is thicker and where timbers are expected to hold the roof while practically all the coal is removed.

Nevertheless conditions have been encountered in which the break occurred at or on the points of the pillar. As the roof is hard and fragile, tending to break rather than bend and to cave rather than subside, a protecting pillar frequently is left as a continuation of the points of the main pillar, but the roof does not rest long enough on these to cause a squeeze. This pillar may be solid and narrow or it may be in the form of a chain of square or triangular stumps as indicated in Fig. 1. These latter are formed by cutting through the pillar at short distances behind the point. They afford a convenient passageway between working places. In any case, the coal lost in thus protecting the points of the pillar is but a small part of that recovered and the percentage of recovery consequently is high.

The roof will break in a span of about 80 ft. and will not hang as a body on the protecting pillars. An ideal working condition exists at the faces in that the roof is supported as a beam by the ends of the pillar, aided by the timbers in the triangular space. Within this space, consequently, there is no overhanging ledge, as in caving systems where straight faces are maintained, nor is there a tendency to creep, such as is manifest in the subsidence systems of longwall mining.

More space can be left, therefore, between the last row of timbers and the face, giving ample room for the conveyor and for loading by hand or by machines. Timbers within the triangular space take care of whatever subsidence takes place between the pillar points, and any caving that might occur in the gob is so far removed that it will not menace the men and the equipment at the faces.

The possibility of wide variations is suggested in the length and angle of the faces to meet conditions brought about by various thicknesses of cover and characters of roof. Thus it is pointed out that a tender roof under light cover will allow the working of faces that are longer and joined in a narrower angle than those under heavy cover and strong roof.

Several of these variations are indicated in Figs. 2 and 4. In the main the system is best adapted to work under light cover and tender roof, and experience in other modifications of longwall mining cannot be entirely relied upon in judging the limits under which a successful application can be made.

FIG. 5

Loading Out

A loader has a "cinch" in loading out 25 tons of coal per shift as compared with work in a room, for he does not have to exert himself by throwing coal long distances or to any considerable height. Note how several men work together, making the labor of loading more congenial than when in a room alone or in pairs. Furthermore the most careful man in the crew is sure to see that the place is safe. At least one man is likely to have a "hunch" for timbering, though some may be willing to take chances to see the coal fly.



Let us now turn to the details of the mine work at the face.

The Lower Kittanning seam is being worked in No. 9 mine. Its maximum thickness is 7 ft., but not all the coal is merchantable. About 18 in. above a bottom of hard shale occurs a 6- to 14-in. parting of hard fireclay which splits the clean coal into two benches, aggregating 5 ft. in thickness. Above the upper bench is an 18-in. bed of roof coal that is left in place. Above this is a hard, easily broken and non-flexible shale and sandstone which remain up until a break and fall are desired.

A description of a working place in various stages of mining by the "V" system may aid the reader to visualize actual conditions at the faces. Let us assume that the night shift is so far spent that the face conveyors have been shifted toward the faces and rows of timbers set behind them to make ready for the mining of the next cut. Standing then at the mouth of a

gallery one sees two diverging and long open alleys which are fenced on one side by a row of timbers and about 6 ft. away on the other side bounded by a face of coal.

Nearly touching the former in each alley is a face conveyor 20 in. wide, leaving a working space from 3 to 4 ft. wide between the face and the conveyor, which is sufficient when a longwall machine is used for undercutting. When the face is shot down the coal rolls outward, so that in places the conveyor may be covered with coal. By day one will notice four or five men, one of whom is a "strawboss," at work on each face, shoveling or lifting lumps of coal onto the conveyor.

Immediately after the faces are cleaned up one observes a roof span 11 or 12 ft. wide supported by solid coal on one side and a row of timbers on the other, indicating the depth of cut cleaned up, and showing that there is sufficient width for the use of a

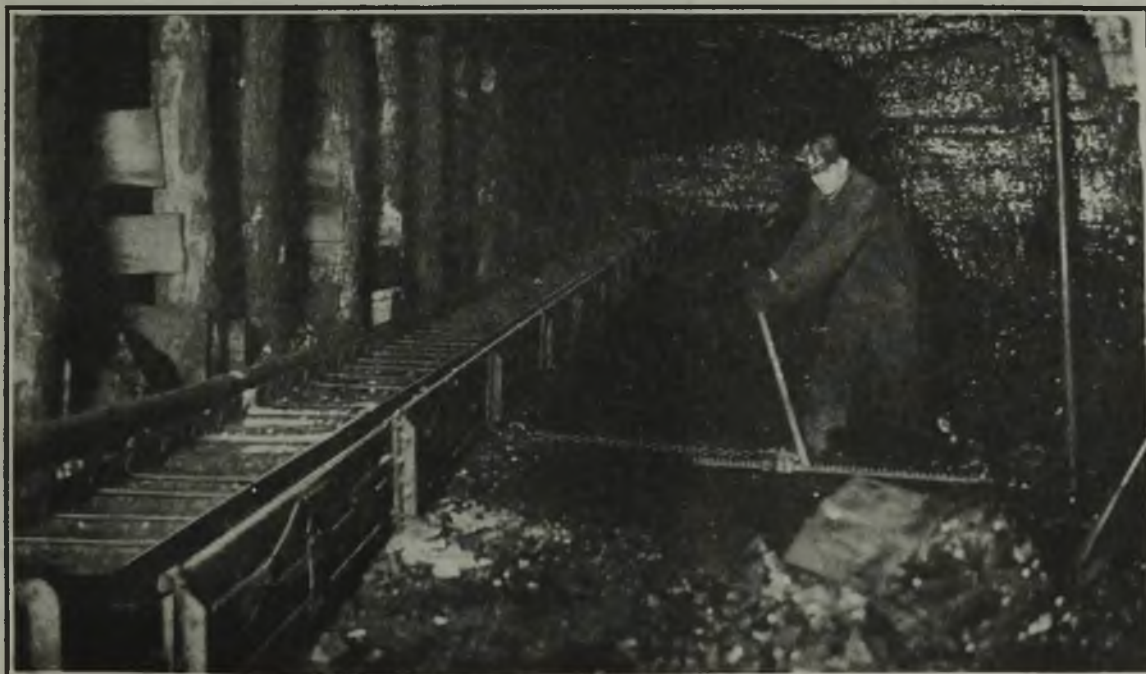


FIG. 6

Shifting
Conveyor
Towards
Face

After each cut the face conveyor must be shifted sidewise the depth of the cut and moved in the direction of the gallery a distance equal to the length of three sections of the conveyor. A prop puller does this admirably. The seam is in two parts. The coal is shot and the upper bench removed, the parting of clay is then shoveled over the conveyor into the goaf and then the lower bench is fed to the conveyor.



FIG. 7

Well-Loaded Conveyors

Because this lateral conveyor must dispose of all the coal coming from four gallery conveyors it should be made about twice as wide as the experimental conveyor shown here. In this system entries can be kept tidy at all times. Electric lights make the lateral, the galleries and the faces safer places in which to work.

special type of loading machine. All this can be viewed from the mouth of the gallery, for faces as well as the various conveyor entries are illuminated by electric lamps on a line circuit.

Modern mining must embody the principles which other industries long ago put into practice but which, by reason of the difficulty of application, mine managers are only beginning to utilize, namely, ample illumination, segregation and judicious division of labor and, most important, intelligent supervision as regards efficiency and safety. A crew of ten men or more working together as "buddies" are more cheerful and willing than they are when working alone in one-man places. And rest assured that ten men will not jointly run risks by unsafe practices even though they might do so as individuals.

Longwall mining machines are better than shortwall machines for undercutting the coal because the former require less working space and cut in any direction. Consequently, when the longwall machine is used, the conveyor can be shifted toward the face on the completion of the loading of a cut and a row of timbers placed behind it, leaving a roof span of 6 ft. over the men who do the cutting. When a shortwall machine is used this roof span may be 9 ft. wide.

The two benches of merchantable coal, separated by the clay parting are shot down as a unit. If after shooting the conveyor is partly buried in coal it is capable of digging its way out. The top bench of coal is loaded out first, after which the parting is broken up and shoveled over the conveyor into the gob between the timbers. At least two-thirds of a loader's time is utilized in gobbing the parting, seriously affecting his actual capacity for loading clean coal, for it should be remembered he does not have any time during which he is waiting for cars and consequently whatever time is spent shoveling clay is time lost to shoveling of coal.

Depending on the depth of the cut, four or five loaders are employed on each face. Thirty-two loaders working in a panel of eight faces can produce 830 tons of coal per shift. Forty loaders are expected to produce 1,050 tons per shift. In either case the average output per loader per shift is 26 tons. In a seam of equal thickness, free of partings, the output per loader per shift should be increased to 30 tons or more. At the present time

from 50 to 65 men are employed in a section, the output per man being about 10 tons per day or 1.25 tons per man-hour, for all day and night employees.

It is not to be supposed, with the many savings this system of mining affords, that advantage will not be taken of even greater gain by the use of loading machines. A machine will be developed, requiring not more than 24 in. clearance, that will be light enough and easily moved from place to place. Such a machine will load coal from the end of the pile, its long axis being parallel to the face when loading coal, and will advance from the gallery toward the point of the pillar. Modifications of longwall mining, conveyors, and loading machines undoubtedly will make possible even at the present time the economic mining of some seams 3 ft. thick in competition with mining by other methods in seams much thicker.

In Fig. 1 is shown the general arrangement for transporting coal from the faces to the tippie. As already noted, conveyors carry coal to the loading point, where it is loaded into mine cars. To do this one



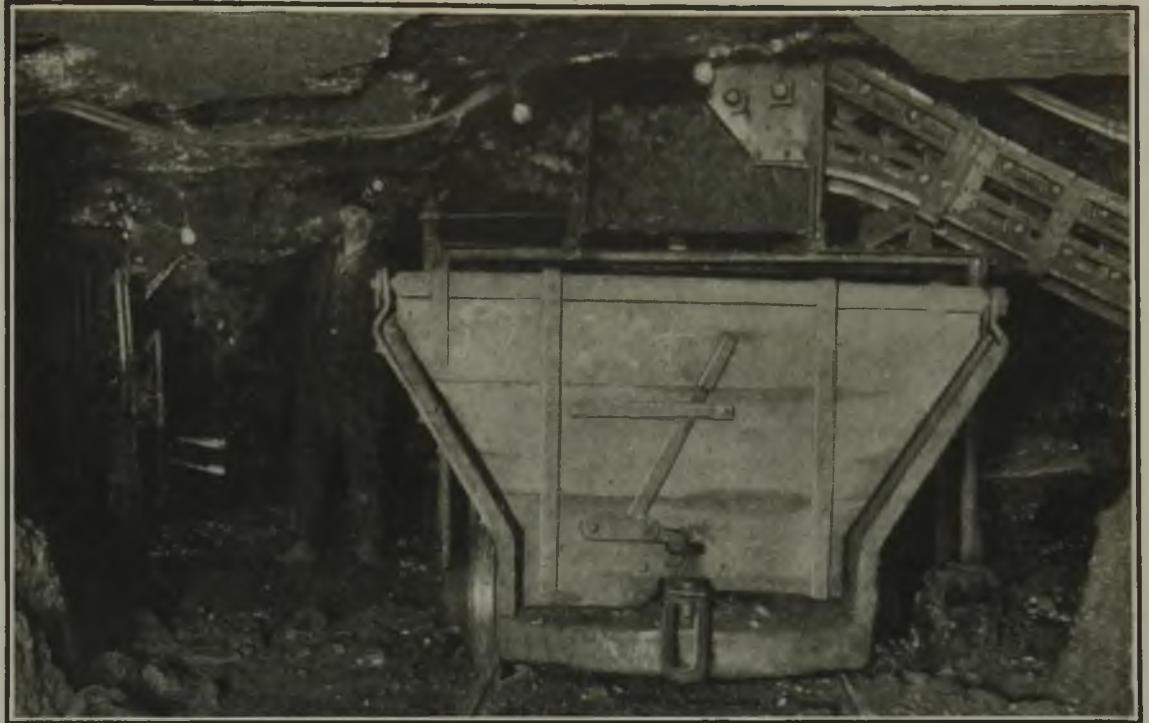
Fig. 8—Gallery Boom Feeds Lateral Conveyor

In order to discharge onto another conveyor, the end of the Mover conveyor is curved upward by the addition of a curved section as shown. Coal does not spill at discharge points.

FIG. 9

Lateral Conveyor Loading Mine Car

A chute which is swung as a cradle by a lever diverts the coal coming from the conveyor either into the back end of the mine car shown or into the front end of the one behind it. The switchboard on the left controls the lateral and gallery conveyors and also the remote-controlled hoist by which the mine cars are moved.



man equipped with a rope hoist to move the trips is required. The conveyor is not stopped while the mine cars are being shifted. The trimmer manipulates a lever-operated chute on a cradle axle that causes the discharge of coal to change direction, without spillage, from the rear end of a loaded car to the front end of an empty car.

Directly behind the trimmer is a switchboard, by which he can control the movements of the hoist and the main conveyor. Gallery and lateral conveyors are controlled from the switchboard, which also is arranged to stop face conveyors. The latter, however, can be started only by "straw bosses" and only also when the gallery and lateral conveyors are in motion. The switches for starting the face conveyors are located at the face at a point near the gallery.

A 10-ton locomotive hauls a trip of twenty-five 2.4-ton mine cars to the loading point, where it is uncoupled and run to the storage track, where the loaded trip is standing. This it hauls to the tippie, which is 3,000 ft. distant. The average time of a round trip between those points is 15 minutes. The average time of loading a trip, including incidental delays, is about the same, so the locomotive is on the go all the time. A trip has been loaded in 10 minutes, or at the rate of 6 tons per minute.

Absolute control and continuity of operation of loading and transportation in the panel are assured. Delays are minimized and mine cars are idle only a small fraction of the loading time, each making at least five trips to the tippie in one shift. The company will soon open up a mine in the Upper Kittanning seam, in which conveyors will be used to transport coal from face to tippie. Many savings will result therefrom, for mine-car haulage will be eliminated and no roof will have to be brushed or bottom lifted to make good haulage grades.

Many advantages accrue from using this system of mining instead of room-and-pillar mining. Some of these are self-evident, others have already been elaborated in the preceding text. For brevity I shall set them down without explanation as they were given to me by the company. They are:

- (1) Higher percentage of recovery;
- (2) no necessity for supporting roof in first mining;
- (3) better supervision of labor;
- (4) better and more simplified ventilation and drainage;
- (5) no abandoned workings where gas and water may accumulate;
- (6) miners' lamps eliminated by use of electric lighting;
- (7) no abandoned working places where equipment may be lost;
- (8) harmony due to psychology of grouped labor;
- (9) greater safety due to the operation being by groups;
- (10) no shotfiring during working hours;
- (11) no explosives handled by inexperienced men.

The advantages over ordinary longwall mining are:

- (1) Miners and equipment are protected on either flank by solid coal;
- (2) ability to change direction and length of faces;
- (3) length of working face greater than width of panel;
- (4) rapid recovery due to angle of faces;
- (5) entry development without need of mine cars;
- (6) adaptation to either advance or retreat;
- (7) quick development possible for new properties;
- (8) increased tonnage per employee;
- (9) no tracks or trolley wires near men at working faces;
- (10) loading operation easier into conveyors than into cars;
- (11) greater economy in equipment for a given output;
- (12) greater capacity in a given area;
- (13) miners not delayed by inadequate transportation facilities;
- (14) workers less dependent on other operation forces;
- (15) distribution of labor more flexible;
- (16) use of light, portable and self-contained conveyors;
- (17) less possibility of accident by reason of the removal of the haulage hazard.

RESUME STUDY OF MINE EXPLOSIONS.—George S. Rice, of the Bureau of Mines found on his trip to Europe that research into the causes and prevention of mine explosions had been virtually stopped in Europe during the war-time period and had not been fully resumed in Continental countries, except that in France the fundamentals of safety explosives are being studied. In Great Britain, research along this line has been resumed at the Eskmeals experimental station and also at several of the universities. In the study of the use of stone dust English investigators have attained greater progress than that achieved in the United States.

How Output of Men in Mines Varies with Size of Plant, Seam Thickness and Labor Relations

In Some Well Managed Mines Four Times as Much Is Done per Man as in Others—Low Tonnages per Man in Union Mines—Man in Big Mine Has Slightly Larger Capacity

BY HOWARD N. EAVENSON
Pittsburgh, Pa.

A STUDY of the data presented in this article will show that with the proper organization and with carefully planned mining methods, the average quantity of coal loaded per day, where this quantity is not restricted by outside regulations, can be increased at least 25 per cent without a corresponding increase in the day labor needed.

The information contained in this article was collected at the request of the U. S. Coal Commission and is published with the permission of that body and of the various companies furnishing the data. For obvious reasons, the names of the companies are not given. No data were obtained from states south of Virginia or west of the Mississippi River.

The data covering the labor, in man-hours, required to produce a ton of bituminous coal have been collected with the idea of showing what is being done at some well-managed plants and not to show the average labor required by all mines, which undoubtedly is considerably higher than the average of the figures shown. Almost all the figures were obtained by a questionnaire addressed to the companies whose records are given. When they were obtained from other sources the com-

pany was asked to verify them. Because much work was needed to compile these figures the data were requested for only one or two months at each plant, and

Article to be presented at the New York meeting of the American Institute of Mining and Metallurgical Engineers, in February.

TABLE I—SUMMARY OF LABOR DATA EMPLOYED IN BITUMINOUS MINES

	MAN-HOURS REQUIRED PER NET TON						
	Load- ing	Cut- ting	Total Loading & Cutting	In- side	Out- side	Total Day- men	Total Labor
Minimum.....	0.36	0.014	0.43	0.17	0.03	0.27	0.84
Maximum.....	2.01	0.86	2.01	1.23	0.66	1.45	3.38
Average, 1921.....							1.91
As between Union and Non-union Mines for Mines Given							
Union:							
Minimum.....	0.55	0.07	0.68	0.24	0.03	0.27	1.14
Maximum.....	2.01	0.86	2.01	0.95	0.45	1.40	3.38
Non-union:							
Minimum.....	0.36	0.014	0.43	0.17	0.07	0.34	0.84
Maximum.....	1.43	0.25	1.42	1.23	0.66	1.45	2.39
As Regards Size of Mine—Less than 1,000 Tons Output per Day							
Minimum.....	0.46	0.016	0.50	0.17	0.07	0.41	1.10
Maximum.....	2.01	0.86	2.01	1.23	0.66	1.45	3.06
Average, 1921.....							1.83
Between 1,000 and 2,000 Tons Output per Day							
Minimum.....	0.36	0.014	0.43	0.26	0.08	0.37	0.84
Maximum.....	1.28	0.14	1.41	0.87	0.34	1.37	2.25
Average, 1921.....							1.72
Over 2,000 Tons Output per Day							
Minimum.....	0.43	0.03	0.46	0.24	0.03	0.27	1.13
Maximum.....	1.14	0.16	1.26	0.64	0.24	0.79	1.95
Average, 1921.....							1.72
As Regards Thickness of Seam Worked							
Seams 48 in. and less in thickness:							
Minimum.....	0.39	0.03	0.43	0.17	0.07	0.42	0.84
Maximum.....	1.77	0.25	1.79	0.845	0.665	1.20	2.51
Average, 1921.....							2.41
Seams 49 in. to 72 in. in thickness:							
Minimum.....	0.36	0.018	0.43	0.26	0.07	0.35	0.90
Maximum.....	1.6	0.86	1.77	1.23	0.52	1.45	2.49
Average, 1921.....							1.86
Seams 73 in. to 110 in. in thickness:							
Minimum.....	0.43	0.014	0.48	0.24	0.08	0.33	0.95
Maximum.....	2.01	0.16	2.01	0.98	0.34	1.18	3.06
Average, 1921.....							1.54

Note.—Average 1921 figures are calculated from data in report of U. S. Coal Commission.

TABLE II—PRODUCTION DATA, WEST VIRGINIA MINES

Mine	Can Loaders Load More with Full Car Supply?	Remarks	Man Hours per Net Ton					Total All Men	Greatest Tonnage Loaded in One Day	
			Load-ers	Ma-chine Men	Total Ton-nage Men	In-side	Out-side			
1	Yes	Loaders drill and shoot, timber and clean coal, no track work (8 hr.)	0.48	0.03	0.51	0.40	0.19	0.59	1.10	25.4
2	Yes	Loaders drill and shoot, timber and clean coal, no track work (8 hr.)	0.43	0.03	0.46	0.36	0.15	0.51	0.97	26.0
3	Yes	Loaders drill and shoot, timber and clean coal, no track work (8 hr.)	0.50	0.05	0.55	0.45	0.22	0.67	1.23	34.0
4	Yes	Loaders drill and shoot, timber and clean coal, no track work (8 hr.)	0.46	0.04	0.50	0.41	0.19	0.60	1.10	34.0
5	Yes	Loaders drill and shoot, timber and clean coal, no track work (8 hr.)	0.44	0.04	0.48	0.32	0.12	0.44	0.93	32.0
6	Yes	Loaders drill and shoot, timber and clean coal, no track work (8 hr.)	0.39	0.04	0.43	0.30	0.12	0.43	0.84	34.0
7	Yes	Loaders drill and shoot, timber and clean coal, no track work (8 hr.)	0.61	0.07	0.68	0.48	0.25	0.73	1.41	43.0
8	Yes	Loaders drill and shoot, timber and clean coal, no track work (8 hr.)	0.60	0.06	0.65	0.47	0.25	0.72	1.37	41.0
9	Yes	Loaders shoot, but do not drill coal, do no track work or timbering; clean coal (9 hr.)	0.50	0.05	0.55	0.32	0.16	0.48	1.03	35.1
10	Yes	Loaders shoot, but do not drill coal, do no track work or timbering; clean coal (9 hr.)	0.59	0.04	0.63	0.38	0.08	0.45	1.08	32.4
11	Yes	Loaders shoot, but do not drill coal, do no track work or timbering; clean coal (9 hr.)	0.43	0.05	0.48	0.33	0.15	0.47	0.95	38.5
12	Yes	Loaders shoot, but do not drill coal, do no track work or timbering; clean coal (9 hr.)	0.61	0.06	0.67	0.31	0.11	0.41	1.08	44.4
13	Yes	Loaders drill, shoot, and timber, but do not lay track.	0.65	0.08	0.73	0.55	0.09	0.64	1.36	39.0
14	Yes	Loaders drill, shoot, and timber, no track. (9 hr.)	0.49	0.09	0.57	0.87	0.51	1.37	1.94	37.8
15	Yes	Loaders drill, shoot, and timber, no track. (9 hr.)	0.65	0.07	0.72	0.43	0.19	0.61	1.34	70.0
16	Yes	Loaders drill, shoot, and timber, lay room track.	0.63	0.11	0.74	0.95	0.30	1.25	1.99	81.0
17	Yes	Loaders drill, shoot, and timber, lay room track.	0.80	0.06	0.85	0.17	0.24	0.42	1.27	
18	Yes	Loaders drill, shoot, and timber, lay room track.	0.57	0.07	0.64	0.36	0.29	0.65	1.29	
19	Yes	Loaders drill, shoot, and timber, lay room track.	1.04	0.02	1.06	0.758	0.32	1.08	2.14	33.0
20	Yes	Loaders drill, shoot, and timber, lay room track.	0.75	0.09	0.84	0.64	0.35	0.99	1.83	19.0
21	Yes	Loaders drill, shoot, and timber, lay room track.	0.46	0.06	0.52	0.73	0.14	0.87	1.38	55.0
22	Yes	Loaders load coal only.	0.53	0.10	0.63	0.70	0.36	1.06	1.69	30.0
23	Yes	Loaders load coal only.	0.65	0.15	0.80	0.93	0.52	1.45	2.25	27.5
24	Yes	Loaders load coal only.	0.51	0.07	0.58	1.23	0.19	1.42	2.00	48.0
25	Yes	Loaders timber and lay straight track; do not drill or shoot.	0.76	0.12	0.88	0.63	0.16	0.79	1.67	27.3
26	Yes	Loaders timber, drill, shoot coal, lay track and clean dirt.	0.63	0.12	0.75	0.42	0.11	0.53	1.27	29.0
27	Yes	Loaders timber, drill, shoot coal, lay track and clean dirt.	0.44	0.08	0.52	0.54	0.29	0.83	1.36	

TABLE II (CONTINUED)—PRODUCTION DATA, WEST VIRGINIA MINES

Mine	Load-ers	Ma-chine Men	Total Ton-nage Men	Daymen		Total All Men	Greatest Tonnage Loaded in One Day	
				In-side	Out-side			
1	0.48	0.03	0.51	0.40	0.19	0.59	1.10	25.4
2	0.43	0.03	0.46	0.36	0.15	0.51	0.97	26.0
3	0.50	0.05	0.55	0.45	0.22	0.67	1.23	34.0
4	0.46	0.04	0.50	0.41	0.19	0.60	1.10	34.0
5	0.44	0.04	0.48	0.32	0.12	0.44	0.93	32.0
6	0.39	0.04	0.43	0.30	0.12	0.43	0.84	34.0
7	0.61	0.07	0.68	0.48	0.25	0.73	1.41	43.0
8	0.60	0.06	0.65	0.47	0.25	0.72	1.37	41.0
9	0.50	0.05	0.55	0.32	0.16	0.48	1.03	35.1
10	0.59	0.04	0.63	0.38	0.08	0.45	1.08	32.4
11	0.43	0.05	0.48	0.33	0.15	0.47	0.95	38.5
12	0.61	0.06	0.67	0.31	0.11	0.41	1.08	44.4
13	0.65	0.08	0.73	0.55	0.09	0.64	1.36	39.0
14	0.49	0.09	0.57	0.87	0.51	1.37	1.94	37.8
15	0.65	0.07	0.72	0.43	0.19	0.61	1.34	70.0
16	0.63	0.11	0.74	0.95	0.30	1.25	1.99	81.0
17	0.80	0.06	0.85	0.17	0.24	0.42	1.27	
18	0.57	0.07	0.64	0.36	0.29	0.65	1.29	
19	1.04	0.02	1.06	0.758	0.32	1.08	2.14	33.0
20	0.75	0.09	0.84	0.64	0.35	0.99	1.83	19.0
21	0.46	0.06	0.52	0.73	0.14	0.87	1.38	55.0
22	0.53	0.10	0.63	0.70	0.36	1.06	1.69	30.0
23	0.65	0.15	0.80	0.93	0.52	1.45	2.25	27.5
24	0.51	0.07	0.58	1.23	0.19	1.42	2.00	48.0
25	0.76	0.12	0.88	0.63	0.16	0.79	1.67	27.3
26	0.63	0.12	0.75	0.42	0.11	0.53	1.27	29.0
27	0.44	0.08	0.52	0.54	0.29	0.83	1.36	

In June, 1922, at Mine No. 16 in Logan Co., one man loaded 572 mine cars holding 743 6 net tons coal in 222 hr. spent in the mine. Loader worked in two entries 18 ft. wide, coal averaged 44 in. thick; he drilled and shot his coal, but neither picked out impurities nor set timbers. Roof conditions in these working places were not favorable with considerable water present. Besides this, he did 2 days or 18 hr. of day work; his total earnings for the month, including pay for water at face, were \$528.50. Average loading per hour = 3.4 tons or 2.5 mine cars.

non-union mines in the list are generally considered to be equally well managed.

The production per month in a few cases includes the slate which has to be loaded and hauled out of the mine, for this needs almost as much handling as coal. Where this is the case that fact is noted.

The number of days worked includes only the total time in which the tipples operated; not the number of days on which the mines ran. This makes the output per day appear slightly higher than it should be in these cases, but does not affect the item of "days worked," as the total days worked per month for each class, or the average number of each class working

TABLE III (CONTINUED)—PRODUCTION DATA, KENTUCKY MINES

Mine	Can Loaders Produce More with Full Car Supply?	Remarks
1		Loaders with exception of machine, load drill and shoot coal
2		All loaders timber, lay track and clean dirt
3		Same as No. 1
4	Yes	Loaders drill, timber, lay track and clean dirt; do not shoot
5	Yes	Loaders drill, timber, lay track and clean dirt; do not shoot
6	Yes	Loaders drill, timber, lay track and clean dirt; do not shoot
7	Yes	Loaders drill, timber, lay track and clean dirt; do not shoot
8	Yes	Loaders drill, timber, lay track and clean dirt; do not shoot
9	Yes	Loaders drill, timber, lay track and clean dirt; do not shoot
10	Yes	Loaders drill, timber, lay track and clean dirt; do not shoot
11	Yes	Loaders drill, timber, lay track and clean dirt; do not shoot
12	Yes	Loaders drill, timber, lay track and clean dirt; do not shoot
13	Yes	Loaders drill, timber, lay track and clean dirt; do not shoot
14		Loaders load only, but clean 8-in. laminated coal.
15		Loaders timber and lay straight room track only
16		Loaders timber and lay straight room track only
17	Yes	Loaders drill, clean coal, set timbers and pay for one-half shooting
18	Not this month	Loaders drill, clean coal, set timbers and pay for one-half shooting
19	Yes	Loaders drill, clean coal, set timbers and pay for one-half shooting
20		Loaders drill, shoot coal, timber, but do no track work
21		

Working time was 8 hr. per day. In addition to loading coal, the loader only lays "jumpers" in the face of his room. Drilling, shooting, timbering and straight track work is done by the company. Loader E earnings, in month given (January, 1921) were \$547.80.

TABLE III (CONTINUED)—PRODUCTION DATA, KENTUCKY MINES

Mine	Loaders	Man-hours per Net Ton					Total All Men	Greatest Tonnage Loaded in One Day
		Mach. Men	Total Tonnage	Inside	Outside	Total		
1	0.794	0.12	0.91	0.59	0.32	0.91	1.82	
2	0.76	0.11	0.87	0.52	0.29	0.81	1.68	
3	0.65	0.018	0.67	0.51	0.19	0.70	1.37	
4	0.82	0.09	0.91	0.52	0.15	0.67	1.58	
5	1.02	0.02	1.04	0.59	0.18	0.77	1.81	
6	0.955	0.017	0.97	0.52	0.15	0.67	1.64	
7	0.887	0.016	0.905	0.533	0.21	0.74	1.64	
8	0.74	0.016	0.756	0.50	0.17	0.67	1.43	
9	0.83	0.023	0.85	0.58	0.15	0.74	1.60	
10	1.04	0.018	1.06	0.58	0.214	0.81	1.86	
11	1.15	0.035	1.21	0.98	0.196	1.18	2.39	
12	0.87	0.014	0.88	0.478	0.18	0.66	1.54	
13	0.835	0.027	0.86	0.616	0.137	0.75	1.61	
14	0.36	0.07	0.43	0.31	0.16	0.47	0.90	
15	0.47	0.08	0.55	0.37	0.20	0.57	1.13	
16	0.54	0.10	0.64	0.40	0.24	0.64	1.28	
17	0.83	0.11	0.94	0.47	0.12	0.59	1.53	
18	0.63	0.09	0.72	0.30	0.12	0.42	1.14	
19	0.75	0.09	0.84	0.38	0.16	0.54	1.38	
20	0.78	0.09	0.867	0.32	0.114	0.431	1.29	
21	0.80	0.10	0.893	0.26	0.10	0.374	1.27	

Loader C in 25 days loaded 706 net tons coal; average, 28.3 tons per day; Loader D in 26 days loaded 710 net tons coal; average, 27.3 tons per day; Loader E in 22 days loaded 913 net tons coal; average, 41.5 tons per day. Total, 119 days loaded 3,577 net tons coal; average, 30.1 tons per day.

TABLE III (CONTINUED)—PRODUCTION DATA, KENTUCKY MINES

Mine	Loaders	Men Working per Day					Total All Men	Average Production Net Tons per Day					Total All Men	
		Mach. Men	Total Tonnage	Inside	Outside	Total		Loaders	Mach. Men	Total Tonnage	Inside	Outside		Total
1	27.0	4	31.0	20.0	11.0	31.0	62.0	10.07	136	8.77	13.6	24.73	8.77	4.39
2	69.0	10	79.0	47.0	26.0	73.0	152.0	10.54	145	9.20	15.47	27.96	9.92	4.78
3	73.0	2	75.0	57.0	22.0	79.0	154.0	12.30	898	11.97	15.75	40.77	11.37	5.83
4	83.0	1	84.0	53.0	15.0	68.0	152.0	9.75	809	9.32	15.26	53.93	11.90	5.32
5	86.0	2	88.0	50.0	15.0	65.0	153.0	7.87	676	7.69	13.54	45.13	10.41	4.42
6	170.0	3	173.0	92.0	27.0	119.0	292.0	8.38	949	8.23	15.48	52.74	11.97	4.88
7	107.0	2	109.0	64.0	25.0	89.0	198.0	9.01	964	8.84	15.06	38.56	10.83	4.87
8	93.0	2	95.0	63.0	21.0	84.0	179.0	10.76	1,001	10.54	15.89	47.67	11.92	5.59
9	108.0	3	111.0	76.0	20.0	96.0	207.0	9.62	692	9.36	13.67	51.95	10.82	5.01
10	117.0	2	119.0	67.0	24.0	91.0	210.0	7.67	898	7.55	13.40	37.42	9.87	4.28
11	35.0	2	37.0	30.0	6.0	36.0	73.0	6.97	244	6.59	8.13	40.66	6.78	3.34
12	125.0	2	127.0	69.0	26.0	95.0	222.0	9.22	1,153	9.08	16.71	44.35	12.14	5.19
13	61.0	2	63.0	45.0	10.0	55.0	118.0	9.57	584	9.27	12.98	58.4	10.62	4.95
14	81.7	16	97.7	72.4	36.2	108.6	206.3	22.5	230	18.84	25.4	50.8	16.95	8.9
15	158.0	28	186.0	123.0	66.0	189.0	375.0	16.9	190	14.32	21.7	40.4	14.10	7.1
16	155.0	28	183.0	114.0	69.0	183.0	366.0	14.8	164	12.55	20.0	33.3	12.55	6.3
17	92.0	12	104.0	53.0	13.0	66.0	170.0	9.7	149	8.60	16.9	68.8	13.54	5.3
18	60.0	8	68.0	29.0	12.0	41.0	109.0	12.8	192	11.31	26.5	64.1	18.76	7.1
19	150.0	18	168.0	77.0	33.0	110.0	278.0	10.7	178	9.55	20.8	48.6	14.58	5.8
20	238.0	28	266.0	97.0	35.0	132.0	398.0	10.3	175	9.21	25.3	70.0	18.56	6.2
21	166.0	20	186.0	57.0	21.0	78.0	264.0	10.0	167	8.96	29.2	79.3	21.35	6.3

TABLE IV—PRODUCTION DATA, MARYLAND MINES

Mine	County	Union or Non-union	Name of Seam	Thick-ness, Inches	Production Net Tons	No. Days Worked	Aver. Prod. per Day
1	Allegany	Union	Sewickley	36	15,249 15,354-C 1,162-S	24	635
2	Allegany	Union	Pittsburgh	96	16,516	27	612

TABLE IV (CONTINUED)—PRODUCTION DATA, MARYLAND MINES

Mine	Men Working per Day				Average Production Net Tons per Day			
	Loaders	Machine Men	Daymen	Total All Men	Loaders	Machine Men	Daymen	Total All Men
1	140	2	142	20	40	182	4.53	635
2	154	0	154	63	17	80	3.97	612

TABLE IV (CONTINUED)—PRODUCTION DATA, MARYLAND MINES

Mine	Man Hours per Net Ton						Total All Men	Greatest Tonnage Loaded in One Day
	Loaders	Mach. Men	Total Tonnage	Inside	Daymen	Total		
1	1.77	0.03	1.79	0.25	0.25	0.50	2.29	12.11-P 14.5-M
2	2.01		2.01	0.82	0.22	1.05	3.06	13.9

TABLE IV (CONTINUED)—PRODUCTION DATA, MARYLAND MINES

Mine	Can Loaders Produce More with Full Car Supply?	Remarks
1		Loaders, with exception of machine, load, drill and shoot coal
2		All loaders timber, lay track and clean dirt

TABLE V—PRODUCTION DATA, OHIO MINES

Mine	County	Union or Non-union	Name of Seam	Thick-ness, Inches	Month	Production Net Tons	No. Days Worked	Aver. Prod. per Day
1		Union	No. 8	66	Mar., '22	32,500*	26.0	1,250
2	Belmont	Union	Pgh. No. 8	60	Mar., '22	21,281	23.0	925
3	Belmont	Union	Pgh. No. 8	60	Mar., '22	10,436	24.25	422
4	Belmont	Union	Pgh. No. 8	60	Mar., '22	12,562	22.75	552
5	Belmont	Union	Pgh. No. 8	60	Mar., '22	23,299	24.12	965
6	Belmont	Union	Pgh. No. 8	60	Mar., '22	19,327	24.0	805
7	Belmont	Union	Pgh. No. 8	60	Mar., '22	8,601	24.37	352
8	Belmont	Union	Pgh. No. 8	60	Mar., '22	30,968	22.75	1,361
9	Belmont	Union	Pgh. No. 8	60	Mar., '22	44,987	21.50	2,092
10	Jefferson	Union	Pgh. No. 8	60	Mar., '22	18,059	22.37	807
11	Jefferson	Union	Pgh. No. 8	60	Mar., '22	13,197	22.25	593
12	Jefferson	Union	No. 6	48	Mar., '22	12,553	22.75	551
13	Jefferson	Union	No. 6	48	Mar., '22	26,447	23.12	1,143

* All machine coal.

TABLE V (CONTINUED)—PRODUCTION DATA, OHIO MINES

Mine	Can Loaders Produce More with Full Car Supply?	Remarks
1		Loaders drill and shoot but do no timbering or track work
2	Yes	Loaders drill, shoot, lay track, set timber, and clean coal
3	Yes	Loaders drill, shoot, lay track, set timber, and clean coal
4	Yes	Loaders drill, shoot, lay track, set timber, and clean coal
5	Yes	Loaders drill, shoot, lay track, set timber, and clean coal
6	Yes	Loaders drill, shoot, lay track, set timber, and clean coal
7	Yes	Loaders drill, shoot, lay track, set timber, and clean coal
8	Yes	Loaders drill, shoot, lay track, set timber, and clean coal
9	Yes	Loaders drill, shoot, lay track, set timber, and clean coal
10	Yes	Loaders drill, shoot, lay track, set timber, and clean coal
11	Yes	Loaders drill, shoot, lay track, set timber, and clean coal
12	Yes	Loaders drill, shoot, lay track, set timber, and clean coal
13	Yes	Loaders drill, shoot, lay track, set timber, and clean coal

per day, were reported. It is hardly likely that any error introduced by this factor will be as great as the variation in production is from month to month, even at the same plant.

The number of machine men working per day includes both machine runners and helpers, and in computing the average production per day, the number of crews, each of two men, is used as the divisor and the number of man-hours per ton includes the time of

both men. The coal produced per machine sometimes includes all coal produced, both pick and machine, as data were not always available for separating this. Wherever it could be segregated, it is so shown and computed.

The number of man-hours per ton is computed from the actual number of hours in the working day at each plant and not from the time actually spent at the face. Usually the loader does not stay at the face all

TABLE V (CONTINUED)—PRODUCTION DATA, OHIO MINES
Men Working per Day —Average Production Net Tons per Day—

Mine	Men Working per Day			Average Production Net Tons per Day												
	Loaders	Mach. Men	Total Men	Loaders	Mach. Men	Total Men	Inside	Outside	Total							
1	148	22	170	58	29	87	257	8.4	114	0	7.35	21.5	43	1	14.37	4.9
2	128	18	146	36	26	62	208	7.2	102	0	6.33	25.7	35.5	14.91	4.4	
3	85	8	93	26	12	38	131	5.0	106	0	4.5	16.2	35.17	11.1	3.2	
4	70	6	76	25	10	35	111	7.88	184	0	7.26	22.1	55.2	15.8	4.97	
5	129	20	149	43	21	64	213	7.48	96	5	6.48	22.44	46.6	13.5	4.06	
6	99	14	113	38	19	57	170	8.13	115	0	7.12	21.18	42.37	14.12	4.73	
7	54	6	60	26	6	32	92	6.52	119	0	5.86	13.54	58.66	11.0	3.82	
8	148	22	170	60	30	90	260	9.19	123	0	8.00	22.68	45.36	15.12	5.25	
9	222	24	246	72	18	90	336	9.42	174	0	8.50	29.06	110.10	23.24	6.23	
10	120	14	134	42	20	62	196	6.72	115	0	6.02	19.21	40.35	13.02	4.12	
11	66	10	76	20	10	30	106	8.98	118	0	7.80	29.65	59.30	19.77	5.59	
12	82	12	94	57	20	77	171	6.72	91	0	5.86	9.67	27.50	7.15	3.22	
13	105	16	121	71	18	89	210	10.88	122	0	9.46	16.09	63.5	12.84	5.44	

TABLE V (CONTINUED)—PRODUCTION DATA, OHIO MINES

Mine	Man Hours per Net Ton						Total All Men	Greatest Tonnage Loaded in One Day
	Loaders	Mach. Men	Total Men	Inside	Daymen Outside	Total		
1	0.95	0.14	1.088	0.37	0.18	0.557	1.64	24.1
2	1.11	0.156	1.264	0.31	0.225	0.536	1.80	
3	1.6	0.14	1.77	0.49	0.227	0.72	2.49	
4	1.01	0.86	1.10	0.36	0.14	0.50	1.61	
5	1.06	0.165	1.23	0.36	0.19	0.59	1.82	
6	0.98	0.139	1.12	0.38	0.19	0.57	1.69	
7	1.22	0.14	1.36	0.59	0.14	0.73	2.09	
8	0.87	0.129	1.00	0.35	0.18	0.53	1.52	
9	0.85	0.09	0.94	0.28	0.07	0.35	1.28	
10	1.19	0.14	1.32	0.42	0.20	0.62	1.94	
11	0.89	0.14	1.02	0.27	0.14	0.41	1.43	
12	1.19	0.17	1.36	0.83	0.29	1.12	2.48	
13	0.73	0.13	0.85	0.50	0.13	0.62	1.47	

TABLE VI—PRODUCTION DATA, PENNSYLVANIA MINES

Mine	County	Union or Non-union	Name of Seam	Thickness, Inches	Month	Production Net Tons	No. Days Worked	Aver. Prod. per Day
2	Somerset	Non-union	C/C	48	Mar., '22	16,184	24	674
3	Somerset	Non-union	C/C	51	Mar., '22	31,147	23	1354
4	Somerset	Non-union	C/C	45	Mar., '22	26,645	25	1066
5	Somerset	Non-union	E	41	Mar., '22	16,097	25	644
6	Westmoreland	Non-union	Pittsburgh	85	Jan., '23	23,904	26	919
						28,135-P		
						9,378-M		
7	Westmoreland	Non-union	Pittsburgh	86	Mar., '23	37,513	24	1563
8	Greene	Non-union	Pittsburgh	76	Dec., '22	38,771*	25	1551
9	Fayette	Non-union	Pittsburgh	84				
10	Somerset	Open-shop	B	42	Mar., '23	41,777	27	1547
11	Somerset	Open-shop	B	44	Mar., '23	42,210	27	1556

*All machine coal.

TABLE VI (CONTINUED)—PRODUCTION DATA, PENNSYLVANIA MINES

Mine	Men Working per Day			Average Production Net Tons per Day										
	Loaders	Mach. Men	Total Men	Loaders	Mach. Men	Total Men	Inside	Outside	Total					
1	171	All Pick	171	51	23	74	245	5.602	5.602	18.78	41.65	12.94	3.91	
2	102	3	105	45	56	101	206	6.61	449	6.42	14.98	12.03	6.67	3.27
3	181	3	184	79	7	79	263	7.48	903	7.36	17.14		17.14	3.15
4	171	17	188	81	30	111	299	6.23	135	5.67	13.16	35.53	9.60	3.56
5	95	20	115	68	21	89	204	6.80	64	5.70	9.47	30.67	7.24	3.16
6	72	8	80	36	30	66	146	12.8	140	11.5	25.5	30.6	13.9	6.3
7	142	5	147	99	67	166	313	11.0	156	10.63	15.8	23.3	9.41	5.0
8	177	18	195	142	66	208	403	8.8	172	7.95	10.9	23.5	7.46	3.8
9								20.0						
10	242P		242	139	36	175	417	6.4	6.4	11.1	43.0	8.84	3.7	
11	232	23	255	119	34	152	407	6.7	135	6.10	13.1	47.1	10.30	3.8

TABLE VI (CONTINUED)—PRODUCTION DATA, PENNSYLVANIA MINES

Mine	Man-hours per Net Ton						Total All Men	Greatest Tonnage Loaded in One Day
	Loaders	Mach. Men	Total Men	Inside	Daymen Outside	Total		
1	1.428		1.428	0.425	0.192	0.617	2.045	17
2	1.21	0.036	1.25	0.534	0.665	1.20	2.45	25.25-M
3	1.07	0.018	1.09	0.466		0.466	1.55	17.15-P
4	1.28	0.127	1.41	0.607	0.225	0.833	2.247	18.55-M
5	1.18	0.25	1.40	0.845	0.261	1.11	2.51	21.0-P
6	0.61	0.11	0.695	0.31	0.26	0.575	1.27	15.85-M
7	0.73	0.10	0.752	0.51	0.34	0.850	1.60	14.45-P
8	0.91	0.09	1.01	0.73	0.34	1.07	2.10	19.8-M
9	0.45							40-M
10	1.25		1.25	0.72	0.18	0.905	2.16	32-P
11	1.19	0.12	1.31	0.61	0.17	0.777	2.11	22
								21

TABLE VI (CONTINUED)—PRODUCTION DATA, PENNSYLVANIA MINES

Mine	Can Loaders Produce More with Full Car Supply?	Remarks	
		Loaders	Daymen
1	Yes	Loaders drill, shoot coal, timber, lay track and clean dirt	
2	Yes	Loaders drill, shoot coal, timber, lay track and clean dirt	
3	Yes	Loaders drill, shoot coal, timber, lay track and clean dirt	
4	Yes	Loaders drill, shoot coal, timber, lay track and clean dirt	
5	Yes	Loaders drill, shoot coal, timber, lay track and clean dirt	
6	Yes	Loaders drill, shoot coal, timber, lay straight track	
7		Loaders drill, shoot coal, timber, lay straight track	
8		Loaders drill, shoot coal, timber, lay straight track	
9		Loaders lay track and set timbers	
10		Loaders drill, shoot coal, timber and lay room track	
11		Loaders drill, shoot coal, timber and lay room track	

At Mine No. 9, in Fayette County, pick miner loading average for past years is 11 net tons daily; loader average after air-puncher mining machine is approximately 17 net tons per day; loader average after electric shortwall, mining machine is approximately 20 net tons per day. Pick miners lay track, set timbers and drill holes; machine loaders lay track, set timbers but drill no holes—neither class handles much slate. Roof coal or draw slate are left up in working places. Empty cars are delivered to the face of working places.

TABLE VII—PRODUCTION DATA, VIRGINIA MINES

Mine	County	Union or Non-union	Name of Seam	Thickness, Inches	Month	Production Net Tons	No. Days Worked	Aver. Prod. per Day
2	Dickinson	Non-union	Upper-Banner	45	May, '22	14,674*	27	543

*All machine coal.

TABLE VII (CONTINUED)—PRODUCTION DATA, VIRGINIA MINES

Mine	Men Working per Day			Average Production Net Tons per Day										
	Loaders	Mach. Men	Total Men	Loaders	Mach. Men	Total Men	Inside	Outside	Total					
1	242	20	262	203	43	246	508	10.4	252	9.625	12.4	58.7	10.25	5.0
2	70	10	80	29	5	34	114	7.7	109	6.78	18.7	109.0	15.91	4.8

TABLE VII (CONTINUED)—PRODUCTION DATA, VIRGINIA MINES

Mine	Man-hours per Net Ton						Total All Men	Greatest Tonnage Loaded in One Day
	Loaders	Mach. Men	Total Men	Inside	Daymen Outside	Total		
1	0.77	0.06	0.831	0.64	0.14	0.780	1.6	24
2	1.04	0.15	1.179	0.43	0.07	0.503	1.67	16

TABLE VII (CONTINUED)—PRODUCTION DATA, VIRGINIA MINES

Mine	Can Loaders Produce More with Full Car Supply?	Remarks	
		Loaders	Daymen
1		Loaders shoot, do not drill. Set safety posts only and lay straight track.	
2			

the time that the mine works; in most mines the actual time at the face does not average over seven hours. All labor required in producing coal is included in the figures, whether employed inside or outside. The figure in the column headed "Greatest tonnage loaded in one day" is the largest quantity loaded during that month.

In the accompanying tables the figures under total labor are not the sums of figures in the previous columns; each item is the minimum or maximum of

the figures in its class. For all the mines given the data can be summarized as shown in Table I.

The production per loader in mines Nos. 9 and 27 is the average production of thousands of men in different states and in many mines under different conditions. There is no doubt that this rate can be equalled in nearly all mines with approximately the same coal thicknesses, and it should be excelled in many mines with better roof conditions.

In comparing the day labor required in the Illinois, Indiana and Ohio mines with those in eastern Kentucky, West Virginia and Pennsylvania it must be remembered that pillar withdrawal is practically unknown in the former three states, though largely practiced in the latter ones.

Estimates show that in the latter mines the inside day labor could be reduced from 25 to 50 per cent, which would affect not only the slate, timber and trackmen but the men engaged in transportation, if the same methods of mining were practiced. This increase in day labor required for pillar withdrawal is, of course, balanced against the increased yield of coal per acre.

If all of the best performances could be grouped at one plant it would be possible, by present methods,

TABLE VIII—PRODUCTION DATA, INDIANA MINES

Mine	County	Union or Non-Union	Name of Seam	Thick-ness, Inches	Month	Pro-duction Net Tons	No. Days Worked	Aver. Prod. per Day
1	Knox	Union	5	78	Dec., '22	89,262*	16.0	5579
2	Knox	Union	5	78	Mar., '23	59,165*	14.0	4226
3	Sullivan	Union	6	60	Mar., '22	13,596	18.62	730

* Local union has limit of four cars per man per day.

TABLE VIII (CONTINUED)—PRODUCTION DATA, INDIANA MINES

Mine	Men Working per Day			Average Production Net Tons per Day		
	Loaders	Mach. Men	Total Tonnage Men	Loaders	Mach. Men Two Men	Total Tonnage Men
1	516.0	48.0	564.0	232	9.89	33.8
2	326.0	44.0	370.0	192	11.42	33.3
3	75.3	11.5	86.8	127	8.41	8.4

TABLE VIII (CONTINUED)—PRODUCTION DATA, INDIANA MINES

Mine	Man-hours per Net Ton			Total All Men	Greatest Tonnage Loaded in One Day
	Loaders	Mach. Men	Total Tonnage Men		
1	0.74	0.07	0.809	1.16	16
2	0.615	0.083	0.698	1.03	22
3	0.82	0.013	0.095	2.35	

TABLE VIII (CONTINUED)—PRODUCTION DATA, INDIANA MINES

Mine	Man-hours per Net Ton			Total All Men	Greatest Tonnage Loaded in One Day
	Loaders	Mach. Men	Total Tonnage Men		
1	0.74	0.07	0.809	1.16	16
2	0.615	0.083	0.698	1.03	22
3	0.82	0.013	0.095	2.35	

Can Loaders Produce More with Full Car Supply?

Remarks

1 Yes Loaders drill and prepare shots, clean coal. Timber but do no track work

2 Yes Loaders drill and prepare shots, clean coal. Timber but do no track work

3 Loaders drill, shoot and timber, but do no track work

TABLE IX (CONTINUED)—PRODUCTION DATA, ILLINOIS MINES

Mine	Man-hours per Net Ton			Total All Men	Greatest Tonnage Loaded in One Day
	Loaders	Mach. Men	Total Tonnage Men		
1	0.86	0.13	0.96	1.63	
2	0.67	0.08	0.75	1.23	
3	0.73	0.16	0.89	1.31	
4	0.55	0.13	0.68	1.18	
5	0.82	0.08	0.90	1.82	
6	0.82	0.08	0.99	1.60	
7	1.14	0.12	1.26	1.95	
8	0.81	0.14	0.95	1.60	

10* From Coal Age April 13, 1922.

TABLE IX (CONTINUED)—PRODUCTION DATA, ILLINOIS MINES

Mine	Man-hours per Net Ton			Total All Men	Greatest Tonnage Loaded in One Day
	Loaders	Mach. Men	Total Tonnage Men		
1	0.86	0.13	0.96	1.63	
2	0.67	0.08	0.75	1.23	
3	0.73	0.16	0.89	1.31	
4	0.55	0.13	0.68	1.18	
5	0.82	0.08	0.90	1.82	
6	0.82	0.08	0.99	1.60	
7	1.14	0.12	1.26	1.95	
8	0.81	0.14	0.95	1.60	

10* 10 best = 15 tons
*From Coal Age, April 13, 1922.

TABLE IX—PRODUCTION DATA, ILLINOIS MINES, ALL UNION

Mine	Name of Seam	Thickness, Inches	Month	Production Net Tons	No. Days Worked	Aver. Prod. per Day
1	6	90	March, '22	68,252	24.75	2758
2	6	84	March, '22	83,736	22.5	3721
3	6	80	March, '22	80,651	23.0	3506
4	6	90	March, '22	59,253	23.75	2495
5	6	90	March, '22	41,003	24.12	1700
6	6	56	March, '22	40,691	25.12	1620
7	6	66	March, '22	44,465-M		
8	6	84	March, '22	20,910-P		
10*	6	66	March, '22	65,375	25.5	2564
10*	6	84	March, '22	51,189	24.75	2068

*From Coal Age April 13, 1922.

TABLE X—PRODUCTION DATA, ILLINOIS DISTRICTS

District	Number of Mines	Period	Production Net Tons	No. Days Worked	Aver. Prod. per Day
1	7	Year—1920	1,456,068	260	5,600
2	11	Year—1920	1,915,462	259	7,396
3	13	Year—1920	3,900,031	254	15,353
4	26	Year—1920	13,340,068	232	57,500
5	5	Year—1920	2,163,696	281	7,344
6	27	Year—1920	6,658,820	201	33,228
7	46	Year—1920	18,493,064	219	84,443
7	52	Year—1921	18,523,933	159	116,503
State†	135	Year—1920	47,927,209	230	208,899
State†	140	Year—1921	38,205,778	146	263,488
State		Jan.-Mar., incl. '22	10,364,378		

Second set of figures for each year includes mines in Districts 1, 2, 3, 4, 5, 6, 7.

TABLE IX (CONTINUED)—PRODUCTION DATA, ILLINOIS MINES

Mine	Men Working per Day			Average Production Net Tons per Day		
	Loaders	Machine Men	Total Tonnage Men	Loaders	Machine Men Two Men	Total Tonnage Men
1	295.1	35.5	330.6	9.3	124.0	8.34
2	310.0	38.9	348.9	12.0	191.0	10.66
3	318.2	46.6	364.8	11.0	102.0	9.61
4	171.6	40.1	211.7	14.5	124.0	11.78
5	175.8	17.6	193.4	9.7	193.0	8.79
6	165.2	15.4	180.6	9.8	210.0	8.97
7	364.9	26.5	391.4	7.0	132.0	8.80
8	208.8	35.3	244.1	9.9	117.0	8.47
10*				10.2	143.7	

*From Coal Age April 13, 1922.

TABLE X (CONTINUED)—PRODUCTION DATA, ILLINOIS DISTRICTS

District	Men Working per Day			Average Production Net Tons per Day		
	Loaders	Mach. Men	Total Tonnage Men	Loaders	Mach. Men (2)	Total Tonnage Men
1			2,410			4.08
2			1,990			6.97
3			4,460			6.94
4			10,177			9.43
5			157			17.90
6			5,660			8.84
7	16,474	1570	18,044	15,649	33,693	9.32
7	21,869	2084	23,953	18,300	42,253	10.2
State†	36,589	3487	40,076	30,842	70,918	5.21
State†	48,225	4596	52,821	33,404	86,225	9.3
State						11.9

† Second set of figures for each year includes mines in Districts 1, 2, 3, 4, 5, 6, 7.
‡ Data Incomplete.

TABLE X (CONTINUED)—PRODUCTION DATA, ILLINOIS DISTRICTS

District	Man-hours per Net Ton			Total All Men
	Loaders	Mach. Men	All Tonnage Men	
1			1 96	3 38
2			1 14	1 94
3			1 15	1 82
4			0 85	1 51
5			?	1 81
6			0 90	1 61
7	0 78	0 07	0 86	1 71
7	0 78	0 08		1 71
State†	1 40	0 13	1 54	2 71
State†	0 86	0 08		1 78
State				

† Second set of figures for each year include mines from Districts 1, 2, 3, 4, 5, 6, 7.

Note—The unit figures for 1920 are all slightly higher than the actual figure, as the tonnages include some mines not reporting the days worked. All base data from coal operators' associations' bulletins.

District 1.—No. 2 seam is worked almost entirely by longwall, pick miners in small shaft operations that could not compete with the rest of the state if they were not so close to Chicago. The seam is from 2 ft. 6 in. to 4 ft. 0 in. thick, averaging about 3 ft. 4 in. and has irregular streaks of dirt and sulphur in it, as thick as 4 in. Roof conditions are poor. Grades are slight in most of the district.

District 2.—No. 1 seam averages 4 ft. thick and is much broken by small faults, slips and clay veins. It has numerous sulphur bands locally. The roof is usually good, the fireclay bottom heaves badly when wet. No. 2 seam is the same as in District 1. No. 5 seam is from 4 to 8 ft. thick, averaging 4 ft. 8 in., with discontinuous bands of pyrites over the middle of the seam. The gray fireclay bottom heaves badly when air slaked. In local sections, a thin layer of iron pyrites on top of the coal keeps the roof up.

District 3.—No. 5 seam is the same as in District 2. No. 6 seam averages about 6 ft. thick and has a band of iron pyrites about 2 in. thick, in the lower part of the seam. It has a hard clay bottom and a shale top that disintegrates with exposure.

District 4.—No. 6 seam is about the same as in District 3 and furnishes nearly all the production in this district.

District 5.—No. 6 seam is about the same as in Districts 3 and 4, except that the roof is always shale and falls easily; the bottom is soft fireclay. No. 7 seam is from 2 ft. 6 in. to 7 ft. 6 in. thick and averages about 5 ft. 6 in. It contains numerous bands and lenses of sulphur. The roof, not generally good, is a black shale; the bottom is soft fireclay. The two seams share in the district's production.

District 6.—No. 6 seam supplies almost all the production in this district and averages about 7 ft. thick. It has a quantity of impurities. Its roof and bottom are as in District 5.

District 7.—Normally District 7 supplies about 40 per cent. of the state output. No. 5 seam averages about 4 ft. 6 in. thick with, usually, a good roof and bottom. The quality of this coal is best in this district. No. 6 seam reaches a maximum thickness of 14 ft. varying from 8 to 12 ft. over large areas. It always has the parting of iron pyrites; in the thickest coal that parting is sometimes 4 in. thick, and while the top is not good, usually a foot or more of coal is left up for support. This district has a number of large mines, some of them the largest producers in the world.

to produce a ton of coal with 0.644 man-hour of labor, or slightly less than 77 per cent of the best total figure shown by these data.

GEORGE OTIS SMITH, Director of the Geological Survey states that activities in which topographic maps are essential are mining operations, and oil and water power development. Co-operative topographic mapping with the Geological Survey has been requested by states for the following purposes: California, oil; Colorado, coal; Idaho, phosphate; Kentucky, oil and coal; Louisiana, oil fields in the northern part of the state; Texas, oil; Utah, coal; West Virginia, coal and oil.

AS NEW MINING DISTRICTS are opened up in Alaska, additions, betterments, and extensions of the Alaskan railroad will be required, according to Colonel Steese, of the Alaskan Engineering Commission. The railroad has a mining department under a consulting geologist of the Bureau of Mines who has a general supervision over mining activities in their relation to railroad operation. The commission has closed the Eska coal mine and abandoned the Chickaloon mine to encourage private investment. The coal reserve of the railroad will be exhausted this year and a small reserve of 10,000 tons is recommended. There has been constructed a four-mile spur connecting newly developed coal mines in Moose Creek, which it is estimated will save the cost of its construction in two years through the lower cost of coal. Mining supplies are carried by river boats operated by the Commission from Nenana to Fort Gibbon and Holy Cross.

The Miner's Torch

Who Furnishes the Inspiration?

IN MY Christmas stocking this year I found a book of Proverbs. I have just been looking at it and out of curiosity turned to the index to see what subject was allotted the most space. Of course, it was money. Here are the first three quotations on that subject:

"A man without money is a bow without an arrow."

"A man without money is like a ship without sails."

"A man without money is like a bird without wings; if he soars he falls to the ground and dies."

One of these quotations is from the Dutch, one from the Roumanian and the third is marked anonymous. All of them could easily have been written by the same author and I have seen at least a score of variations on the same theme in English and American literature.

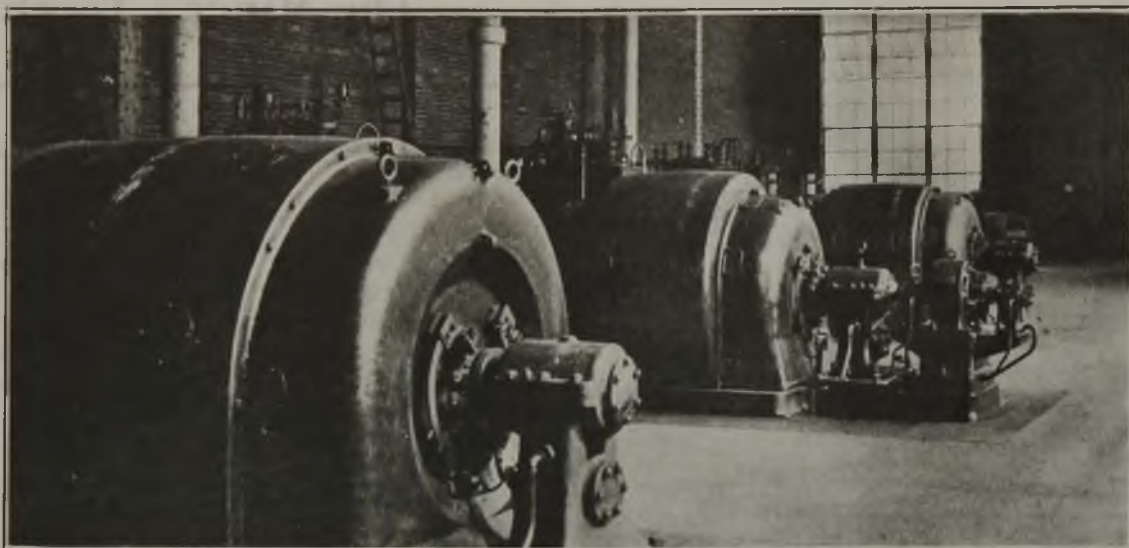
I hate to question the wisdom of the ages, as it were, but here goes. It is my conviction that the most overrated influence in the world today is that which is credited to money. You men who are living in mining camps, look around a little and see if all of the men and women who are "getting on," as it were, must give the credit for their "soaring" to money.

I did that very thing years ago when I first went to live in mining camps—I mean that I did the looking around, not the soaring—and I discovered that generally the person who was accomplishing the most good in the camp was an old maid or a widow or a married woman without children of her own who was taking an interest in all of the young people of the camp, and unconsciously exerting a wonderful influence on their lives, and doing it mostly on a limited allowance.

Picture to yourself a neatly furnished home with a piano, bookcases filled with books and here and there on the wall an attractive picture. Into this home are welcomed the boys and girls who have no similar attractions in their own homes and almost before they realize it they develop an interest in music, find pleasure in books and pictures, and come to look upon neatly kept homes as the kind that can alone fulfill their ideals. One house such as I have described owned by one lone woman who has a little love for her fellows can have a tremendous influence on the lives of half of the children of a mining village.

Poor cooking and badly furnished homes and dirty children do not necessarily point to underpaid workers, at least not in mining camps. Compare the incomes of the women who inspire the children in any camp with the incomes of the fathers of the children who need and profit by the inspiration, and see if you can still take the proverb seriously.

The good Lord furnished a few women of this character to each settlement, even though the settlement appears God forsaken to the outsider, and that explains largely why all of the children don't turn out to be anarchists and heathens even in the towns where small provision has been made for the comfort and education of the inhabitants. Many a man who has sprung from lowly surroundings should give most of the credit for his achievements to some woman whom he has entirely forgotten.



*Turbine Room of the Power Plant**

This Mine Power Plant Produces Power Cheaply

Tests Show Cost to Be 0.43c. per Kilowatt-Hour Under Full-Load Conditions, 1.9c. on Idle Days—Many Automatic Mechanical and Electrical Features in the Plant—Stokers Feed Crushed Refuse With Washed Slack

BY C. L. MOORMAN

Chief Engineer, Consolidated Coal Co., St. Louis

A MINE-OPERATED power plant near Staunton, Ill., supplying power to three mines of the Consolidated Coal Co. of St. Louis has now been in operation for a little over a year and has convinced the company that a privately owned plant can produce power at low cost. Unusual economy in the production and distribution of electrical energy has been obtained, although the plant is not markedly conspicuous in size when compared with the large public-utility power houses of the country. Nevertheless, it produces power during 8-hour full-load periods at a cost of 0.43c. per kilowatt-hour, which is far below the cost at which power could be purchased. The average cost per kilowatt-hour for a 24-hour period is 0.74c. when the mines are operated at full time and 1.9c. on idle days, these figures being based merely on the direct operating charges.

This company owns and operates, among many others, three mines known as Nos. 7, 14 and 15, located approximately at the three points of an equilateral triangle about three miles on a side, the areas allotted to the various shafts being so large that they meet each other. These mines have a combined daily capacity of 13,000 tons. Each mine has a large coal-washing and screening plant in addition to the customary raw-coal screening facilities all of which require a considerable amount of power for their operation.

With the rapidly increasing use of electrical power

*Steam at 175 lb. pressure and 100 deg. superheat is delivered to these three turbo-generator sets from four water-tube boilers each rated at 600 hp. and fired by automatic stokers. The three generators have a capacity of 3,500 kw. and deliver 2,300-volt 60-cycle three-phase electrical energy which is stepped up to 13,000 volts for transmission.

to drive underground locomotives and coal-cutting machinery and the substitution of motors for steam drives in the operation of preparation machinery, shops, washeries, pumps, etc., it was found that the use of steam-engine driven direct-current generators at each mine was proving not only uneconomical but inadequate.

Early in 1921 work on the construction and equipment of the central power-generating station at Mine No. 15 was undertaken. This plant was designed to furnish necessary electrical power for operation of the three mines under normal conditions with ample power surplus available for any prospective increase in the number or size of motor-driven machines or other facilities.

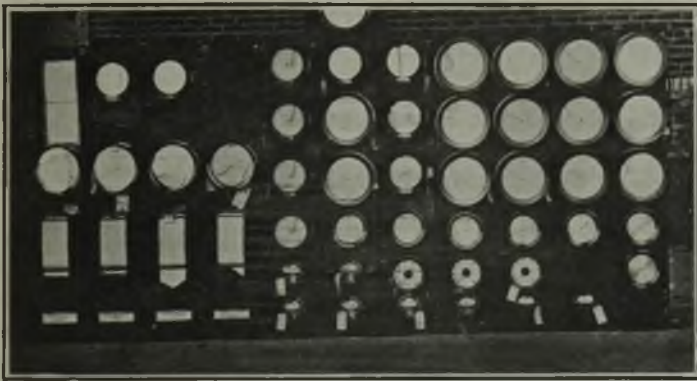
Appearance and utility were both considered in the design of the building, its equipment and appurtenances. A heavy structural steel framework rests on massive reinforced-concrete foundations. Pressed-brick walls enclose the steel supports and steel-framed windows and doors provide openings. The buildings are 89 ft. wide, 117 ft. long and 49 ft. from floor to roof, the basement under the whole being 15 ft. deep. A tapering white concrete chimney 11 ft. in diameter at the top, 240 ft. high, embellishes and adorns an exterior already pleasing.

Equipment comprises four water-tube boilers each of 600 normal rated horsepower fired by automatic stokers and furnishing steam at 175-lb. pressure and 100-deg. superheat to three turbo-generators which deliver 3,500 kw. of 2,300-volt 60-cycle three-phase electrical energy.

For transmission this energy is stepped up to 13,000 volts and again transformed back to 2,300 volts at the

distant mines. At this voltage it is used to drive motor-generator sets some of which are located above and some below ground. These convert the energy into direct current at 250 volts. To supply power to various above-ground motor drives, several transformer banks are employed which reduce the pressure of the alternating current to 440 volts. The ventilating fans at each of the mines are driven by 2,300-volt alternating-current motors capable of 50-per cent speed reduction.

A recently erected preparation plant at Mine No. 15 is furnished with picking tables where pieces of coal containing impurities are separated from the run-of-mine coal as it is spread out and conveyed into railroad cars for shipment. A portion of these separated lumps having bands of sulphur or slate or pieces of coal with slate or pyrites adhering to them are crushed and conveyed to the boiler room and utilized to make steam instead of being thrown out to waste piles as is the custom at many mines, thus effecting a material reduction in cost of power by use of a fuel which is so low grade as to be without market value. The stokers also



BOILER-ROOM INSTRUMENT BOARD

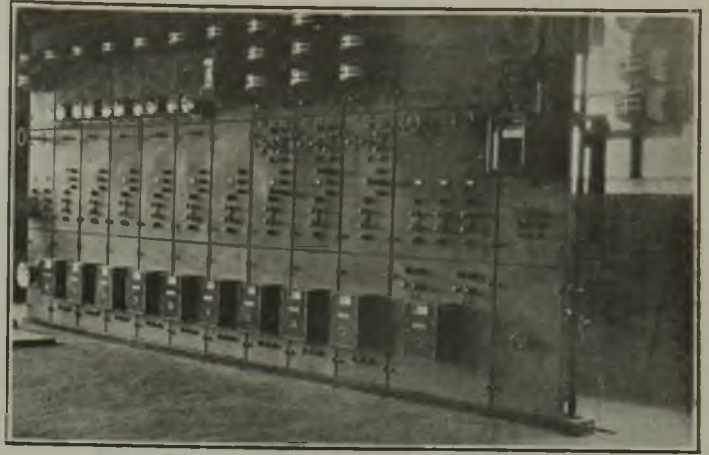
Here automatic weighing devices record the exact quantity of coal consumed by each boiler, the temperature fluctuations, the flue-gas composition, the pressures of steam, water, draft and vacuum; the steam and water flow and the chemical and mechanical changes in converting latent coal energy into power.

use at times of heavy load No. 5 washed slack and raw screenings together with the refuse.

The power plant is equipped with a complete outfit of measuring and recording instruments, regulatory and control devices. As the fuel passes from overhead coal bunkers into chutes leading to stokers it is automatically weighed and recorded so that the quantity of coal burned under each boiler is determinable at any time. In the turbine room is located a group of indicating and recording instruments, the antennas of which reach out to every part of the plant where the various changes taking place are shown and charted.

Instruments automatically chart pictures of diagrams of temperature fluctuations, flue-gas composition; steam, water, draft and vacuum pressures; also the quantities of steam and water flow, and make graphic records of chemical and mechanical changes that occur in converting coal into heat and electrical energy.

These records assist the engineer in controlling the temperatures of the feed water entering and leaving the heaters and of the cooling water entering and leaving the condensers. They aid him by recording the air temperatures inside and outside the plant, in standardizing the cooling of the air discharge at each generator, and in maintaining below fixed levels the temperature of the oil in bearings and of the exhaust steam leaving each turbine. He is enabled also to regulate the combustion temperatures of the furnace gases in the first and last stages of the boiler.

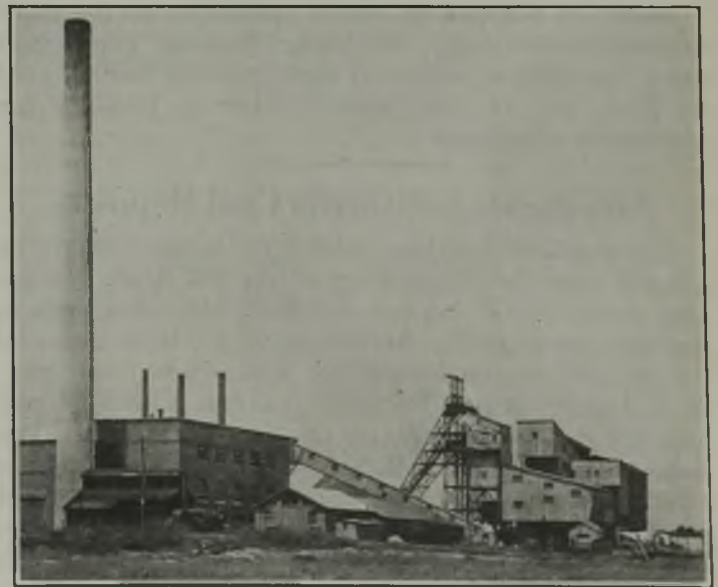


AUTOMATIC SWITCHBOARD WHICH CONTROLS DISTRIBUTION

From here the operator has control over the distribution of power to all the mines. Each feeder circuit starts from the plant from a full-automatic circuit-breaker switch.

Pressure-record charts show steam pressures in the main header and in two branches, pressure of feed water to boilers and of make-up water to heater, of water ejected by condenser pumps and air pumps, of vacuum obtained in each condenser, of draft in each boiler and in breeching. Quantity charts indicate how much steam is flowing from each boiler, how much is used by the hoisting engine and by the fan engine, how much water is passing to boilers from the heaters and the quantity of make-up water entering the cooling pond. Indicating meters and gages are installed throughout the plant, supplementing the recording instruments.

For control and distribution of electrical power an automatic switchboard is used at the main plant, others being placed at the substations at Mines Nos. 7 and 14. Switches, fuses, circuit breakers, relays and all the intricate and heavy apparatus for controlling the power output are set up in a walled-off corner of the basement of the plant. On the main floor are a series of light slate panels on which are mounted push buttons, switches and instruments which function to control and show the pressure and quantity of current being de-



NEW POWER PLANT SERVING THREE CONSOLIDATED COAL CO. MINES

It was built a year ago at Mine No. 15 in Macoupin County, Ill. The stokers handle practically all of the crushed refuse from the picking tables, burning also washed and raw slack, which is delivered into the boiler-room coal hoppers through the long conveyor shown in the picture.

livered by the generators and also the quantity sent out over the transmission lines.

By means of push buttons on an automatic switch-board the operator closes a circuit to magnetically operated switches in the basement which instantly put power on any desired feeder line. The installation of indicating and recording instruments for the electrical end of the plant also is very complete and in combination with those at the substations permits a correct determination to be made of the output of each generator and of the consumption of electrical energy at each and every point of delivery.

Water for boiler use is obtained from a reservoir about one mile distant, through a 4-in. pipe; a motor-driven centrifugal pump at this pond is started and stopped by throwing a switch at the power plant.

A daily record form is filled out by the operating engineers on which is shown the economy obtained for each twenty-four hour period, this being a résumé of various chart readings and the conclusions based thereon. On this form is recorded how much and what kind of fuel is used and how much water is converted into steam, giving the evaporation of water per pound of fuel; how much steam is used to drive generators and the weight of steam used for each kilowatt-hour of electrical power produced.

Tests show that power is being produced at this plant at an average cost of 0.43c. per kilowatt-hour during the 8-hour hoisting period with full-load conditions. The cost averages 0.74c. for a 24-hour period when the mine works full days and reaches a maximum of 1.9c. during idle days. These figures cover the wages paid to operatives, fuel cost at market price, upkeep, lubricants and all other direct operating charges, but not interest, depreciation, overhead or profit.

Wages of the operating force total about \$2,000 per month, maintenance and repair men's wages are about \$500; lubricants, repair parts, waste and all other material cost about \$1,500; an aggregate monthly cost of \$4,000 for wages and maintenance, averaging \$133.33 per day. Fuel is charged to the plant at an average price of \$1.50 per ton, and the quantity consumed varies from 75 tons on days when none of the mines is working to 131 tons when all three are operating.

About 40 per cent of steam production at the plant is used for hoisting, ventilating, heating, pumps and other auxiliaries connected directly with mining coal at Mine No. 15, the balance going to turbines for generation of current.

Investigate California Coal Deposits

Although coal has been known for a long time to be present upon the Middle Fork of the Eel River, Mendocino County, Calif., no serious efforts have been made to develop the deposit. According to C. McK. Laizure, a thorough investigation of the beds is now under way. A. L. Fisher, of San Francisco, has put a crew of men at work driving a slope on the dip of the bed. The slope is more than 500 ft. long and exposes a coal vein 12 ft. thick. The coal is of the sub-bituminous type and is comparatively low in ash and of excellent quality. Although not conclusively proved it is believed that the inclosing formations are Cretaceous. The Camp Carbon coal mine is at an elevation of 1,800 ft. and six miles from Dos Rios, the nearest railroad point. It is expected that the coal will find important application in the industrial development of California. The property is under option to the Carbon Co., of Oakland, Calif.

Coal Companies Lead in Tree Planting

DURING the spring of 1923, says the *New York Central Lines Magazine*, thirty-eight coal companies set out more forest trees than any other group of tree planters in Pennsylvania. The trees planted aggregated 1,137,175, which is sufficient to reforest 1,200 acres of idle land. As showing the great interest taken in this direction, it is only necessary to state that eight years ago the mining companies planted only 7,600 trees. Of the thirty-eight companies, the Clearfield Bituminous Coal Corporation led with 163,000 trees.

The forestry department of that company was organized in the spring of 1920. The corporation's coal holdings amount to 150,000 acres, of which 24,000 acres are owned in fee and available for reforestation. A survey of this surface proved that 2,000 acres were covered with virgin timber, 16,000 acres with natural reproduction, 4,000 acres barren, 1,000 acres semi-barren near mines, and 1,000 acres of farm land. With this acreage the following forests were established:

Name	Acreage	County
Peale	15,000	Centre and Clearfield....
Bigler	1,700	Clearfield
Patton	4,500	Cambria
		Gallitzin
		Gallitzin
Total	21,200	

The rest of the acreage is scattered in small tracts near the corporation's mines, notably at Sample Run and Barr Slope, Indiana County, Pa. To the north, east and south are extensive forest lands under state control.

A study of the soil and geographic location of the various tracts, indicated that the best results would obtain by planting white, Norway, Scotch and pitch pine; Norway spruce and European larch, and 431,000 seedlings supplied by the state have been set out since the spring of 1921. Unfortunately, however, the department is unable to furnish more than 50 per cent of annual requirement; and in order to make up the deficiency and to carry out properly the extensive plans contemplated it has become necessary for the corporation to establish its own nursery near the mining town of Clymer, Indiana County, Pa.

Planting seedlings on barren land and watersheds is but a small part of the work accomplished by the corporation's forestry department. In the Peale forest of 15,000 acres particular care is given to natural reproduction and underplanting. Fire lanes have been cut, old roads opened and a fire tower erected and connected with state towers by telephone. In the important work of protection against fire, the forester is receiving the hearty co-operation of the State Forestry Department and the Pennsylvania Fire Protective Associations.

The Peale forest is made up of 2,000 acres of virgin timber, the rest of the area consisting of forest growth in various stages of development. There is also in this forest a large quantity of sound dead timber, that fire killed many years ago. This virgin and dead timber forms the source of the present mill supply. When this is gone the second growth will be ready for the mill, and there is enough of it to supply the mines until the seedlings planted today reach maturity. In cutting the timber the selective method is employed, which is most essential where conservation is the main objective. In three years this forest has produced 3,032,751 board feet of lumber, of which 50 per cent was used for mining purposes and the rest for new construction and repair work. The corporation, with a confidence born of past achievement, may well look forward to the day when its timber supply will largely exceed the demand.

News Of the Industry

Miners Want Four Years' Contract on "Best Terms Obtainable"

Convention Gives Union Negotiators Much Freedom for Coming Wage Conferences—Lewis Beats Down Rebels—Klansmen Lose—Howat Thrown Out

BY E. W. DAVIDSON

The United Mine Workers are ready. In a two weeks' convention at Indianapolis, Ind., marked by much hullabaloo from a comparatively small radical wing, they built the platform on which they will stand when they meet the bituminous-coal operators in wage-scale sessions opening at Jacksonville, Fla., Feb. 11. The platform calls for a four-year contract under "the best agreement possible to obtain . . . on a basis of no reduction in wages," and gives the union's negotiators more latitude than they have ever had in recent history, requiring only that they submit to the rank and file on referendum whatever agreement they can win from the operators.

The tone of the convention was not militant. When President Lewis and Secretary Green declared the union is weakened and yearns for a period of peace, they were applauded. Therefore demands for more pay and attacks upon the administration's program for a four-year contract were set upon solidly. The union will fight if necessary, administration spokesmen said, but if it can retain for a term of years the present scale, which is "the best that ever prevailed in the industry," it will be happy to have peace and recuperate for whatever battle may be necessary later.

Committee Has Broad Powers

The scale committee's report, adopted without a change, creates a big policy committee with practically unhampered powers to give to the negotiators. Also, a pertinent clause permits outlying districts to make agreements with their operators before a basic scale is made in the Central Competitive Field, if the chance arises and the union policy committee thinks best.

The convention had the usual outbursts. A small radical element led by such men as John Hindmarsh and John Watt, both of the Springfield district of Illinois, campaigned against the administration on all occasions, great and trivial. But they lost miserably on such radical issues as recognition of Soviet Russia by the United States and alliance of the Mine Workers with one great labor party in this country.

They lost their battle for Myerscough and Howat and on everything strictly radical and were a menace to the Lewis forces only when they allied themselves with the members who think Lewis is too domineering.

On three points during the convention the administration was staggered. It barely saved itself in the battle which preserved the president's right to appoint organizers. The large element which tries biennially to change the constitution so as to permit election of organizers by districts won its point by a standing vote and lost by only 157 in the only roll call of the convention. It was a close shave for the administration.

The second staggering blow was dealt in the Ku Klux Klan battle. The administration tried rather halfheartedly to lift the union ban against Klansmen on the ground that the ban

is unenforceable. The anti-Klan forces, however, beat down the proposal. This issue was called "the most delicate of the convention."

The third was the fight to get more delegates into the convention from the big locals such as those in Illinois. The rebels led this fight and fell but 12 votes short of getting a roll call on it. They charged a miscount and yelled for 45 minutes or until the adjournment that day.

Convention Has "Atmosphere"

All the way through the two weeks of deliberation in old Tomlinson Hall the rebels continuously rebelled, President Lewis continuously defied them with such famous phrases as "You may meet in Hell before I'll change the rule," the 1,900 delegates all continuously strove to make at least one speech to be reported back home, and the heavy odors of fried onions and hot dogs from the hallways and of stale fruit from the great market downstairs continuously filled the place. For once the voices of speakers from the rostrum reached every corner of the hall, thanks to a "magnavox" installed by the telephone company, and it must be said that white mule was conspicuous for its absence. In every other particular the convention was conventional.

An effort to change the constitution

What the Miners Want

The report of the Scale Committee adopted by the miners convention unchanged, follows:

"(1) We recommend to the convention, in lieu of all resolutions relating to wages and working conditions that have been presented, that the properly accredited representatives of the organization be authorized and instructed to secure the best agreement obtainable from the operators in the Central Competitive Field on the basis of no reduction in wages and that any agreement so secured be submitted to a referendum vote of the membership for ratification.

"(2) We recommend that the next wage scale cover a period of four years, beginning April 1, 1924, and ending March 31, 1928.

Policy

"(1) For the purpose of meeting in a practical and constructive way all unforeseen emergencies which may arise a Policy Committee composed of the Scale Committee of

the Central Competitive Field, three representatives from each outlying district, the members of the International Executive Board and the International officers, be authorized to take such action for the protection of our best interests as circumstances may require and to advise the membership on unexpected developments which may arise and which cannot now be foreseen.

"(2) The committee recommends that the outlying districts be authorized to enter into wage-scale negotiations with their respective operators when the opportunity presents itself, it being understood, however, that no outlying district will conclude an agreement until after an agreement for the Central Competitive Field has been secured, or permission to do so has been granted by the policy committee.

"(3) The committee recommends that all contracts in the bituminous district run concurrently and expire on the same date."

to strip President Lewis of the power to arbitrarily remove district officers and appoint others was reported unfavorably by the constitutional committee and was beaten by vote.

An effort to get the constitution changed to make all agreements national instead of determined from a basic agreement made in the Central Competitive Field was killed.

The big fight to strip President Lewis of the power to appoint organizers started Tuesday forenoon. Some feel Lewis uses organizers to maintain "his machine." Secretary Bittner of the committee, defending a negative report on the matter, denied there are "hundreds" of such men on the payroll and that organizers work for the "machine." He said union-fighting operators would be pleased to see organizers elected by the rank and file.

Lewis made little attempt to defend himself, evidently thinking it better generalship merely to tell the convention he was willing to leave the matter to the delegates. It appeared to be a disappointment to the Lewis faction, however, when the debate was brought to an abrupt end by John Watt, of Springfield, Ill. Watt got recognition on the floor, and then, proceeding to the platform as if to make a speech, merely moved that debate cease. The motion was seconded by a roar from the rebels, and the committee's report went to a vote. The rebels won, 760 to 734, but the administration obtained a roll call by a standing vote of 689.

Lewis Has Close Call

The Lewis administration won the roll call, 2,263 to 2,106, or by a narrow margin of 157. The States of Indiana and Illinois, the Canadian delegation and scattering sections in Pennsylvania and elsewhere voted against Lewis. It was noticeable, however, that Frank Farrington, president of the Illinois miners, who until last year was a bitter opponent of Lewis, voted for the administration. Wednesday afternoon a delegate rose to protest the roll call, saying he could prove that illegal votes had been cast for the administration. President Lewis sternly declined to recognize him.

During Wednesday afternoon the administration defeated a long list of resolutions aimed to shear the headquarters officers of many powers. A resolution requiring merely a majority vote of the executive board to call a general strike was defeated. A two-thirds vote of the board is now required.

Almost a riot ensued when the committee reported against a resolution changing the basis of representation in the convention. The resolution would have changed back to the old plan of allowing a delegate in the convention for every 100 members of each local. The present arrangement, put through with a fight at the last convention of 1922, permits only one delegate for every 500 members in the big locals but one for each local smaller than that. This was aimed at such regions as recalcitrant Illinois, where many locals are big. The present plan has a decided effect on aye-and-no voting, because it reduces the number of delegates, but of course it has no effect on roll calls, for one vote always is cast

Main Acts of Convention In Its Final Week

Adopted scale committee's report unchanged, calling for four-year agreement with operators on best terms obtainable.

Refused to remove constitutional membership bar against Klansmen.

Preserved president's power to appoint organizers after bitter fight. Administration won, 2,263 to 2,106, in only roll call of the convention.

Defeated many other resolutions to shear Lewis of power.

Refused to reinstate Howat and Myerscough.

Rebels failed by only 12 votes to get roll call on resolution permitting more delegates from big locals such as those in Illinois. Near riot followed.

Elected Van A. Bittner and Thomas Kennedy delegates to International Mining Congress in Prague next June.

Chose Indianapolis over St. Louis for 1926 convention.

for every 100 members in each local, no matter what the size of the convention.

The standing vote on this question supported the administration, 785 to 692. Of course a howl arose. On a motion for a roll call the count was 558. Since this lacked but 12 of enough to get a roll call, the convention fell into a roar of protest against the tellers' count in spite of President Lewis' best efforts. Alex Piazza, of District 5, was knocked down by somebody unknown.

Rebels Howl for an Hour

Every time Lewis recognized chairman Van Bittner, of the constitution committee, so that the committee report could proceed, the rebels howled. For nearly an hour this thing kept up. Then Lewis got silence just long enough to declare: "You may shout until you meet each other in hell and you won't change the rule of this convention!"

Although the dangerous resolution to permit Ku Klux Klan members to be United Mine Workers was just ahead and might easily have been railroaded through during the hubbub, this was not done. A few innocuous sections of the committee's report were adopted amid the noise and at 5 o'clock the gavel closed the day's doings. There followed much rebel talk in the halls about a demand for the election of tellers from the house instead of continuing with the Lewis appointees.

Thursday morning Secretary of Labor James J. Davis made the address reported in another column, advocating a settlement running for a term of years, urging the miners' union to maintain a research bureau to gather statistics on coal from the labor standpoint, favoring selective immigration to protect miners and other American labor from a flood of cheap foreign workers, and answering hotly the jeers of the rebel element in the convention who booed him when he began.

In the afternoon the main business of the convention—the scale report—came up, with the resulting acceptance of the most important section, which empowers the miners' scale committee to get "the best agreement obtainable" from the operators, instead of filling up the platform with demands for more pay and shorter hours.

Frank Farrington, chairman of the committee, prefaced his reading of the report by saying he knew it would not appeal to those of "extreme and impossible views" but that it was the best thing that could be adopted for the benefit of the whole union organization in all its ramifications.

The report, giving the miners' representatives free power to obtain the best agreement possible, recommending a four-year contract running concurrently in all districts, creating a miners' policy committee and authorizing outlying districts to start negotiations "when opportunity presents itself" and make agreements either after the Central Field agreement has been made or before with the permission of the policy committee, was greeted at once by the attack of the six-hour-day and five-day-week element.

Illinois Leads Attack

About all of the attack came from Illinois, Farrington's own district, which is now largely out of his control. Delegate Hindmarsh made a long speech for shorter hours, declaring the miners' union is moving backward instead of forward by not demanding the six-hour day and five-day week. He had a great deal to say about the 7-hour day in England. William Roy, of Ohio, asked him if American miners would like to have a 7-hour day under the low wages and hard conditions of the Britons. William Mitch, of Indiana, said the British miners have lost heavily in the past four years and that wages in some of the 13 districts of England are lower than the cost of living.

"The boys back home in this country," said Mitch, "would rather strike to prevent a reduction in wages, if a strike were forced upon them, than to strike for a shorter working day." A section of the convention yelled "No!"

The broken condition of the British miners was pictured by Vice-President Philip Murray, who said they had taken three reductions and got only one small increase, along with their 7-hour day, in the past four years. He quoted Frank Hodges, secretary of the British miners, to the effect that the Britons should at once adopt the militant policy of the American miners.

"Four years of peace will enable the United Mine Workers, as the only constructive force in the coal industry, to put forth a program that will save its membership," said Murray after he had spoken of the "chaotic and diseased" condition of the industry because of overdevelopment and over-manning.

"If we struck, what would be the cost? Every strike has brought thousands of men into the industry and it would do it this time. In 1922, when the men of the coke field struck with the rest of the country, they mostly went *elsewhere* to work and new thou-

sands are now in there taking their places."

He said the 6-hour day proposal would only be trading ground at best, for non-unionism is a menace that makes the short day an utter impossibility.

Frank Farrington, once a power behind the move for the 6-hour day but now lined up with Lewis against it, admitted it would be suicidal to unionism. He granted that about eight years ago he was one of the pioneers for it and sent out a circular to his members favoring it. But it is pure theory nowadays, he argued, and is fit only to be used "for grandstanding."

"West Virginia," he said, "is now able to produce 100,000,000 tons of coal, or one-fifth of the whole normal need of the country. There are enough non-union men in the land to produce all of the coal the country needs. The situation down in that West Virginia region is so severe that you have heard a man from there say he doubted if any agreement could be made with operators that did not cut wages."

Then Farrington touched upon the weakness of the union. When the 1922 strike started, he said, Districts 29 and 17, both in West Virginia, were 100 per cent strong. Now, he doubts if there is a single due-paying member of 29 left, and 17 has lost about 14,000 men. In such a field the 6-hour day would make it impossible for the union regions to sell any coal at all in competition with the non-union mines.

"There are other things to be said against the 6-hour day," finished Farrington, "but it is not advisable to say them because they would only become arguments in the mouths of the common enemy, the operators."

Lee Hall, president of the Ohio district, whose bailiwick voted in its state convention for shorter hours and 25 per cent more pay, declared he favored a shorter day, but there are times when such a demand cannot be made. Other benefits for the union miners in various districts are more to be desired.

Union Weary of Strikes

"We're weary now, after having suffered from the five months' strike of 1922," said International Secretary William Green. "Let us fight only when we want to. We don't want to now, even though there are a lot of non-union operators who would like to have us do it. Let us have a spell of peace. When the time comes and the necessity confronts us, then we can do our fighting."

A West Virginia delegate declared he thought there certainly would have to be a fight if a reasonable agreement were to be made for West Virginia. He feared a reduction in wages. President Lewis answered that the scale for West Virginia would be the scale for the whole Central Field. The union spent a million dollars protecting its frontier there in 1922 and would continue to protect it.

The defenders of the 6-hour day from Illinois pointed to the advancement of machinery in mining, which is helping the "big fellow" among the mines to swallow up the little mining businesses, thus throwing more men out of jobs. It was argued that the shorter work-

John Lewis' Keynote

Looking forward to April 1, President Lewis said this to the miners' convention: "In every moral and economic way the country and the mine workers would profit by a settlement for a term of years at a wage scale which, at the very worst, would be the best that ever prevailed in this industry. I know my people will fight if necessity arises, but I would be a false leader indeed to lead them into battle unnecessarily. I know that the mass of my people desire peace. Securing a four-year contract would be one of the greatest accomplishments in the history of this organization."

day is the only defence against this movement that can be raised so long as mines remain in private ownership.

A number of questions were asked. Ohio delegates were assured they could, under the proposed plan of settlement, go home after the basic scale was fixed, and make the best deals they can with their district operators to get a scale for the removal of roof slate, which now has to be loaded out free.

"In case there is a strike," asked another, "will there be a referendum to the members before any settlement is signed?" Farrington said that would lie with the policy committee. This was hooted by the rebels.

Finally the case had been set up so strongly by the administration that the first section of the report was adopted readily by a show of hands and the convention adjourned for the day, leaving the balance of the report to be acted upon later.

On Friday morning the balance of the scale committee's report was adopted without change and without a roll call. However, it gave another opportunity for vocal attack by the rebel element mainly on the ground that four years is so long a period that too many things may happen in that time.

"We could get away with anything during the war in Illinois without getting docked; now we can't get away with anything," complained Thomas Parry, of Divernon, Ill., opposing the four-year plan because it would perpetrate "obnoxious" conditions now in

Illinois Operators Against 4-Year Plan

No important operator in Illinois favors the four-year agreement which the miners are asking. They regard the four-year plank as union trading ground. A considerable number, however, talk favorably of a two-year continuance of present wages, though there are more who are willing to grant only one year. A considerable group demand a wage cut. The Illinois delegation goes to Jacksonville uninstructed and will take its position after it has "talked with our Eastern neighbors."

effect in that state. "Why, we can't even load out a piece of impurity the size of my fist," he declared. Vice-President Harry Fishwick, of the Illinois district, tried to get the Parry remarks expunged from the record as not representing the opinion of the organization.

Martin Flyzik, of Washington, defending the report, pointed out that the outlying districts have lost ground in point of wages and need four years to recover. The whole union needs exactly the same thing. After the four years, then it should be ready to fight again. He has seen wages forced down in the outlying fields such as his own where a reduction to \$6.25 was accepted last spring after a long and unsuccessful strike, and he wanted protection for four years against any further reductions.

A peace speech by President Lewis wound up the debate. He pointed out that it took eight months of effort, beginning in December, 1921, to get the settlement that finally ended the 1922 strike in August, 1922, and that after another long effort, a settlement was made to continue the agreement until April, 1924; but in neither case were the miners able to get a long-term agreement. The industry knew not what was going to happen after a period of but a few months and therefore there could be no stability.

Lewis Makes Peace Speech

"It is obvious," said Lewis, "that in every moral and economic way the country and the mine workers would profit now by a settlement for a term of years at a wage scale which at the very worst would be the best that ever prevailed in this industry. I know my people will fight if the necessity arises, but I would be a false leader indeed to lead them into battle unnecessarily. We suffered some inconvenience in the strike of 1922 and many a man has not yet got out of the debt incurred then. I know that the mass of our people desire peace. Securing a four-year contract to begin April 1, 1924, would be one of the greatest accomplishments in the history of this organization.

"Someone gets up here and fears that another war might occur during the period of a four-year agreement and that the contract would not permit the loading out of impurities then. God forbid such reasoning will prevail in the consideration of matters of such consequence as this. In 1917, although we had a contract, your representatives in a logical presentation of the case to the operators, were able to open that contract to meet the conditions prevailing. In another war the coal industry would meet the situation in just as intelligent a way.

"Arguments for a four-year contract at no reduction in wages are such that it is not advisable to voice them here when my words are to be carried far and wide. Those reasons ought to be obvious to all well-informed United Mine Workers. When 29 district presidents unanimously favor this report it should be accepted."

An anthracite delegate asked whether the next anthracite agreement would be made to run concurrently with the

bituminous agreement. Lewis replied that since the situations regarding the two kinds of coal are so different—less than 16 per cent of soft coal going into domestic use while more than 60 per cent of hard coal does—the officers are unable now to make a ruling on the question. The decision would be determined by conditions as they arise. Someone wanted to bar anthracite delegates from any forthcoming referendum vote on a bituminous scale. This was squelched. Then the scale committee report went through.

A victory for the anti-Klan men ended a two-hour battle to change the constitution so as to remove the clause barring proven Klansmen from the United Mine Workers. This, according to Secretary Van Bittner, of the constitution committee, and other speakers, was "the most delicate question before the convention." In all the bitter debate that followed, not one speaker frankly defended the Ku Klux Klan though there were many shouts and much muttering from all parts of the floor.

The convention elected Thomas Kennedy, of Pennsylvania, and Walter Nesbit, of Illinois, delegates of the United Mine Workers to the International Mining Congress in Prague next June. No other candidates ran close to these, although John Hindmarsh, Frank Ledvinska, Fred Mooney and Andrew McGarry were runners up.

Alexander Howat Squelched

A decisive blow at radical strength in the union was delivered by the administration on Saturday, Feb. 2, when the convention wound up in a blaze of excitement. The drives to get Alexander Howat, of Kansas, and Thomas Myerscough, of Nova Scotia, back into the union crumpled against the stone battlements of Lewis' strength. The appeals and grievances committee, after agreeing earlier in the convention to reconsider the cases of the two rebel leaders, ousted for defiance to headquarters, finally reported against them Saturday morning. President Lewis refused Myerscough permission to speak. Then the convention upheld the committee by a show of hands.

Howat, determined not to be sat upon so firmly, waded up an aisle toward the platform, demanding a chance to talk. Amid wild disorder, sergeants-at-arms grabbed the man and dragged him out of the hall. The roar of the rebels was threatening, but Lewis warned the convention that "any attempt to rush the stage or to force the chairman to do otherwise than refuse Howat a voice under the law of the organization, would fail." This warning, backed up by the massing of loyal Lewis men, stopped an abortive rush and left the convention in loud confusion which lasted until Lewis whacked the gavel block, ending the 29th consecutive and sixth biennial convention of the United Mine Workers.

Howat, who is not even a Mine Worker and of course not a delegate, then went outside and held a rump convention. There he made his speech.

The 1926 convention of the union will be held in Indianapolis, as the last two have been. St. Louis was voted down.

Secretary Davis Faces Down Miner Rebels

Urges Long-Term Contract Without Wage Cuts—Wants Miners to Have Research Bureau and Joint Interpreters of Contracts

Facing the boeing of a small radical element in the miners' union convention at Indianapolis, Jan. 30, James J. Davis, Secretary of Labor, went out from Washington advocating several things. He urged the union to create a bureau of research to gather data on coal from the labor standpoint, to secure for the industry joint interpreters of contract in each region; he declared for a long-term wage contract without wage reduction to give the coal industry a chance to "recover"; he argued for the passage of a new check on immigration before next July 1, when the 3-per cent immigration law goes off the

Secretary Davis' speech, in which he waved one of the radical handbills and declared he was always ready to face any issue so long as the opposition would listen to facts.

After his speech of one hour and twenty minutes, Lee Hall, district president from Ohio, proposed a resolution condemning the anti-Davis handbill as "a slanderous, untrue, un-American, dirty sheet," promulgated by men "without honor or principle and too cowardly to sign their own names." The resolution passed with four rising to vote against it.

Secretary Davis, in advocating a new immigration law to stop a flood of aliens ready to burst upon this country July 1, when the present law expires, said it is possible for more than a million a year to come and that they would create chaos here, working for little and displacing American labor. Had it not been for the 3-per cent immigration law now about to run out, he declared, between three and five million more men than are now out of employment would be jobless, with consequent disorder all over this land.

"Do you need more miners," he asked, "when you've already got 244,000 more than the industry can give five and a half day's work to?"

"No!" shouted back the convention.

He revealed that even under the 3-per cent law, foreign labor is stealthily sneaking into the United States in large numbers. "Bootlegging" of foreigners goes on all the time, netting the "bootleggers" from \$250 to \$2,500 a head for every alien brought in against the law. Asiatics come in through Canada and Mexico, he said, and about 30,000 a year get here by violating the seaman's act. Mexicans, he said, are brought in by trainloads, especially during periods of strike or impending strike, as in the case of Colorado and Utah coal mines.

He denied the accusation in the rebel handbill that he favored the Rosenbloom and Kelly bills now before Congress, saying he has a better one himself, and denied also that his plan for alien enrollment in this country would result in deportation of every alien who might strike. He defended the enrollment plan, saying it would enable this country to reach all its aliens to instruct them in their rights and duties as Americans and would be a thing of value to them rather than a detriment. We enroll all Americans for voting and enroll all Americans for schooling, so why should Americans protest against enrollment of aliens within our borders?

He denied the charge that he favors cutting of wages, saying if wages were reduced \$1 a day for the 41,000,000 gainfully employed workers in this country, the reduction of \$41,000,000 a day in the nation's buying power would be disastrous to industry.

Secretary Davis declared for government rehabilitation of injured workmen to reduce pauperism and de-



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James J. Davis

Some of the mine workers' delegates did not want to hear the Secretary of Labor and tried to hoot him down, but wiser counsel ultimately prevailed.

statute books, and favored not only selective immigration from transoceanic and adjoining nations but also enrollment in this country of all aliens.

Secretary Davis was greeted in Indianapolis by a convention full of posters and fliers denouncing him as an enemy of labor and one who would like to see miners' wages reduced: The rebel plan in the meeting evidently was to hoot him down. Realizing this, President Lewis in the chair, declaring Secretary Davis to have been "always square to the United Mine Workers of America," asked for Mr. Davis "that privilege which you would grant any honorable man." This merely drew a chorus of "Boos!"

"The honor of your organization is at stake," roared Lewis. "You are standing before the entire nation and this organization is going to be judged by the acts of this convention. If there are any men here so devoid of the natural instincts of a gentleman that they cannot accord the courtesies due the Secretary of Labor, let them leave the hall at once." Of course nobody left. Instead they merely "moo'ed" occasionally during the beginning of

pendency in this country. An average of \$400 will add an average of 20 years of independent useful life to such men, he said. "Isn't that a better way to get labor than to import it?" he queried. Two mine explosions killing nearly 100 men within a week reminded him of the necessity also of more effort to make the coal mines of this country safe.

Advocating research bureaus among labor unions he said:

"Your organization has now reached the stage where you should create your own permanent research bureaus, which would furnish your own and joint conference assemblies with specific and reliable details of the local variations in your cost of living as compared with the city centers furnished by the Department of Labor—also the coal markets, their sources of supply, the way and wherefore of the variations in freight rates, costs of production, selling prices both wholesale and retail, profits and evidences of profiteering, if any, and by whom.

"Such research work covering a period of coal shortage would quickly expose the spot-coal gamblers, who are the worst menace of the industry and therefore its worst enemies because their piratic activities besmirch the reputation of the industry and create the unwarranted impression that the coal business is a 'hold-up' game of conspiracy between employers and employees.

Would Eliminate Spot Gamblers

"Continued harmony in the industry for, say, 5 years would eliminate for the time being all the spot or short coal gamblers and pave the way for the solution of most of your troubles.

"I congratulate you on the way you resolved last Saturday to handle another disturbing factor in the coal industry and which can be remedied only by the co-operation of your officials and members. It is that of the sporadic local strike. Scores of these petty affairs occur every year, and as a direct result public confidence is shaken in the integrity of joint contracts.

"Now I know from personal experience in dozens of cases that come to the Conciliation Service of the Department of Labor that your leaders generally disapprove and do all they can to prevent these illegal petty strikes in violation of your agreement; yet some of the rank and file in too many instances proceed without the sanction of their district and national officials.

"Of course I understand that these petty strikes are intended as protests and to convey the idea of lack of local confidence that they are getting a square deal; but they should understand that neither the interpretation of the contract nor the decision of any local dispute rests with the local union, and the failure of so many local unions to appreciate this, by taking matters into their own hands, brings down upon the whole organization official and public censure.

"Now it strikes us that there is a simple way to correct this evil by the appointment of a joint interpreter of the agreement in each mining district and sub-district, this interpreter to have the sole power to interpret the application of the terms of the agreement



Edgar W. Tait

President, Allegheny River Mining Co., recently elected member of Board of Directors, Central Pennsylvania Coal Producers' Association and of the Executive Committee of the Association of Bituminous Coal Operators of Central Pennsylvania.

to any local dispute—in other words, have the final decision when all the other machinery for adjustment has failed. Understand that this interpreter does not make nor change any part or verbiage of any joint agreement; he merely decides what it means in relation to any dispute, and the virtue of his services lies in its promptness which begets the confidence of all employed.

"The idea of such an interpreter was developed during the war period, and has been continued partly in the copper and oil industries of the Rocky Mountain and Pacific Coast States, with the result that not a single shift has been lost in either industry for six years over any local dispute once the agreement has been made, and I am glad to note that District 17, in West Virginia, is working under the same idea with similar flattering results. Why not expand the idea and clean out the cobwebs of petty strikes that put your organization in such bad light in the minds of so many people?

"The way to hold the confidence of the American people is to keep your contract. Yes, make it the most sacred instrument of your organization.

"Let me again emphasize the fact that the chief needs of the coal industry are: (1) Peace for a term of years, and you will (2) eliminate the spot coal gambler; (3) create your own permanent Research Bureau; (4) appoint interpreters of your local agreements, and (5) you will remove the cause for any petty local strike.

"Thus demonstrating to the country at large that the problems of the coal industry can best be solved jointly by your employers and yourselves."

At the wind-up of his reply to the radical attack on him in the convention by men "more loyal to other flags than to that of this nation" Secretary Davis called Lewis the "greatest president the United Mine Workers ever had" and shook hands with him on the stage. Then the Hall resolution condemning the handbill passed with a whoop.

Two Big Strip Pits Developed In Ohio and Montana

What is considered the biggest slack coal deal in the history of the State of Ohio, involving between 1,100,000 and 1,500,000 tons and approximately \$2,250,000, was closed Jan. 17 with the signing of a contract by the Blanchard Zanesville Mining Co. and the Ohio Power Co. The coal is to be shipped from the Big Muskingum stripping mine of the coal company at Ellis, Ohio, six miles north of Zanesville, to the new plant of the power company at Philo, Ohio, ten miles south of Zanesville.

The contract covers a period of ten years, and the coal is to be shipped at the rate of 300 to 450 tons daily. Extensive improvements at the Big Muskingum mine have been begun in preparation for handling the big output which the shipment of 300 tons of slack daily will entail. Improved types of tippie equipment, including a long picking table and cleaning plant and shaker screens, are to be installed.

This mine came into production in August, 1923, the present maximum output being 1,000 tons daily. New producing units will be installed as soon as practicable and this production will be doubled and eventually tripled. As shipments to Philo may be made by rail or water the loading plant will include a four-track railroad tippie and river tippie. Owing to the great saving in freight it is intended to ship practically all of this coal by river.

The Northern Pacific R.R. has a 600-acre tract of sub-bituminous coal, which is an extension of the Sheridan-Wyoming field located 35 miles south of Forsythe, Mont. This company is in a position to open up seven other similar tracts if it so desires. The coal is 30 ft. thick and will yield from the tract mentioned as much as 26,000,000 tons, the mining of which will require the removing of only 45,000,000 tons of cover. It proposes to strip at the rate of 1,000,000 tons of coal per year for railroad fuel.

Brydon Asks to Be Heard on Stream-Pollution Bills

When the Rivers and Harbors Committee of the House of Representatives met Jan. 30 to consider bills relating to pollution of coastal and navigable waters and inland streams by oil and acidulous materials, Harry L. Gandy, executive secretary of the National Coal Association, appeared as the representative of John C. Brydon, president of the association, and presented a statement by Mr. Brydon on the bills. Six bills were before the committee, two of which, the Bland bill and the Rosenbloom bill, have a direct bearing on the bituminous coal industry.

Mr. Brydon's statement, after reciting at considerable length the effect on the coal industry of the enactment of these measures, asked that the industry, through the National Coal Association, be given an opportunity to be heard through witnesses and briefs in the event that serious consideration be given the Bland and Rosenbloom bills.

Drop Gouge Charge Against Madeira-Hill Co.

The Federal Trade Commission has dismissed the case against the Madeira-Hill Co. involving charges of conspiracy to increase the prices of certain sizes of anthracite through pyramiding, according to an announcement by the commission Feb. 2.

The commission said no evidence was adduced showing the Madeira-Hill corporation had an agreement with wholesale customers to sell anthracite at stated prices. The wholesalers mentioned by the commission included Pattison & Browns, Inc., the Titan Fuel Corporation, Hartwell-Lester, Inc., C. P. Brodhead and Lynn M. Ranger.

The original action was instituted on request of the President to consider findings of fact of the U. S. Coal Commission, together with assertions by Governor Pinchot of Pennsylvania, that the passing of anthracite through numerous hands before it reached the consumer was a device by which the price was unduly raised.

The commission immediately went over the whole situation with the Coal Commission, and then instituted its own investigation, using statistics gathered by the Coal Commission in arriving at its final decision.

"For the purpose of expediting the disposition of this complaint," a formal statement by the Trade Commission said, "the commission adopted the hitherto unusual procedure of itself hearing, under oath, the testimony of the witnesses adduced by the commission's attorneys in support of the complaint and of the respondents' denial.

"It very quickly appeared that the general statements made in the report of the United States Coal Commission were not applicable to Madeira-Hill & Co., and that the charge in the complaint that Madeira-Hill (the respondent operator) has assured the Pennsylvania Fair Practices Committee that it would sell the grades of coal in question at \$10.50 per ton, f.o.b. mine, and had in fact sold such coal at a higher price, was not substantiated by proof.

"The chairman of the Fair Practices Committee was called and denied absolutely that there had been any agreement between Madeira-Hill and his committee as to the price at which the company was to sell his coal. He stated unequivocally that Madeira-Hill had appeared before his committee, produced their costs of production and requested that the sum of \$11.50 per ton be fixed at which they should sell the sizes of anthracite referred to; that his committee fixed \$10.50 and that Madeira-Hill did not, at any time, agree with or assure his committee that it would sell said coal at the price so fixed.

"Of course, any declarations which might be made by Madeira-Hill, as to the existence of an agreement or arrangement with the wholesaler respondents, could be binding only as to the party making the statement.

"Not only were there no corroborative statements from the wholesalers, with the possible exception of Ranger, but their denial of such arrangement was complete and explicit. In

oral testimony, Ranger himself strenuously denied the existence of such an arrangement and insisted that the arrangement in accordance with which he says in one of his letters he paid an additional \$2.50 per ton to Madeira-Hill, was the arrangement created by the original order and accepted and did not refer to any agreement for a division of profit."

Saunders Named President of United Engineering Society

William L. Saunders, chairman of the Naval Consulting Board and deputy chairman of the Federal Reserve Bank of New York, has, it is announced, been elected president of the United Engineering Society, succeeding J. Vipond Davies. Mr. Saunders is chairman of the Board of the Ingersoll-Rand Co. and a director of other large corporations.

He was twice mayor of Plainfield, N. J., and is a past president of the American Institute of Mining and Metallurgical Engineers, New York Chamber of Commerce, and Manufacturers Export Association. He also is a member of the American Society of Civil Engineers, American Society of Mechanical Engineers and the Iron and Steel Institute.

The report of the retiring president showed that the total membership of the four founder societies which compose the United Engineering Society and which embrace the civil, mining, mechanical, and electrical engineering groups is 54,224. Membership of the associate societies aggregates 25,615.

George H. Pegram, chief engineer of the Interborough Rapid Transit Co., was chosen first vice-president, and J. V. W. Reynders, vice-president of the American Institute of Mining and Metallurgical Engineers, was named second vice-president. Other officers elected are: Alfred D. Flinn, secretary; Joseph Struthers, treasurer; Henry A. Lardner, assistant treasurer.

Byproduct Coke Output in 1923 Made New Record

A new record in the output of byproduct coke was established in 1923, according to the U. S. Geological Survey, which reports that the total production of all coke during the year has been exceeded but twice in the history of the country. The 2,999,000 tons reported by producers for December brought the year's output of byproduct coke up to 37,527,000 net tons. This was an increase of 6,693,000 tons over the 1920 output, hitherto the maximum. The combined production of beehive and byproduct coke was about 55,487,000 tons, an amount almost equal to that of 1917 and only 1.8 per cent less than the record set in the war year 1918.

Production from byproduct ovens passed the production of beehive ovens in November, 1918, and since that date byproduct coke has been continuously in the lead. In 1923, 67.6 per cent of the total was contributed by byproduct ovens and 32.4 per cent by beehive ovens.

OUTPUT OF BEEHIVE AND BYPRODUCT COKE IN THE UNITED STATES

Year	Net Tons Produced		Per cent of Total Output		
	Beehive	By-product	Beehive	By-product	
1913	33,584,830	12,714,700	46,299,530	72.5	27.5
1915	27,508,255	14,072,895	41,581,150	66.2	33.8
1917	33,167,548	22,439,280	55,606,828	59.6	40.4
1918	30,480,792	25,997,580	56,478,372	54.0	46.0
1919	19,042,936	25,137,621	44,180,557	43.1	56.9
1920	20,511,092	30,833,951	51,345,043	40.0	60.0
1921	5,538,462	19,749,580	25,287,622	21.9	78.1
1922	8,573,467	28,550,545	37,124,012	23.1	76.9
1923	17,960,000	37,527,000	55,487,000	32.4	67.6

The recovery in coke production was associated with great activity in the iron industry and with a shortage of household fuel.

In comparison with 1922, both branches of the industry reported a great increase in output. For byproduct coke the increase amounted to 8,976,000 tons, or 31 per cent. Production of beehive coke showed a still larger increase because the strike in the Connellsville region had artificially restricted operations the year before.

PRODUCTION OF BYPRODUCT COKE, BY STATES, IN 1922 AND 1923

State	(In thousands of net tons)		Increase (+) or Decrease (-)	
	1922(a)	1923(b)	1923	
			Tons	Per Cent
Alabama	3,493	4,335	+842	+24
Colorado	365	448	+83	+23
Illinois	1,983	3,162	+1,179	+60
Indiana	3,995	4,970	+975	+24
Kentucky	457	435	-22	-5
Maryland	590	864	+274	+46
Massachusetts	407	604	+197	+48
Michigan	1,142	1,650	+508	+45
Minnesota	462	693	+230	+50
New Jersey	791	893	+102	+13
New York	1,495	1,782	+287	+19
Ohio	4,912	6,247	+1,335	+27
Pennsylvania	7,152	9,312	+2,161	+30
Tennessee	27	124	+97	+369
Washington	6	31	+25	+417
West Virginia	502	924	+422	+84
Missouri, Rhode Island and Wisconsin	772	1,053	+281	+36
Total	28,551	37,527	+8,976	+31

(a) Final figures. (b) From monthly reports furnished by operators.

PRODUCTION OF BEEHIVE COKE, BY GROUPS OF STATES, IN 1922 AND 1923

	(In thousands of Net Tons)		Increase 1923	
	1922a	1923b	Tons	Per Cent
Pennsylvania & Ohio	6,939	14,484	7,545	109
West Virginia	418	1,037	619	148
Ala., Ky., Tenn., & Ga.	432	1,079	647	150
Virginia	379	721	342	90
Colorado & New Mexico	207	371	164	79
Washington & Utah	198	268	70	35
Total	8,573	17,960	9,387	109

(a) Final figures. (b) Estimated from railroad shipments.

The only new plant to start operation in 1923 was that of the Weirton Steel Co. with 37 ovens, which began producing in July. On Jan. 1, 1924, there were approximately 709 ovens under construction, of which 541 were additions to existing plants and 168 were at 7 small new plants.

At 100 per cent operation with all ovens active and all conditions favorable, the plants in existence at the end of 1923 could produce 44,092,000 tons of coke a year. When the ovens under construction are in operation this total will be increased to 48,350,000 tons of coke. The plants now built have a coal-carbonizing capacity at 100 per cent operation of 63,000,000 tons, and this will be increased by the ovens under construction to 69,000,000 tons.

Regulationists Gain Strength from Teapot Dome Developments

Deals Blow to Administration Effectiveness Obtained by Giving Broad Power to Single Officials—Position of Trade Commission Stronger—Pinchot Gains Prestige

BY PAUL WOOTON

Washington Correspondent of *Coal Age*

Teapot Dome developments put great strength behind the regulationists. The present administration has placed great emphasis upon less government in business. The development of that policy has meant the placing in private hands of many undertakings which might have been handled as a part of the government's work. It now is certain that no further leases will be made of naval reserves. If it becomes necessary for the government to draw upon them, the federal government will have to go into the oil production business.

One of the indirect effects of the explosion which has blown the lid from the teapot is that it paves the way for the hoisting of regulation on coal and other basic commodities. The part played by the oil magnates not only brings into disrepute all big business but also all of the industries where large aggregates of capital are required for their development. The argument now will be brought forward that the federal government cannot co-operate closely with big business on the ground that the friendly contacts which such a policy engenders means that these interests are favored unduly. It is certain to affect to a great degree all of the leasing being done under the recently enacted General Leasing Act.

The sensational developments in connection with the Sinclair and Doheny leases is a blow to the increased effectiveness of administration which has been obtained of late by giving broad powers to single officials. The trend again will be toward the creation of boards and commissions, where the division of responsibility among several persons is a guarantee against the corruption of a single official.

There is no question that the Teapot Dome matter has strengthened the position of the Federal Trade Commission and is reacting unfavorably on the policies of Secretary Hoover in placing great faith in the integrity of the men conducting our industries.

The developments constitute a great victory for the ultra-conservationists. It has increased Governor Pinchot's

prestige and has placed new pressure behind his coal bill. The interjection of long debates on Teapot Dome will divert attention from coal legislation in the immediate future. The attention of Congress now is centered on the personal ethics of high administrative officers. The tendency still is to dwell on satchels of currency, cancelled checks and the more spectacular features of the incident. It is not going to be long, however, before attempts will be directed at things more fundamental and with them will come, it is believed generally, a wave of regulation which will be applied first to underground resources.

Pittsburgh Coal Co. Takes Over Reiss Interests

Public announcement is made of the affiliation of the Milwaukee-Western Fuel Co., the C. Reiss Coal Co., of Sheboygan, Wis., and the Pittsburgh Coal Co., which really was brought about several months ago when the Pittsburgh Coal Co. bought the interest of the late Edward A. Uhrig in the first-named company. The combine, which practically controls the Lake Michigan trade, shipped 7,000,000 tons by lake last season. V. H. Palmer, of Cleveland, Ohio, will direct all future lake shipments. The three companies will be continued as separate organizations.

Retailers Urge Coal Institute

Efforts are being made by officers of the National Retail Coal Merchants Association to obtain the co-operation of other organizations concerned with the coal industry in early consideration of the proposal for organization of an institute embracing all phases of the industry to handle common problems.

The retail dealers and the anthracite operators have committees on this subject awaiting action by the wholesale dealers and by the bituminous operators.

It is hoped by the retailer's organization to have committees representing all branches of the industry functioning by the time of the next annual convention of the Retail Coal Merchants Association, which will be held in Bluefield, W. Va., June 4, 5 and 6, although it is not believed that it will be possible by that date to have concrete plans for the proposed institute perfected.

Officers of the retailers' association have just begun consideration of the program for the annual convention and details have not yet been arranged. One of the subjects to be given major attention at the convention will be coal legislation in Congress and in individual states.

Trustees to Run Business of Jewett, Bigelow & Brooks

A trusteeship has been effected to conduct the affairs of Jewett, Bigelow & Brooks, with mining and operating offices in Cincinnati and general offices in Detroit. This was the result of conferences held in Cincinnati beginning Jan. 28 and continued for several days. A. McD. England, of the Logan Hardware & Supply Co., Logan, W. Va.; M. E. Brown, Sterling Hardware Co., Hazard, Ky.; Ray Moss, Moss Stores Co., of Pineville, Ky.; John S. Storrs, Storrs-Schaefer Co., Cincinnati; A. T. Siler, attorney, of Williamsburg, Ky., and W. F. Courtney, of Armour & Co., Chicago, have been named as trustees for the creditors and the J. B. B. corporations have agreed to vest in E. L. Douglass, vice-president and operating manager, full power to conduct the business on behalf of the corporation.

The situation was forced through a cloud that has been hanging over the company since it entered an export deal in 1920-21. Jewett, Bigelow & Brooks own or control the following companies: Hazard Jellico Coal Co., First Creek Mining Co., Guyan Mining Co., Varilla Mining Co., Pine Ridge Coal Mining Co., Bradley-Jellico Coal Co., Kimberly Mining Co., Roth Coal Co., Black Joe Coal Co., Jaybee Jellico Coal Co., J B Blue Gem Coal Co., No. 182, J B Elkhorn Coal & Land Co., J B Straight Creek Coal Mining Co., J B B Pocahontas Coal Co., J B Hickory Cannel Coal Co., J B Harlan Fox Coal Co., the Richfield Coal Co. and the J B Stores Co.

Officers of the Jewett, Bigelow & Brooks Co. are well satisfied with the turn that has been taken in the affair and believe that it will only be a reasonable length of time before the whole of the situation is clarified. They point to the fact that there has been an element of doubt existing for some time which will be entirely done away with in the event that the trusteeship reaches the happy conclusion which has been bespoken for it.

N. C. A. Appoints Committees

The National Coal Association has appointed a committee to study Senator Oddie's bill for the establishment of a department of mines and mining, composed as follows: J. G. Bradley (chairman), president, Elk River Coal & Lumber Co., Dundon, W. Va.; D. B. Wentz, president, Stonega Coke & Coal Co., Philadelphia, Pa., and A. M. Ogle, president, Vandalia Coal Co., Terre Haute, Ind.

C. E. Bockus has been chosen by President Brydon to head the committee which, in conjunction with similar committees of the American Wholesale Coal Association, and of the National Retail Coal Merchants' Association, will constitute the Commerce Department's advisory committee on coal. D. B. Wentz and D. C. Guthrie are the other two members of the committee. S. H. Robbins, M. L. Gould and Walter Barnum will serve as alternates. Constituted in this manner, it is pointed out, the committee is representative in that it is drawn from Virginia, West Virginia, Pennsylvania, Ohio, Indiana and Washington.

Censure Coal Company for Johnson City Disaster

A verdict censuring the Crerar Clinch Coal Co. for alleged failure to observe all precautionary rules was returned by the Coroner's jury which heard the testimony at the inquest into the explosion which caused the loss of 33 lives at the East Side Mine, Johnson City, Ill., Friday afternoon, Jan. 25.



Practical Pointers For Electrical And Mechanical Men



Accident Hazard Eliminated by Change In Automatic Reclosing Circuit Breaker

AS THE old-fashioned steam-driven direct-current power plant becomes more and more obsolete, the modern underground substation, which may be located near the working face of the mine, will be called upon to deliver not only proper voltage but will be required to render reliable, efficient and economical performance.

Much has been accomplished in a highly satisfactory manner by means of various devices designed to function automatically, but it is probable that the most appreciated piece of automatic apparatus used in the coal-mining industry is the automatic reclosing circuit breaker used to control the direct-current side of the substation equipment. It not only reduces the labor cost of operation but it has complete and accurate control over all the circuits within the mine, and as its functions are governed by the load conditions of these circuits, important equipment is spared many hard bumps that ordinarily would be experienced

upon the reclosing of a manually operated circuit breaker.

One of the most dangerous accidents that may occur when two or more substations equipped with synchronous converters are operated in parallel is the failure of the direct-current circuit breaker to open at a given load, the result being that the load rises to such a value that the alternating-current supply is interrupted. Under these conditions the direct-current side of the converter would be left directly across the line and if the ordinary type of manually operated breaker is employed a runaway and serious damage to one converter usually results.

The modern automatic reclosing circuit-breaker may have its operating coil in series with the switch of an overspeed device which will de-energize the operating coil of the circuit breaker in time to prevent a runaway under ordinary conditions. It is here, however, that I wish to bring out a point: The conditions are not always ordinary, and serious troubles consequently result.

Probably the most popular automatic reclosing circuit breaker now used in the mining industry is the one manufactured by the Automatic Reclosing Circuit Breaker Co., of Columbus, Ohio. It is some of their old style breakers that I wish to use for an example—types AA and ARL. As all such automatic breakers are based on a similar principle a like weakness may exist in other makes. However, I do not wish the readers of this article to confuse these types with any of the later models, which give almost perfect satisfaction in operation.

Many old type circuit-breakers are still in service, performing in a most satisfactory manner, and are entirely too valuable to discard for the later types. In my experience I have never known one of them to fail electrically, and rarely have they failed mechanically. Some of these mechanical failures, however, might result disastrously to the generator. It is the object of this article to show how these breakers may be changed to make the liability of such failure more remote.

Referring to Fig. 1, it will be noticed that the breaker is closed through the mechanical action of the plunger. (1) by lifting the plunger pin (2) until the

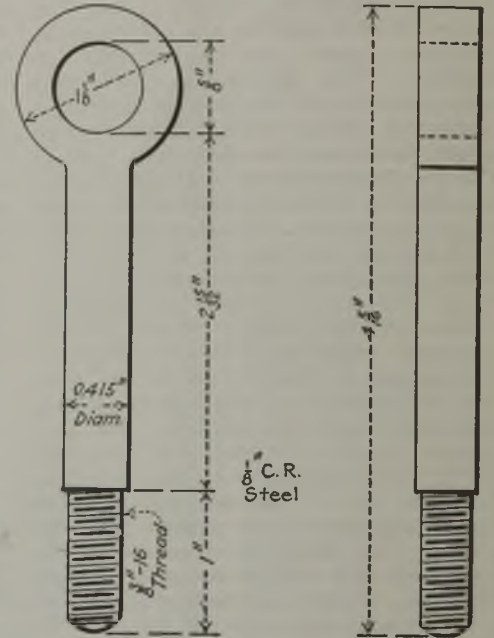


Fig. 2—New Plunger Pin Attachment
The extra weight of the plunger assists in opening the breaker under all conditions.

same comes in contact with the roller (3) the roller arm (4) is brought parallel with the top of the mainbody casting (5) and the breaker is found to be in a closed position.

As long as the surface on which the roller around (6) engages is kept smooth and the eccentric bushing (7) is properly adjusted there is no question but that this type of breaker will function properly, but when stations are isolated underground without an attendant, these little items are likely to be in need of attention quite frequently, and as a result the general wear that should be cared for by adjusting the eccentric bushing permits the arm (4) to raise above its proper position, which is parallel to the body casting, until it acts as a fixed prop, and even when the operating coil (8) is de-energized by the operation of the overspeed device the breaker remains in a closed position after the plunger (1) and plunger pin (2) have returned to the normal position occupied by them when the breaker is open. This condition probably would result in a runaway and considerable damage.

A quick, reliable method to prevent such an occurrence is as follows: Remove the plunger (1), plunger pin (2) and the roller (3)—Fig. 2 gives the required dimensions for a plunger pin that may be substituted for items 2 and 3 in types AA and ARL of a 600-amp. breaker; other capacities may be de-

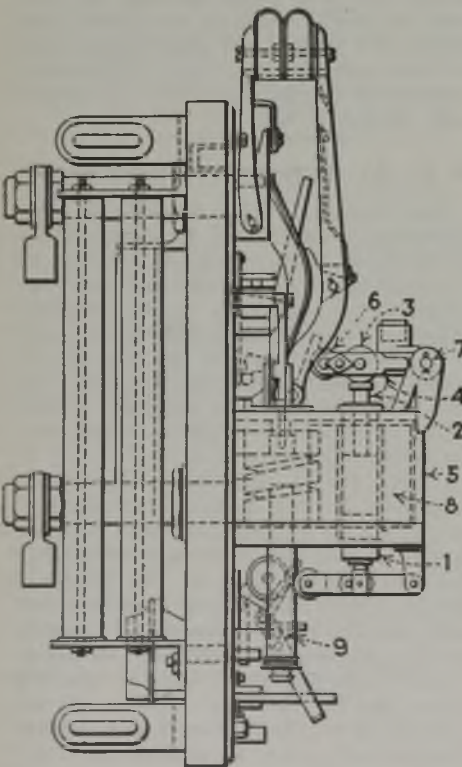


Fig. 1—Automatic Circuit Breaker

The plunger pin is redesigned so as to prevent the breaker locking closed when the operating circuit is cut open.

terminated accordingly. Now take the plunger (1); center, drill and tap it to accommodate the pin shown in Fig. 2; place the new plunger pin in the opening left by the pin (2) and screw the plunger on the pin until its shoulder is firmly butted against the top of the plunger, then insert the pin formerly in the roller (3) into the hole of the new plunger pin, reassemble the parts and adjust the breaker. The function of the new pin is to pull the roller arm (4) down when the operating coil is de-energized, regardless of any slight change in the position of the roller arm. It is obvious that the new plunger pin will permit the weight of the plunger to act upon the arm with a jerk, this action being assisted by the pull of the torsion spring (9).

To my knowledge one coal company in eastern Ohio has nine of its substations equipped with old-style breakers arranged as described, and results so far have been very satisfactory.

ROYCE L. GRIMES,

Electrical and Chemical Engineer.
Piney Fork, Ohio.

Keeping the Rock Drill Fit

Rock drills, like all other equipment, need care and attention. The very nature of the work of the drill has made it necessary that all parts be ruggedly constructed, and for this reason the parts inherently withstand much abuse and require but little maintenance. They must be given a reasonable amount of repair, however, and it is essential that it be carried out with due consideration of the function of each part.

The proper maintenance of the drill requires, in the first place, occasional inspection, which when carefully made will disclose any undue wear, damage or imperfect operation of any part. Occasionally, the drill should be taken apart and given a thorough cleaning, preferably with kerosene. After being dried all parts should be reassembled and oiled. In the wet types of drills, if water leaks past the packing around the water tube it will wash away the lubricant. This quickly results in wear on the rifle bar and piston. For this reason it is advisable before assembling to test for leakage by placing the thumb over the end of the tube and turning on the water pressure. When water tubes are renewed, a brand new rubber tube should be used.

The drill shown in the illustration is designed so that the side rods are equipped with cushion springs which hold the different parts together. Both rods should therefore be tightened up to the same tension to prevent breaking the front cylinder head, back head or other parts.

It must be remembered that when the hammer is in operation the steel holder is not a shock absorber and if the hammer is not held close to the drill steel the blow of the piston will be transmitted to the holder rather than to the steel.

Referring to the accompanying illustration, the following vital parts always should be considered:

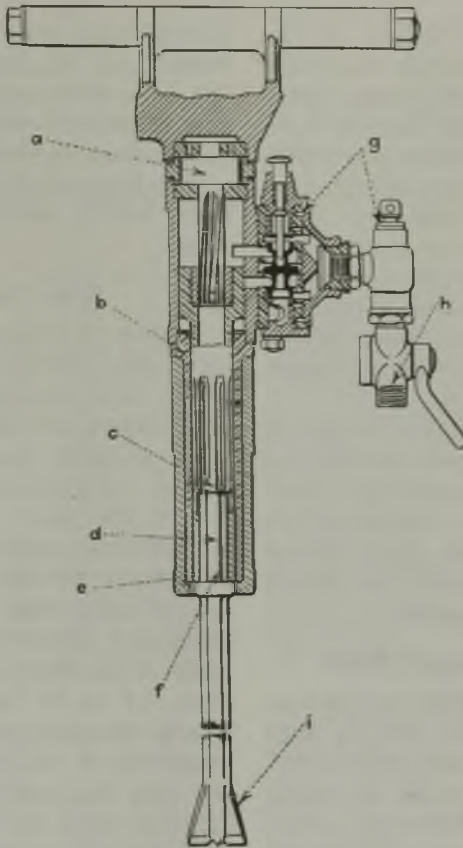
(a) Broken pawl springs will wear out rotating device. Examine before assembling.

(b) If cylinder front head washer is worn, insufficient guide is provided for front end of piston. When piston hits the steel, side strains and vibrations are set up, resulting in piston leakage.

(c) Examine striking end of piston. If the end is unevenly worn or is chipped or spalled, it indicates shanks of steel are bad. Square end of piston, then be sure shank end of every steel is square, as one uneven, poorly made shank may ruin the piston.

(d) Temper shanks in oil. Grind end smooth and square. Never temper shanks in water or they will be hard and brittle, resulting in increased breakage of steel and piston.

(e) Renew rotation sleeve bushing when worn. When bushings wear large at either end, they allow the steel to wobble. This makes piston hit edge of shank instead of the flat, square end. A gage to be used to determine when the sleeve is worn to the renewal point may be easily obtained.



Rock Drill for Mining Service

The hammer action of a drill makes it necessary that each part function properly. An incorrectly operated drill will soon cause much damage.

(f) Be sure shanks are of proper dimensions. This will give full power of piston blow. If shanks are short, piston will strike front head washer, resulting in breakage of through rods.

(g) Fill lubricator often with proper grade of liquid grease.

(h) Be sure to blow out hose well before connecting to air throttle.

(i) Properly made, correctly tempered and sharp bits will increase the drilling speed. Allow the steel to cool after forging and then reheat for tempering.

Nature and Composition of Insulating Varnishes

Insulating varnishes may be described as liquids of varied color and consistency, composed of a useful semi-solid part, or "base," made up of resins, asphalts, pitches, drying oils, driers, etc., and a solvent in which this base is dissolved or uniformly incorporated. They are used to fill or cover paper, fabric and other materials, thus improving their physical and insulating properties by replacing the occluded air with a dielectric of higher order or helping to maintain the constancy of

the initial insulation of the parts treated by affording an impermeable covering to these parts through which deleterious substances cannot pass.

They should be of such nature that, after application, they may be changed from the liquid to the solid state, or practically so, by some convenient means such as heat. In order to perform their function they must possess numerous and varied qualities, both before and during setting as well as in their subsequent useful life.

Spirit varnishes consist of varnish gums or resins dissolved in a suitable solvent, usually alcohol. The varnish may or may not be colored by the addition of dye, but it usually contains ingredients to improve the flexibility. These varnishes dry by the evaporation of the solvent, which leaves a film of the gum on the surface to be coated.

Some consider spirit varnishes more as finishes than as insulating varnishes, for their principal use is as a finishing coating over other insulating varnishes. In some applications, however, they are used for insulating purposes where little flexibility and great binding and cementing properties or exceptionally quick dry are required.

Oil-type insulating varnishes consist of varnish gums or resins in combination with vegetable drying oils (generally China wood oil and linseed oil) dissolved in a suitable thinner, usually petroleum naphtha. In the black varnishes the clear gums are replaced with asphaltic materials or pitches. The oil-type varnishes dry by the evaporation of the solvent and oxidation of the vegetable oils. The drying time is governed by the proportion of gums and oils and by the quantity of oxidizing agents or driers in the varnish. The greater the proportion of oils, the longer the drying time. They are classed as air-drying or baking varnishes, depending on the method of drying and length of drying time.

Some of the quick air-drying black varnishes may contain no drying oil. Such varnishes are neither oil type nor spirit varnishes and may be termed "asphaltic varnishes," consisting of an asphaltic base and solvent which may be a petroleum or coal-tar distillate or a mixture of the two.

In the manufacture of spirit varnishes the gums are cut cold in the solvent, while the oil type varnishes and asphaltic varnishes are made by fluxing the various ingredients together in a kettle at a high temperature. Variations in the physical characteristics are produced by variations in the formulas and in the heat treatment.

Liquid varnish changes to a solid by drying, and during this process it passes through all the intermediate stages. To thoroughly understand the characteristics of a varnish it is necessary to study it both in the liquid and solid states.

It has not been possible to combine all the desirable qualities in one product and for this reason many distinct types of insulating varnishes have been produced in which certain qualities have been improved at the expense of others to make them most suitable for specific uses. Many of these characteristics are interdependent while others are opposed and cannot be combined.



Production And the Market



Undercurrent of Confidence in Market for Soft Coal as Result of January Trade Trend

The trend of business in the first month of the year has given the soft-coal market a feeling of greater confidence. The Geological Survey shows larger bituminous-coal production at this period than has ever been experienced at this time of the year. There is slightly more activity although it has not yet been reflected on prices. The anthracite market is suffering from weather conditions and is not as active as it should be at this time of the year. Bituminous coal consumers are coming into the market with more regularity and that much quiet buying is being done is shown by the production figures, which are being maintained around 11,500,000 net tons weekly.

Consumers are breathing a little easier now that it is known what the soft-coal miners will demand of the operators when they meet at Jacksonville next Monday. No considerable change in prices is expected unless there should be a suspension about April 1, and with the huge reserves on hand it would be several weeks before the market would feel its effect.

End of British Strike Blasts Export Hope

The ending of the British railway strike knocked on the head whatever hopes coal exporters held in that direction. The shortness of the cold spell which covered most sections of the country a couple of weeks ago was reflected in the various markets, and while there continues a good demand for bituminous domestic coals it is not as active as it was last week.

Coal Age Index as of Feb. 4 registers 187 with an average price of \$2.26, there being no change from the previous week.

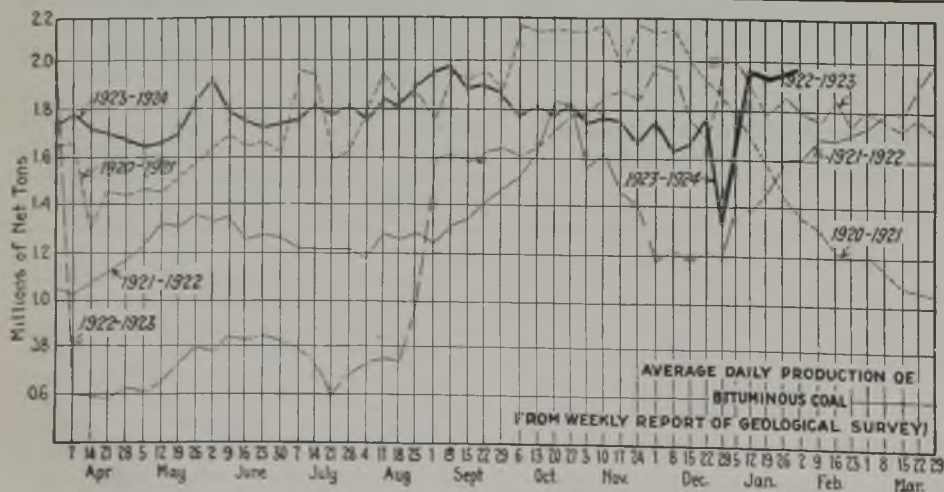
Business in the Middle West is only fair. Stocks in the retail yards were greatly reduced during the low temperatures and many new orders were placed. Demand for domestic coals is fair and there has been

enough cold weather to keep dealers busy. Domestic demand at St. Louis is easier, and little is doing in the anthracite and smokeless trade. Demand for western Kentucky coals is somewhat improved, with prepared sizes in fair call. The outlook for bituminous at the Head-of-the-Lakes is encouraging. Reserves are being put in and the various industries show improvement.

Ohio Not Encouraged at Outlook

Filling of orders placed during the recent cold wave keeps the Ohio trade moving, but the ultimate outlook is not encouraging. Retail dealers' stocks are not large and dealers are not inclined to buy heavily. The steam trade is quiet, though the smokeless coals are moving freely. Transportation in some sections is a trifle slower, but prices are generally maintained. There is a little more activity at Pittsburgh but prices show practically no change and weather conditions have left stocks larger than normally on hand. In New England there is a belief that the resumption of the 1917 wage scale in the New River district probably means a base price of \$4.75 per gross ton f.o.b. vessel Hampton Roads, the same as during the early part of 1917. The condition of the market at New York is reflected in the bids received by the U. S. Shipping Board in that city last week for about 1,700 gross tons of bituminous coal, the prices ranging from \$4.98 to \$5.99, alongside vessel, or on a basis of about \$1.74 to \$2.63 f.o.b. net ton at the mine.

Demand for domestic sizes of anthracite is not exceedingly active. Stove and chestnut coals continue to be the most in call, but these are not sufficiently short to create any trouble. Some independent producers find it difficult to keep their product moving unless they quote close to the larger company price lists. There has been



Estimates of Production

(Net Tons)		
BITUMINOUS		
	1922-1923	1923-1924
Jan. 12 (b)	11,217,000	11,949,000
Jan. 19 (b)	10,925,000	11,622,000
Jan. 26 (a)	10,985,000	11,599,000
Daily average	1,831,000	1,933,000
Coal year	332,576,000	448,448,000
Daily av. coal year	1,311,000	1,782,000
ANTHRACITE		
Jan. 12	2,113,000	1,840,000
Jan. 19 (b)	2,010,000	1,884,000
Jan. 26 (a)	2,119,000	1,782,000
COKE		
Jan. 19 (b)	328,000	251,000
Jan. 26	343,000	263,000
Calendar year	1,252,000	978,000

(a) Subject to revision. (b) Revised from last report.

a marked falling off in sales of anthracite in the Duluth market.

Output of bituminous coal is estimated by the Geological Survey to have been 11,599,000 net tons during the week ended Jan. 26, a decrease of about 23,000 tons when compared with the previous week. During the same period 1,782,000 net tons of anthracite was produced, a decrease of 102,000 tons when compared with the previous week.

Midwest Business Fair

Domestic business throughout the Middle West continues fair with only a few cancellations of purchases made during the blighting cold spells of two and four weeks ago. There has been enough winter to keep the retail yards active and not enough to hamper railroads much. The result has been a smooth flow of large coal but no noticeable drop in its price, for a large number of the Illinois and Indiana mines are still down and no doubt will stay down.

Steam coal went into the inevitable sag during the past

few days, with only a small upward turn at the end of last week. While the dominating producers of Franklin County maintain their circular quotation of \$1.75@1.90 on screenings, a good deal of their output moves sluggishly. Central Illinois small coal has been down to \$1.25 but at the end of the week was reasonably firm at a nickel better than that. Western Kentucky screenings, always on hand for any buyer, is below a dollar on the Chicago market. Eastern coals have a hard time in the Midwest territory except good smokeless. Pocahontas mine-run sticks at \$2.50 and lump at \$3.50 with a good deal moving in.

St. Louis Slows Up

With weather above freezing in St. Louis the domestic demand has eased up and there is little or no demand locally for carload steam, although wagonload steam continues good. Country domestic is just fair as is the demand for cheaper grades, in St. Louis. It is almost impossible in some sections to move Franklin County coal. Country steam has eased up somewhat and the situation is one that makes it difficult to move anything. There is nothing doing in anthracite or smokeless trade and very little coke is mov-

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

Low-Volatile, Eastern				Midwest							
Market Quoted	Feb. 5 1923	Jan. 21 1924	Jan. 28 1924	Feb. 4 1924†	Market Quoted	Feb. 5 1923	Jan. 21 1924	Jan. 28 1924	Feb. 4 1924†		
Smokeless lump.....	Columbus....	\$6.75	\$3.35	\$3.35	\$3.15@3.50	Franklin, Ill. lump.....	Chicago.....	\$5.35	\$3.50	\$3.50	\$3.25@3.75
Smokeless mine run.....	Columbus....	5.50	2.10	2.10	2.00@2.25	Franklin, Ill. mine run.....	Chicago.....	3.85	2.35	2.35	2.25@2.50
Smokeless screenings.....	Columbus....	5.50	1.50	1.50	1.40@1.65	Franklin, Ill. screenings...	Chicago.....	2.60	1.95	1.85	1.75@1.90
Smokeless lump.....	Chicago.....	7.75	3.25	3.60	3.50@3.75	Central, Ill. lump.....	Chicago.....	3.60	3.10	3.10	3.00@3.25
Smokeless mine run.....	Chicago.....	4.85	2.25	2.25	2.50	Central, Ill. mine run.....	Chicago.....	2.85	2.10	2.10	2.00@2.25
Smokeless lump.....	Cincinnati...	6.50	3.25	3.50	3.50@4.00	Central, Ill. screenings...	Chicago.....	1.60	1.55	1.45	1.30@1.40
Smokeless mine run.....	Cincinnati...	5.25	2.10	2.35	2.50@3.00	Ind. 4th Vein lump.....	Chicago.....	4.35	3.10	3.10	3.00@3.25
Smokeless screenings.....	Cincinnati...	5.25	1.20	1.80	1.65@2.00	Ind. 4th Vein mine run.....	Chicago.....	3.10	2.60	2.60	2.50@2.75
Smokeless mine run.....	Boston.....	8.00	4.70	5.05	5.00@5.15	Ind. 4th Vein screenings...	Chicago.....	2.30	1.85	1.85	1.65@1.80
Clearfield mine run.....	Boston.....	3.85	1.85	2.00	1.60@2.50	Ind. 5th Vein lump.....	Chicago.....	4.10	2.60	2.60	2.50@2.75
Cambria mine run.....	Boston.....	4.15	2.55	2.60	2.25@3.00	Ind. 5th Vein mine run.....	Chicago.....	3.10	2.10	2.10	2.00@2.25
Bomerset mine run.....	Boston.....	3.90	2.10	2.25	1.85@2.50	Ind. 5th Vein screenings...	Chicago.....	1.80	1.55	1.45	1.40@1.50
Pool 1 (Navy Standard)...	New York....	5.35	3.00	3.00	2.75@3.25	Mt. Olive lump.....	St. Louis.....	3.10	3.10	3.10	3.00@3.25
Pool 1 (Navy Standard)...	Philadelphia..	5.45	3.00	3.00	2.75@3.25	Mt. Olive mine run.....	St. Louis.....	2.50	2.50	2.50	2.50
Pool 1 (Navy Standard)...	Baltimore....	4.60				Mt. Olive screenings...	St. Louis.....	1.55	1.50	1.50	1.50
Pool 9 (Super. Low Vol.)...	New York....	4.75	2.25	2.25	2.00@2.50	Standard lump.....	St. Louis.....	3.10	2.90	2.75	2.65@2.90
Pool 9 (Super. Low Vol.)...	Philadelphia..	4.80	2.30	2.30	2.10@2.50	Standard mine run.....	St. Louis.....	2.25	1.95	1.95	1.90@2.00
Pool 9 (Super. Low Vol.)...	Baltimore....	4.35	1.85	1.80	1.75@2.00	Standard screenings...	St. Louis.....	1.45	1.10	1.10	1.00@1.25
Pool 10 (H.Gr.Low Vol.)...	New York....	4.10	1.95	1.95	1.75@2.10	West Ky. lump.....	Louisville...	3.85	2.85	2.85	2.75@3.00
Pool 10 (H.Gr.Low Vol.)...	Philadelphia..	4.30	1.85	1.85	1.70@2.00	West Ky. mine run.....	Louisville...	2.35	1.65	1.65	1.50@1.90
Pool 10 (H.Gr.Low Vol.)...	Baltimore....	4.10	1.80	1.80	1.75@1.90	West Ky. screenings...	Louisville...	1.90	1.40	1.10	.90@1.25
Pool 11 (Low Vol.).....	New York....	3.50	1.60	1.60	1.50@1.75	West Ky. lump.....	Chicago.....	3.85	2.85	2.85	2.75@3.00
Pool 11 (Low Vol.).....	Philadelphia..	3.25	1.65	1.65	1.55@1.75	West Ky. mine run.....	Chicago.....	2.35	1.75	1.75	1.50@1.75
Pool 11 (Low Vol.).....	Baltimore....	3.35	1.65	1.65	1.65						

High-Volatile, Eastern				South and Southwest							
Market Quoted	Feb. 5 1923	Jan. 21 1924	Jan. 28 1924	Feb. 4 1924†	Market Quoted	Feb. 5 1923	Jan. 21 1924	Jan. 28 1924	Feb. 4 1924†		
Pool 54-64 (Gas and St.)...	New York....	3.10	1.65	1.60	1.50@1.75	Big Seam lump.....	Birmingham..	3.95	3.85	3.85	3.75@4.00
Pool 54-64 (Gas and St.)...	Philadelphia..	3.15	1.70	1.70	1.60@1.80	Big Seam mine run.....	Birmingham..	2.35	1.80	1.80	1.75@1.85
Pool 54-64 (Gas and St.)...	Baltimore....	3.00	1.50	1.50	1.50	Big Seam (washed).....	Birmingham..	2.60	2.10	2.10	2.00@2.25
Pittsburgh sc'd gas.....	Pittsburgh...	4.50	2.40	2.55	2.50@2.65	S. E. Ky. lump.....	Chicago.....	6.00	3.00	3.35	3.00@3.50
Pittsburgh gas mine run...	Pittsburgh...		2.30	2.30	2.25@2.35	S. E. Ky. mine run.....	Chicago.....	3.25	1.85	2.10	1.75@2.00
Pittsburgh mine run (St.)...	Pittsburgh...	3.10	2.00	2.00	1.90@2.10	S. E. Ky. lump.....	Louisville...	5.75	3.00	3.25	3.00@3.50
Pittsburgh slack (Gas)...	Pittsburgh...	3.30	1.60	1.60	1.50@1.75	S. E. Ky. mine run.....	Louisville...	3.25	1.80	1.80	1.65@2.00
Kanawha lump.....	Columbus....	5.25	2.60	2.60	2.50@2.75	S. E. Ky. screenings...	Louisville...	2.85	1.40	1.10	1.10@1.25
Kanawha mine run.....	Columbus....	3.15	1.60	1.60	1.50@1.75	S. E. Ky. lump.....	Cincinnati...	4.35	2.85	3.00	2.50@3.00
Kanawha screenings.....	Columbus....	2.85	1.35	1.35	1.20@1.35	S. E. Ky. mine run.....	Cincinnati...	2.75	1.55	1.80	1.65@2.00
W. Va. lump.....	Cincinnati...	4.60	2.85	3.10	2.75@3.00	S. E. Ky. screenings...	Cincinnati...	2.25	1.05	1.15	1.15@1.50
W. Va. Gas mine run.....	Cincinnati...	2.75	1.60	1.80	1.65@1.85	Kansas lump.....	Kansas City..	5.50	5.00	5.00	5.00
W. Va. Steam mine run...	Cincinnati...	2.75	1.60	1.80	1.65@1.85	Kansas mine run.....	Kansas City..	3.60	3.50	3.50	3.50
W. Va. screenings.....	Cincinnati...	2.25	1.10	1.20	1.25@1.35	Kansas screenings...	Kansas City..	2.50	3.25	2.25	2.25
Hooking lump.....	Columbus....	4.50	2.75	2.75	2.50@3.00						
Hooking mine run.....	Columbus....	2.80	1.85	1.85	1.75@2.00						
Hooking screenings.....	Columbus....	2.60	1.40	1.40	1.10@1.25						
Pitta. No. 8 lump.....	Cleveland....	4.00	2.55	2.40	2.10@2.75						
Pitta. No. 8 mine run.....	Cleveland....	3.15	1.90	1.95	2.00@2.10						
Pitta. No. 8 screenings...	Cleveland....	2.85	1.60	1.60	1.50@1.75						

* 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	Feb. 5, 1923		January 28, 1924		February 4, 1924†	
		Independent	Company	Independent	Company	Independent	Company
Broken.....	New York.....	\$9.00	\$7.75@8.25	\$8.00@8.50	\$8.00@9.25	\$8.00@8.50	\$8.00@9.25
Broken.....	Philadelphia..		7.90@8.10		8.75@9.25		8.75@9.25
Egg.....	New York.....	9.25@12.00	8.00@8.35	8.50@9.25	8.75@9.25	8.50@9.25	8.75@9.25
Egg.....	Philadelphia..	9.25@11.00	8.10@8.35	8.50@10.00	8.75@9.25	8.50@10.00	8.75@9.25
Egg.....	Chicago.....	12.00@12.50	7.20@8.25	7.50@8.80	8.00@8.35	7.50@8.80	8.00@8.35
Stove.....	New York.....	9.25@12.00	8.00@8.35	9.75@10.50	8.75@9.25	9.75@10.50	8.75@9.25
Stove.....	Philadelphia..	9.25@11.00	8.15@8.35	9.85@11.00	8.90@9.25	9.85@11.00	8.90@9.25
Stove.....	Chicago.....	12.00@12.50	7.35@8.25	7.95@9.25	8.00@8.35	7.95@9.25	8.00@8.35
Chestnut.....	New York.....	9.25@12.00	8.00@8.35	9.75@10.50	8.75@9.25	9.75@10.50	8.75@9.25
Chestnut.....	Philadelphia..	9.25@11.00	8.15@8.35	9.85@11.50	8.90@9.25	9.85@11.50	8.90@9.25
Chestnut.....	Chicago.....	12.00@12.50	7.35@8.35	7.95@9.25	8.00@8.35	7.95@9.25	8.00@8.35
Range.....	New York.....		8.25		9.00		9.00
Pea.....	New York.....	7.50@11.00	6.15@6.30	4.75@5.25	6.15@6.65	4.75@6.25	6.15@6.65
Pea.....	Philadelphia..	7.00@9.50	6.15@6.20	5.25@7.25	6.35@6.60	5.25@7.25	6.35@6.60
Pea.....	Chicago.....	7.00@8.00	5.49@6.03	4.50@5.60	5.40@6.05	4.50@5.60	5.40@6.05
Buckwheat No. 1.....	New York.....	5.25@6.00	4.00@4.10	2.25@3.50	3.50	2.25@3.50	3.50
Buckwheat No. 1.....	Philadelphia..	5.00@5.50	4.00	2.00@3.50	3.50	2.00@3.50	3.50
Rice.....	New York.....	2.25@2.75	2.75@3.00	1.75@2.50	2.50	1.75@2.50	2.50
Rice.....	Philadelphia..	2.14	2.75@3.00	1.50@2.50	2.50	1.50@2.50	2.50
Barley.....	New York.....	1.50@2.00	1.50@2.00	1.25@1.50	1.50	1.25@1.50	1.50
Barley.....	Philadelphia..	1.14	1.50@2.00	1.00@1.50	1.50	1.00@1.50	1.50
Birdseye.....	New York.....		2.10	1.45@1.60	1.60		1.60

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

Northwestern Market Softens

Despite mild weather at Duluth, which has reduced the market, prices of screenings have taken an upward surge in the past week, which points to a considerably strengthened market. The fall off in anthracite sales has been most marked and the bituminous decrease has been in the nature of a slackening rather than a general letdown.

Duluth prices, with the change in screenings, are as follows: Kentucky lump, \$7.25; run of pile, \$6.50; screenings, \$4.50; Youghiogheny lump, \$6.50; run of pile, \$5.50; screenings, \$4.25; Hocking lump, \$6.25; run of pile, \$5.25; screenings, \$3.75@4; Splint lump, \$6.75; run of pile, \$5.75; screenings, \$4.50; Pocahontas lump, \$9; run of pile, \$6.50; screenings, \$5.50. Coke is still at \$10.50 and briquets at \$10. The market in anthracite is the same as last quoted.

The Head-of-the-Lakes outlook in bituminous coal is encouraging. Factories are putting in stocks and the independent iron mines are starting mining with a vim. The Steel Corporation asserts that it has enough coal on its private dock to last through the summer, and this is giving heart to the independents to continue work, as it looks as if the Corporation were planning on a full year. The general impression at Duluth is that there will be no strike this year.

The Milwaukee coal market is very active, both in a wholesale and retail way, and stocks are being drawn upon quite heavily. The protracted cold spell forced many dealers in the interior to buy. Prices hold steady. Jobbers are finding it extremely difficult to get high-grade Eastern soft coal—splints and Pocahontas—the market in the East being sold up and with orders ahead, so that rail supplies of this class of coal will not be available until well into February.

Western Situation Is Spotted

Mines through the Southwest still are working virtually full time, although a surplus of both lump and screenings again has begun to accumulate. Saturday, Jan. 26, the Pittsburg district had its largest payroll in more than two years. There has been no change in quotations on Kansas coal. Lump still is \$5; nut, \$4.25; mine-run, \$3.50, and screenings, \$2.25.

In Colorado the market has slowed down slightly as compared with the past few weeks, due to the warm weather. However, the operators are having no difficulty in disposing of all of the coal mined.

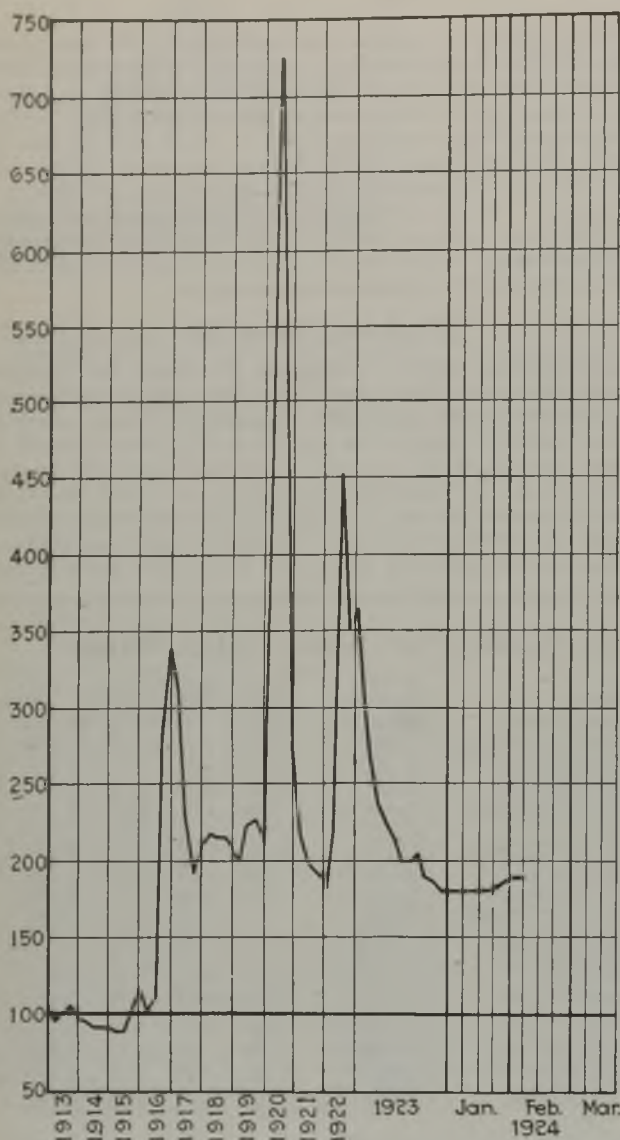
Prices continue to remain unchanged and the present supply of labor is sufficient. Transportation and car supply have been good throughout the state except in Routt County, where weather conditions have prevented considerable movement of all commodities.

Utah business is slow. The state is averaging little more than two days a week and mines are shutting down because they cannot dispose of intermediate sizes. Stocks are low in retailers' yards but cold weather is breaking and no rush for coal is expected. Industries are not buying much.

Demand for Domestic Coals Easier in Ohio

There has been a marked recession in the demand for domestic coals in the Ohio markets, due to milder weather. Orders booked for delivery in the Columbus market, however, will mean considerable activity in the southern Ohio coal fields for several days, but in the absence of continued cold weather the outlook is not encouraging. Retail dealers are not buying heavily and their stocks are not large; prices are firm. The demand for Pocahontas and other smokeless varieties is strong. Steam trade is quiet. The falling off in quotations for screenings is attributed partly to increased production during the period of better lump production and also to several large users refusing to take on more tonnage. Production in the Hocking valley has increased to between 25 and 30 per cent of capacity. Some large consumers are increasing their reserve stocks. Railroads are making inquiries, while iron and steel plants are buying slightly more than current needs.

The Southern Ohio Coal Exchange reports for the week ended Jan. 19 show an output of 213,273 tons from 446 mines having a full-time capacity of 681,400 tons. Of the shortage "no market" was responsible for a loss of 422,308 tons.



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

Index	1924			1923
	Feb. 4	Jan. 28	Jan. 21	Feb. 5
Index	187	187	182	312
Weighted average price	\$2.26	\$2.26	\$2.20	\$3.78

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.

ing. Some dealers are cutting the price of Carterville from \$8 to \$7.50, especially in South St. Louis, to favored customers. Dealers report a good supply of everything on hand.

Kentucky Fairly Active

Demand for western Kentucky coal has been somewhat better, with a good movement to the Southern, Western and Central states, and as far north as Michigan. Prepared sizes have been in fair demand. Steam coal also has been moving quite well, but production of screenings has been heavy enough to break the prices somewhat, as evidenced by screenings having been offered as low as 80@85c. a ton. The bulk of the movement is at 90c. to \$1.15.

Operating time has been increasing in a number of mines, and some that have been down are resuming operations, with others planning to do so. A few operators report better running time, and with car supply favorable, the outlook is for good business over the next sixty days, as stocks in many sections have been greatly depleted. Prepared prices promise to continue at about today's figures, which range from \$1.75 on small nut to \$3 for best 6-in. block, with mine run at \$1.50@1.90.

At Cincinnati a slowing up in transportation and continuance of the strong positions in prices in spite of milder weather are the outstanding features of the market. Coal that had been taking five days from the mines in southeastern Kentucky to Chicago has been slowed up to three weeks and then the Pennsylvania lines notified Kentucky shippers that they would be forced to refuse acceptance of cars at interchange points at Cincinnati. In the high-volatile market the demand for domestic and slack is the strongest. The February "circular" put out by the smokeless companies shows \$3.50 for lump and egg; \$2.50 for mine-run, but no set figure for screenings. These were scarce in the mails before Chicago and Western points started bidding \$4 for "car numbers" and \$3.75 for spot prepared. Retail dealers believe that unless there is a tremendous change, present prices will hold until April 1. These are \$9 to \$10 for Pocahontas lump; \$7 for mine-run; \$8@\$8.25 for bituminous lump and \$4.50@\$5 for slack.

Operators in the Cleveland market say that demand from both steam consumers and retail yards continues fair, with no apparent effort to obtain much more than current needs. Industrial plants have from four to six weeks' supplies on hand. Consumption is kept down through many lines of industries operating only four or five days a week. Distress coal is not so abundant as it was a week ago in view of the troubles experienced by shippers in disposing of recent shipments on open consignments.

Pittsburgh Market Somewhat More Active

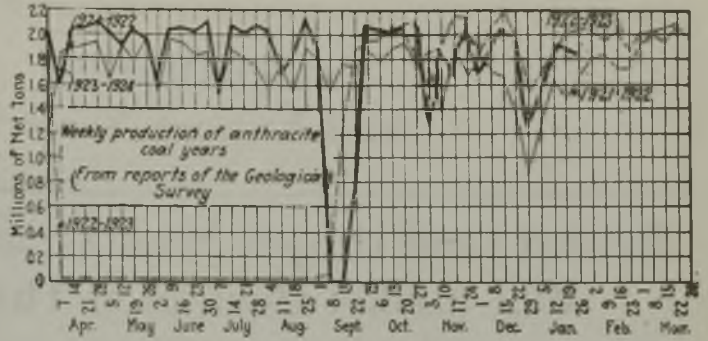
Activity in the Pittsburgh market is a trifle heavier than a week or two back and the turnover since the first of the year has in general been distinctly heavier than during the last few weeks of 1923. Consumption of coal in the territory normally tributary to the Pittsburgh district is all that could be desired, except in the case of domestic coal, the prolonged mild weather having left householders' stocks larger than they normally are at this time of the year. The steel industry is operating at about 25 per cent better rate than during December, with a corresponding increase in coal consumption. The chief difficulty in the district is the competition from nearby non-union fields, which is apparently growing more severe. Operators in the district remain silent as to whether or not they will attend the wage conference at Jacksonville next week, no formal statement having been issued regarding the letter of Secretary Hoover. Reports from central Pennsylvania indicate a better demand. During the week ended Jan. 26 loadings totaled 15,340 cars, as compared with 15,247 during the previous week.

There is a light demand for soft coal at Buffalo, consumers ordering only for current needs.

New England Reports Few Sales

In New England eyes the only outstanding feature of the past week was the resumption of the 1917 wage scale in the New River district. It means, probably, a \$4.75 base price per gross ton f.o.b. vessel at Hampton Roads, approximately the same basis that carried through the early part of 1917. The few sales that have been made since February came in have been at around \$5 for spot shipment, with a net return to the operator of about \$4.75. Inquiry here is still very light, and buyers show interest in quotations only for their bearing on spring prices.

We hear of no material increase in production. Several



of the smokeless agencies are practically without coal on hand at the piers, and there continue to be borrow and loan transactions among the different shippers to clear what tonnage reaches the piers. There are still some unshipped balances due offshore, and these together with contracts coastwise are absorbing nearly all the present restricted east-bound movement of Pocahontas and New River.

At this end for distribution inland there is practically no change in the market. Prices on cars range \$6@\$6.25 per gross ton, but reserves are large in almost every instance and new purchases are for only scattering amounts. Prices of Southern coals will have to advance very materially before there will be any demand for Pennsylvania coals all-rail in the territory easily accessible from tide-water.

Little Improvement in Seaboard Markets

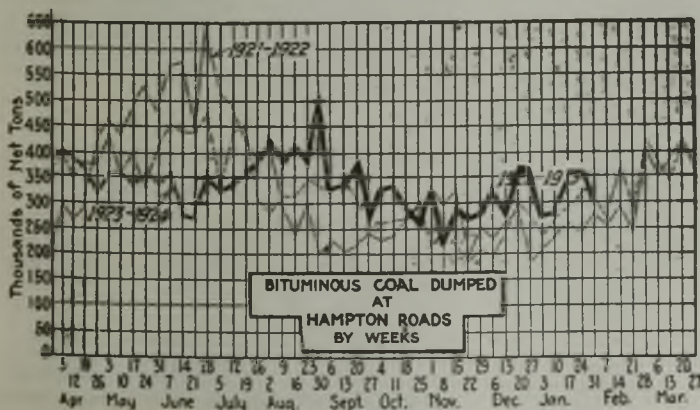
There are a few signs of improved conditions along the seaboard. At New York inquiries are a little more numerous and there has been a trifle better buying, but not sufficient to change current prices: The Philadelphia trade believes that January business was an improvement over December and that this month's buying will be an improvement over last month. The improvement in buying at the New York and Philadelphia markets may be due in part to a fear that there will be a suspension, even though there is a feeling that present prices will continue, notwithstanding the fact that the miners are asking for a long-term agreement and not an increase in wages. The Baltimore market is flat and no encouragement is seen. Interest is centered in the export demand.

The strike of the Nova Scotia miners has already been reflected in the Baltimore market, one steamer carrying about 7,000 tons of coal having left there for Halifax, according to reports. During the first twenty-eight days of January cargo coal amounting to 61,675 tons was dumped at Baltimore, as well as 3,491 tons of coke. The settlement of the British railway strike ended many inquiries which had been made regarding foreign shipments, but some business is reported as having been closed for South America.

Hard-Coal Market Unresponsive to Weather

Weather conditions have had no effect on the hard-coal situation. Retail dealers are well supplied and a few days of real cold weather had little effect. Orders are delivered promptly and production is sufficient to keep the market well supplied and movement rapid. Consumers are beginning to guess as to what will happen on April 1, and with that in view are not likely to buy any more coal than they actually need between now and then. Egg and pea sizes are the easiest, though the demand for stove and chestnut is not much more active. In Baltimore the market is quiet and, due to the mild weather, retail dealers report an increasing call for wood and briquets. The steam coals in the various markets are in better shape. The tonnage has been reduced and quotations for all three sizes are a trifle firmer. Barley is the shortest.

The market for furnace coke stiffened last week. A contract for about 5,000 tons a month during this and next month has been closed at \$4.25, with other contracts reported as having been closed at about the same figure. There also have been several inquiries for the second quarter. Floating supplies of spot furnace coke under \$4 have practically disappeared. Foundry coke continues easy at \$5@\$5.50.



Foreign Market And Export News

British Coal Output Slumps as Result of Rail Strike; Dock Men Threaten

Production of coal in Great Britain during the week ended Jan. 19 took a decided drop as a result of the railway strike, amounting to 2,848,000 tons, which is a lower level than for any week since July 8, 1921, when the output was 2,355,000 tons. The output during the week ended Jan. 12 was 5,747,000 tons.

As soon as the railway strike was ended and even before the men had returned to work the leaders of the dock workers instructed the members of that organization to stop work in all ports of Great Britain on Feb. 16 unless their wage demands are satisfactorily settled.

Contrary to the general expectation, the Welsh coal market has taken a definite turn for the better, in spite of the refusal of the tipplers to operate the third shift. The result of this refusal has been considerable delay in shipment.

In anticipation of labor trouble here soon and in America about March, foreign buyers are showing a tendency to lay in stocks; as a consequence many of the pits are well booked into March. French and Italian buying is becoming heavier, and fair sized quantities have been sold to the Scandinavian state railways.

The feeling among the miners for terminating the wage agreement probably is stronger in Wales than elsewhere in the United Kingdom. It is estimated that from 80 to 90 per cent of the workers in the Welsh coal mines are in favor of the adoption of this course.

Orders for prompt shipment are fairly numerous in Newcastle, though the deliveries of German reparation coal into France and Belgium are proving a handicap. The Norwegian State Railways have placed orders aggregating about 35,000 tons of steams for delivery before March.

French Coal Market Fair

The French Government has taken further steps to obtain from the mine owners a reduction from the last advance in selling prices made as a result of wage increases. No announcement has yet been made as to the outcome of negotiations. The coal market continues fair.

Owing to the cold weather prevailing in Belgium France is now receiving but few offers for sized products. No official change has been made in prices, while rebates are granted in some instances. Total arrivals of coal from Cardiff during the week ended Jan. 23 amounted to 250,000 tons.

United States Coal and Coke Exports During December

	(In Gross Tons)	
	1922	1923
Anthracite.....	381,758	328,945
Bituminous.....	1,468,917	1,078,028
Exported to:		
France.....		12,502
Italy.....		26,562
Other Europe.....		7,442
Canada.....	1,376,079	850,469
Panama.....	4,975	25
Mexico.....	8,710	10,251
Br. West Indies.....	70	11,729
Cuba.....	64,065	71,957
Other W. Indies.....	10,644	23,343
Argentina.....		9,540
Brazil.....		35,849
Chile.....	2,181	
French Africa.....		7,576
Other countries.....	2,193	10,783
Coke.....	123,442	44,951

United States Coal and Coke Imports During December

	(In Gross Tons)	
	1922	1923
Anthracite.....	26,070	33,792
Bituminous.....	356,505	56,262
Imported from:		
United Kingdom.....	188,355	4,913
Canada.....	154,569	37,998
Japan.....		5,028
Australia.....	13,466	7,754
Other countries.....	115	569
Coke.....	9,122	5,324

Better Outlook at Hampton Roads

Business at Hampton Roads was more brisk last week, though prices weakened slightly in the face of increased surplus at tidewater. Coast-wise trade showed improvement and some pick-up was noted in foreign business.

Dumpings at the Norfolk & Western piers led the field easily, and inquiries in all branches of trade increased, with shippers looking forward to continued improvement throughout the entire trade.

Improvement in general shipping, resulting in brisker bunker trade, was reported, with generally steadier conditions and more optimism. The tone of the market was firm and the outlook promising.

Export Clearances, Week Ended Feb. 2, 1924

FROM HAMPTON ROADS		
		Tons
For Brazil		
Br. SS. Castlemoor, for Rio Janeiro.....	8,786	
Br. SS. Loyal Citizen, fo. Sao Paulo.....	5,617	
For Cuba		
Nr. SS. Almora, for Antilla.....	3,517	
For Italy		
Amer. SS. Nobles, for Porto Ferrajo.....	4,387	
Amer. SS. Arcturus, for Porto Ferrajo.....	5,593	
For Nova Scotia		
Br. SS. Kamouraska, for Sydney.....	7,139	
For Virgin Islands		
Br. SS. Berwindvale, for St. Thomas.....	7,603	
For West Indies		
Nr. SS. Gro, for Fort de France.....	6,130	

FROM PHILADELPHIA	
For Cuba	
Nr. SS. Jacob Christensen, for Havana.....	

Hampton Roads Pier Situation

	Jan. 24	Jan. 31
N. & W. piers, Lamberts Pt.:		
Cars on hand.....	1,126	1,194
Tons on hand.....	77,883	84,466
Tons dumped for week.....	148,625	134,570
Tonnage waiting.....	27,000	16,000
Virginian Ry. piers, Sewalls Pt.:		
Cars on hand.....	973	1,013
Tons on hand.....	61,850	66,600
Tons dumped for week.....	82,172	75,333
Tonnage waiting.....	21,520	18,470
C. & O. piers, Newport News:		
Cars on hand.....	958	1,775
Tons on hand.....	49,030	88,640
Tons dumped for week.....	82,081	43,175
Tonnage waiting.....	1,640	10,085

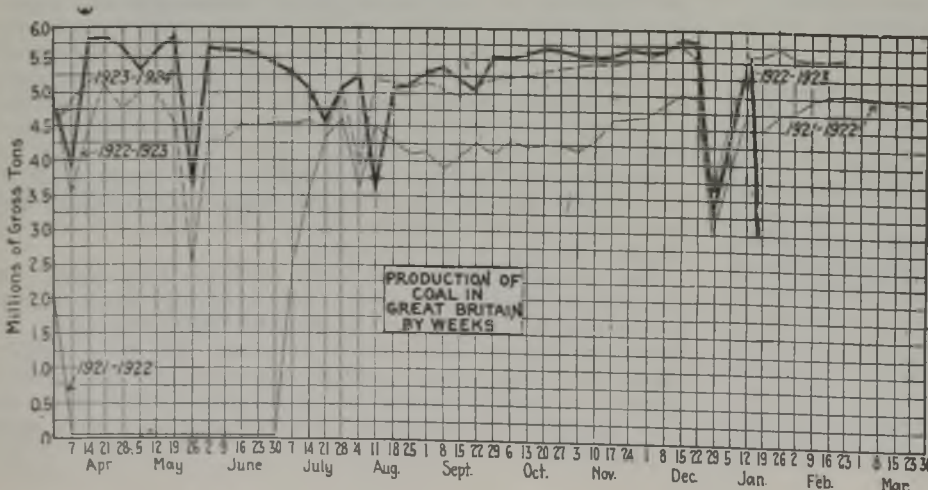
Pier and Bunker Prices, Gross Tons

	PIERS	
	Jan. 26	Feb. 2†
Pool 9, New York.....	\$ 4.90@5.25	\$ 4.90@5.25
Pool 10, New York.....	4.65@ 5.00	4.65@ 5.00
Pool 11, New York.....	4.50@ 4.75	4.50@ 4.75
Pool 9, Philadelphia.....	4.90@ 5.20	4.90@ 5.20
Pool 10, Philadelphia.....	4.50@ 4.90	4.50@ 4.90
Pool 11, Philadelphia.....	4.25@ 4.60	4.25@ 4.60
Pool 1, Hamp. Roads.....	5.25@ 5.35	<i>5.10</i>
Pools 5-6-7 Hamp. Rds.....	4.50@ 4.50	<i>4.30</i>
Pool 2, Hamp. Roads.....	5.00@ 5.15	<i>4.76@ 4.85</i>
	BUNKERS	
Pool 9, New York.....	5.20@ 5.55	5.20@ 5.55
Pool 10, New York.....	4.95@ 5.30	4.95@ 5.30
Pool 11, New York.....	4.80@ 5.05	4.80@ 5.05
Pool 9, Philadelphia.....	5.15@ 5.55	5.15@ 5.55
Pool 10, Philadelphia.....	4.90@ 5.20	4.90@ 5.26
Pool 11, Philadelphia.....	4.65@ 4.90	4.65@ 4.90
Pool 1, Hamp. Roads.....	5.35	<i>5.15</i>
Pool 2, Hamp. Roads.....	5.15	<i>4.85</i>

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

	Quotations, by Cable to Coal Age	
	Jan. 26	Feb. 2†
Admiralty, large.....	29s.@ 30s.	30s.@ 31s.
Steam smalls.....	22s.	23s.@ 25s.
Newcastle:		
Best steams.....	25s.@ 25s. 6d.	25s. 6d.
Best gas.....	24s. 6d.@ 25s.	24s. 6d.@ 25s.
Best bunkers.....	25s.@ 26s.	27s.@ 28s.

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



Traffic News

To Argue Hard-Coal Rate from Buffalo Feb. 18

The case which has just been heard in Minneapolis before Examiner Money for the Interstate Commerce Commission on the opposition to the freight rate increase on hard coal from Buffalo to Minneapolis of \$1.66, will be argued in Washington Feb. 18. County Attorney Olson, of Minneapolis, expects to argue the case before the commission at that time. It has been hinted that a decision probably will be reached by April 1. In the hearing just closed, Secretary Ellis, of the dock association, testified that he did not expect the dock trade to increase prices of hard coal if the joint rate on hard coal were withdrawn, but he did expect them to ask for a lower rate on lake and rail if the all-rail rate were not increased, since they claim the lake and rail rate is not in line with the present all-rail rate.

W.Va. Operators Prepare Data In Lake Rate Fight

In preparation for presentation before the Interstate Commerce Commission of the case of West Virginia operators who seek an adjustment of lake freight rates a meeting of officers of the Northern West Virginia Coal Operators Association and of the lake freight-rate committee was held at Fairmont, W. Va., during the latter part of January, attended by E. J. McVann, of Washington, who has been retained as special counsel by the association. At the conference officers and members of the committee who have been busily engaged in collecting data, submitted the information to Mr. McVann to be used in support of the claims of northern West Virginia operators for an adjustment of freight rates. Serving as members of the lake freight committee for the Northern West Virginia Association are E. W. Ziler, of Elkins; J. M. Orr and A. L. White, of Clarksburg.

Mr. McVann, for the association, has already submitted a petition to the Commerce Commission requesting that northern West Virginia operators be permitted to intervene in the case of the Pittsburgh Vein Operators Association against the Ashland Coal & Iron Ry. and others, that case also involving lake freight rates.

Promotions on B. & O.

Archibald Fries, vice-president in charge of traffic and commercial development of the Baltimore & Ohio R.R., has announced the following appointments, effective Feb. 1, 1924: W. W. Blakely, general freight agent, Pittsburgh, Pa., is appointed assistant to general freight traffic manager, with headquarters at Baltimore, Md.; John

H. Carroll, Jr., general freight agent, Philadelphia, Pa., is appointed general freight agent at Pittsburgh, vice Mr. Blakely, promoted; Samuel House, general freight agent, Baltimore, is appointed assistant freight traffic manager, with headquarters at Baltimore; C. S. Roberts, assistant general freight agent, Baltimore, is appointed general freight agent at Baltimore, vice Mr. House, promoted; George S. Harlan, assistant general freight agent, Baltimore, is appointed general freight agent, with headquarters at Philadelphia, vice Mr. Carroll, promoted.

Lower Railroad Rates for Coal From Indiana Mines In Sight

An order that railroad companies hauling coal from Indiana mines to Indiana points shall reduce their rates is in course of preparation in the offices of the Public Service Commission and is expected to be promulgated next week.

The order has for its basis, it was learned, new schedules that will, according to representatives of the carriers, cut railroad revenues in Indiana more than \$500,000 a year but which will be of benefit to industries, public utilities and other large consumers of coal. Whether retail coal dealers will pass any of the lower transportation costs on to domestic consumers in the way of reduced prices is not known.

Association Activities

Sequent on a two-day meeting of the Executive Committee of the American Wholesale Coal Association the Philadelphia Coal Club held its annual banquet on Jan. 31 at the Bellevue-Stratford, Philadelphia. Noah H. Swayne presided and the speakers were Charles L. Dering, president, American Wholesale Coal Association; I. R. Williams, of the Philadelphia Bar, and Dr. J. T. Holdsworth, of the Pennsylvania State Land Bank. The first spoke on the essential equality of the coal industry with other industries, the second on the threatened invasions on the Constitution and the Supreme Court, and the third on the importance of avoiding special legislation. Noah H. Swayne, of the Noah H. Swayne Co., was re-elected president; Pratt Thompson, Lehigh Coal & Navigation Co., vice-president, and Charles K. Scull, secretary-treasurer. The latter is secretary-treasurer also of the Philadelphia Coal Exchange. The directors elected were W. E. Bernard, J. W. Mason, John Haslett, H. C. Pearson and W. J. Jennings.

One of the most successful and best attended annual meetings in the history of the Northeast Kentucky Coal Association was held recently at Ashland. Reports made by officers and committees of the association went to show that a great volume of constructive work beneficial to the operators in the Big Sandy Valley has been accomplished during the year. J. G. Bradley of Dundon, president of the West Virginia Coal Association, delivered an interesting address on "Labor Relationship," explaining the material benefits to be derived from co-ordination and co-operative effort on the part of individual operators with district associations and through the district associations with their respective state organizations and the National Coal

Association. W. H. Cunningham, of Huntington, delivered an interesting address on the subject of legislation affecting the industry. Another speaker both at the business session of the association and at the banquet was Harry L. Gandy, secretary of the National Coal Association, who urged closer co-operation on the part of operators with district associations and through their district associations with state associations and the national association. At the banquet he declared that the fight of coal against control by the state was the fight of all industries and business. The following officers were elected: C. W. Connor, of Esco, Ky., president; Cadwalader Jones, of Wheelwright, Ky., first vice-president; O. P. Chafeld, of Dunleary, Ky., second vice-president; N. M. White, Sr., of Prestonburg, Ky., treasurer. The above officers and the following operators become the executive committee of the association during the year: Henry LaViers, of Paintsville, Ky.; C. H. Beidenmiller, of Huntington, W. Va.; A. M. Campbell of Ashland, Ky.

The Committee on Reorganization of the Central Pennsylvania Coal Producers' Association has reported the creation of the following committees to carry on the work of the association during the coming year: Legislation, B. M. Clark, chairman; Traffic, Charles O'Neill, chairman; Labor, officers of the association; Public Relations, president and secretary of the association; Statistics, W. A. Jones, chairman; Classification of Coals, Rembrandt Peale, chairman; Mining Methods, Mechanical Machinery and Power, J. Wm. Wetter, chairman; Fire Insurance, C. B. Maxwell, chairman; Finance, Pearle (chairman), Boucher and Coleman; Auditing, Caseley (chairman), Maxwell and Scott.

The Hazard Coal Operators Exchange held its annual meeting at the Lafayette Hotel, Lexington, Ky., on Jan. 25, at which time J. E. Johnson was re-elected president and secretary. The principal business was in connection with reading the reports of the president-secretary and hearing various committee reports, along with adoption of a few resolutions. Henry L. Gandy, Executive Secretary of the National Coal Association, talked on general conditions in the coal trade, and J. D. Battle, traffic manager of the National, talked on transportation conditions and increased efficiency of the railroads.

Obituary

Paul W. Gillham, aged 43, died at Christ's Hospital, Cincinnati, Jan. 25. Mr. Gillham was a graduate physician and practiced until 1909 at Botkin, Ohio, when he entered the coal business. At various times he was associated with the Burlingham Coal Co., the Wyatt Coal Sales Co., the Thomas L. Mordue Coal Co. and the Boone Coal Sales Co. He was one of the three partners who started the MacBard Coal Co. in 1916. About a year ago, realizing that his health was failing, he retired and spent the time in the north woods of Michigan, returning to Cincinnati some four or five weeks ago. He was a son of R. P. Gillham of the Campbell's Creek Coal Co. and two of his brothers are connected with that organization.

Coming Meetings

Rocky Mountain Coal Mining Institute, Winter meeting, Feb. 13-15, Albany Hotel, Denver, Colo. Secretary, Benedict Shubart, 521 Boston Bldg., Denver, Colo.

American Institute of Mining and Metallurgical Engineers, Annual meeting Feb. 18-21, 29 West 39th Street, New York City. Secretary, F. F. Sharpless, 29 West 39th St., New York City.

Northern West Virginia Coal Operators Association, Annual meeting Feb. 12, Fairmont, W. Va. Secretary, J. O. Caldwell, Fairmont, W. Va.

Upper Potomac Coal Association, Annual meeting March 3, Cumberland, Md. Secretary, J. F. Palmer, Cumberland, Md.

Canadian Institute of Mining and Metallurgy, Annual meeting March 5-7, King Edward Hotel, Toronto, Ontario, Canada. Secretary, G. C. Mackenzie, Drummond Building, Montreal, Quebec, Canada.

New England Coal Dealers' Association, Annual meeting March 20-21, Boston, Mass. President, W. A. Clark, Boston, Mass.

News Items From Field and Trade

ALABAMA

The State Board of Examiners, which held a session Jan. 21-24, issued certificates of competency to twenty-three applicants as mine foremen, first-class; two for positions as second-class mine foremen, and eleven passed the test required to hold the position of fireboss in Alabama coal mines.

Promotions recently announced by the Woodward Iron Co. elevated J. A. Long, assistant general manager, to the position of general manager, and William Miller, superintendent of the coke plant, was promoted to be assistant general manager. Mr. Miller was succeeded as manager of the coke department by Harry Ross, formerly assistant superintendent.

ILLINOIS

The Southern Gem Coal Corporation receivership is now in effect for the second time, after the concern had once had it lifted on technical grounds. The original receivers, Charles B. Thomas and W. S. Wilson are in charge of the offices and property.

The mine at Tamaroa owned by the Little Muddy Coal Co. has a record of having worked every day during January. The shaft produces about 700 tons daily.

Thomas Hunter, a former employee for the Union Colliery Co. at Dowell, has accepted a position as state mine inspector in the Springfield District.

Work was resumed Feb. 4 at the McClintock mine of the Crerar Clinch Coal Co. at Johnson City. The plant has been shut down since the explosion of Jan. 25 in which 32 men died.

Miners employed at the mine of the Gallatin Coal & Coke Co.'s mine at Equality are now operating the mine on a co-operative agreement between the receiver for the company and officials of the local mine union. The drifts of the mine were filling with water and getting into such shape that it soon would have been impossible to repair the damage when the miners voluntarily went into the mine and repaired the damage. They then went to the receiver, Charles H. Guard, and signed an agreement to pay all the expenses of running the mine and a fixed amount for each ton hoisted in return for the sale of the coal. The plan was indorsed by the Circuit Court and also by the miners' union. The contract expires on April 1, 1924.

KENTUCKY

Another wash house bill has been introduced before the Kentucky Legislature to force operators to provide wash houses and hot and cold showers for mine workers. Such a law was enacted in 1920, but contained a provision that the operator would have to install such equipment when 30 per cent of his employees demanded it. A test case of the Beaver Dam Coal Co., of western Kentucky, was decided against the company in the Ohio County Circuit Court, and then carried to the Court of Appeals. On Feb. 28, 1922, the Court of Appeals in a decision, held that Chapter 20, Acts of 1920, was unconstitutional in that it was a delegation of legislative power, which only the Legislature had the right to decide.

The Carnegie Hero Fund Commission has awarded a bronze medal to Porter G. Gish, of Boxville, in Union County, western Kentucky, a mine motorman. He saved 24 men in a Union county mine from smothering or suffocating at Henderson, Ky., on May 26, 1921.

Fire destroyed the general office and store building of the Fordson Coal Co., at Stone, in the early morning of Jan. 30, causing a loss estimated at \$150,000.

A bill under which scrip issued by mining and other companies, would be redeemable every pay day by concerns issuing it to employees, has been favorably reported in the house. Such a bill was passed by both divisions of the Kentucky General Assembly in 1922, was later lost and never enrolled.

A state mining inspection board would be created in Kentucky if a bill introduced by Senator Griffin Keely, of Daviess County, was enacted. The bill provides for creation of a board composed of three practical coal miners, to be appointed by the Governor, and all miners permitted to work in mines of the state would have to pass examination under this board and pay a fee of \$2 each for "certificates of competency." The three board members would receive salaries of \$150 each per month and the bill would carry an annual appropriation of \$12,000. This is another law that is fostered by union labor.

W. B. Gathright, who for a number of years was manager in Louisville, for the St. Bernard Mining Company, has announced connection with the R. C. Tway Coal Co., selling coal at wholesale. Mr. Gathright left the St. Bernard Co. on January 1.

The Ulvah Coal Co., at Bluefield, Letcher County, lost its commissary store by fire on Jan. 28, the loss being \$10,000 with insurance of about one third that amount.

E. E. Lanning, of the Jellico Coal & Coke Co., Louisville, and member of the Horton Coal Co., Horton, was recently at Horton, planning the resumption of work at the company's western Kentucky mine, which has been down for some months.

It is reported that the Henry Ford controlled mines at Banner Fork, near Wallins, are planning to resume on full-time operations about March 1, with the idea of running full for nine months.

According to 1923 Geological Survey reports Kentucky showed a loss of 5 per cent in coke production, in a decline of 22,000 tons to 435,000 tons, whereas other states during the same period showed increases of 13 to 41 per cent. One reason for this has been small consumption in the state and long hauls to market along with development of coal markets consuming the fuel, while a good natural gas supply in the state has made for relatively small gas coke production.

MINNESOTA

Dr. Hans Holzworth, representing Thyssen & Co., of Germany, talked before the St. Paul Engineers' association last week on the lignite of North Dakota. He declared there was a supply of lignite for 700 years, and that by carbonizing and briquetting, lignite could be used for either anthracite or bituminous substitute. A plant is to be established at Richardton, N. D. by the Lignite Coal & By-Products Co., of Delaware, using the Thyssen system.

The Lignite Industries Corporation proposes to set up in St. Paul the first plant in this country for briquetting and extracting byproducts from lignite, before it is shipped to Texas. The machine has been tested in Germany for eight months under actual service conditions.

NEW JERSEY

Again placing responsibility for assuring an adequate supply of coal at reasonable prices at the door of Pennsylvania and the federal government, Governor Silzer sent a special message Jan. 29 urging the legislature to impress the situation on Congress. "Three remedies have been suggested," said the Governor's message. "The first is to call upon our neighbor—Pennsylvania—to adopt such measures as she may deem advisable to control the situation so far as it lies within the power of a state to do so. The second is to urge upon Congress the necessity of regulating the industry, not only to the extent of interstate commerce but also upon the basis that it is an industry so affected with the public interest that the federal government may exercise powers such as are now exercised, by act of Congress, over like industries. The third is to deal adequately with the situation after the coal is out of interstate jurisdiction and in the possession of local dealers."

OHIO

H. M. Griggs, manager of the Ore & Coal Exchange, Cleveland, who was recently in Cincinnati, says that there seems little likelihood of contracts being arrived at until the air is clarified of strike talk and labor trouble. He would not venture to name a price at which coal might move, saying that this was a situation that would have to work itself out.

Lathrop & Trotter have opened offices in the Union Trust Building, Cincinnati, and will be the representatives of the Conveyors Corporation of America at this point.

Pittsburgh and Zanesville capitalists plan the development of a 1,000-acre tract near Satillo, which is underlain not only with coal but also clay and sand. The coal will be removed by stripping. The company, which will be chartered soon, is to be styled the Consolidated Coal & Sand Co.

George S. Payne, who has been connected with the Blue Ash Coal Co. since 1913 and who is one of the oldest coal men in the Cincinnati district, announces that he will soon retire from that firm.

Contracts were awarded by the Columbus Board of Purchase for 10,500 tons of coal as follows: J. Miller Coal Co., Columbus, 8,500 tons of nut, pea and slack at \$1.40 f.o.b. mines, this coal to be used by the municipal light plant and the Water Works department. Central West Coal & Lumber Co., Columbus, 2,000 tons of Hocking nut, pea and slack for the garbage disposal plant at \$1.40 f.o.b. mines. All of this tonnage is to be delivered by March 31.

The Central mine, at New Straitsville, employing 107 men, reopened recently after a suspension of several months due to lack of demand. The Gem mine also will soon be reopened.

Several prominent operators from West Virginia attended a meeting held by the Fort Dearborn Coal Co. in Cincinnati Jan. 29 and 30. Among these were Holmes and Quin Morton, of Charleston; Walter Wood, Bill, Tom and Barnes Gillespie and Henry Harmon, all operators, and Harry Hall and George Staymer, of the offices of the company in Chicago.

The Simpson Creek Collieries Co., Cleveland, has been chartered with an authorized capital of 500 shares, no par value designated, to mine and sell coal and coke. Incorporators are Paul J. Bickel, F. S. Whitcomb, Howard L. Barkdull, Edwin H. Chaney and Frank Harrison.

A joint meeting of the Southern Ohio Pig Iron & Coke Association, the Ohio section of the American Institute of Mining and Metallurgical Engineers and the Cincinnati Coal Exchange was held Jan. 28 in the Hotel Gibson, Cincinnati, with 75 members in attendance. "Clean Coal" was the subject that occupied foremost attention during the session, which lasted throughout the day. Standardization of sampling and analysis was suggested as the best means to obtain coal that would burn with the least amount of waste and dirt. The meeting closed with a dinner, at which pictures connected with the coal-mining industry were shown. R. H. Sweetzer, of the American Rolling Mills Co. and president of the Pig Iron & Coke Association, presided at the meeting.

A. E. Frich, secretary to the superintendent of the Ohio Division and other Baltimore & Ohio Ry. experts who have been making an extensive study of maximum efficiency in the use of fuel as applied to the Ohio Division, have announced that a pound of coal moves a ton of freight six miles. The high price of fuel, even for the railroad, has led to an intensive effort at economy and a steady increase in the service to be obtained from every ton. The latest figures, however, have been worked out on a per-pound basis.

The newest and what will be one of the largest ore-carrying vessels on the Great Lakes, the William K. Field, named after the president of the Pittsburgh Coal Co., was launched Jan. 23 at Toledo. The new freighter is owned by the Reiss Steamship Co., of Sheboygan, Wis. The William K. Field is 604 ft. long with a 60-ft. beam, 21.6-ft. draught, and will carry 15,000 tons of coal. The ship will also be equipped to carry a load of 500,000 bushels of wheat. Among those present at the launching were Messrs. Field and Reiss and the following officials of the coal company: J. Donaldson, J. H. Woods, J. B. L. Hornberger and F. J. LeMoyné, vice presidents; C. E. Leshner, assistant to the president; Aaron Westlake, secretary, and Don Rose, general counsel.

PENNSYLVANIA

Herbert Hoover, Secretary of Commerce, has advised members of the Pittsburgh Coal Producers' Association to take part in the wage conference of operators and union officials at Jacksonville, Fla., Feb. 11. The suggestion was contained in a letter to C. J. Goodyear, representing the association. The association refused in 1922 to confer with the union except on a district basis, which the union refused, a strike resulting. Periodic suspension of coal production, Mr. Hoover said, had resulted in high-priced coal, the maintenance of a large number of uneconomic mines, and generally brought about a situation which called for the "real cure of a period of continuous operation under free competition and full movement of coal."

A certificate of incorporation for the merger of three big companies has been approved by the Public Service Commission. The companies involved are the Springfield Mining, the Bloomington and the Springfield companies. The new corporation will be known as the Springfield Coal Mining Co., of Ebensburg, with a capital of \$2,000,000.

M. D. Cooper, of Pittsburgh, assistant general superintendent of the Hillman Coal & Coke Co., in charge of plants in the Connellsville coke region, has his territory enlarged to include Edna Nos. 1 and 2 mines in the Irwin gas coal basin in Westmoreland County, and Jerome Nos. 1 and 2 mines at Jerome, Somerset County, succeeding S. Snyder, who was appointed mine inspector for the same company to succeed Arthur Young, who was recently appointed superintendent of the newly acquired Orient mine.

A. R. Budd, formerly vice-president of the Diamond Coal & Coke Co., has been appointed vice-president of the Hillman Coal & Coke Co., and J. D. Martin has resigned as chief engineer of that company to become general superintendent of the Virginia Iron, Coal & Coke Co., Inc., of Roanoke, Va.

Mike Viscosky, Alfred Ramsell, Mike Kulchek, Clement Acitelli and John Laputka, of Jerome, who were found guilty in the Somerset County Court last September of dynamiting the steel bridge at Jerome, causing a loss of \$100,000, were taken into court on Jan. 26, and given the following sentences: Viscosky, Ramsell and Kulchek, \$1,000 fine each and costs and to serve not less than five nor more than ten years each in the Western Penitentiary at Pittsburgh; Acitelli and Laputka were each sentenced to pay fines of \$1,000 and costs and serve not less than one year and six months nor more than three years in the same institution. Upon an appeal to the Supreme Court, the former three were released on \$5,000 bail and the latter two on bonds of \$2,500.

A state charter has been issued to the Crane Coal Co., Philadelphia, the purpose of which is the mining of coal and the manufacture of coke. The capital stock is \$50,000 and the incorporators are A. B. Crane, Wayne, treasurer; J. Albert Bayley, Laurel Springs, N. J., and Joseph W. Henderson, Chestnut Hill, Philadelphia.

Mayor John Durkan of Scranton has abandoned his willingness to agree to a valuation of \$380 per foot acre on local coal lands, after he had first announced an assessment of \$800 per foot acre, through the failure of the coal companies to agree to the increase over the present \$220 value. As a result, the Mayor has announced that the board of assessors will prepare the 1924 valuation books with the \$800 figure as a basis. This is taken to mean that the appeal of the corporations will be carried into court and a strenuous fight will be made against the increase. The companies, it is understood, were willing to agree to the mayor's offer to make \$380 the valuation for this year, but wanted the provision that they could file an appeal which would stand for some time. Whether or not the compromise negotiations were broken on this point could not be learned.

Thomas W. Harris, of Taylor, was awarded a gold prize of \$250 for having prepared the best paper among a number of competitors on "Working at the Face." The presentation was made at a banquet, at Minooka, Jan. 26, tendered by officials of the Hudson Coal Co. to the employees of the Greenwich mines.

The annual report of the State Employment Bureau of the Pennsylvania Department of Labor and Industry shows that during 1923 4,524 persons applied for work in or about the mines to the various branch

offices of the bureau. Of this total 3,372 were sent to positions and 3,335 of these received work.

A charter was issued to the Windber-Coalport Coal Co., Windber, with a capital of \$60,000. The incorporators are J. Wade Snyder, Windber, treasurer; Sylvester Lehman, Windber, and J. E. Reese, Scalp Level. The company will engage in mining coal and the manufacture of coke and by-products.

VIRGINIA

The Pardee interests, owning the Blackwood Coal & Coke Co., are beginning a development project in southwest Virginia which will involve an expenditure of approximately \$8,500,000 and which when mining operations meet normal production will afford about 2,500,000 tons a year. The company will first develop its holdings on the Southern Ry. between Appalachia and St. Charles, the new mining town to be known as Calvin, for the late Calvin Pardee, who was head of the Pardee interests. A contract has been let for the construction of 300 houses for miners at Calvin. Other buildings include a club house, bath house, theatre, two churches and modern tipples. The sum of \$3,000,000 has been appropriated for the construction of the new mining plant at Calvin, which is to be the first of three. Work on the second operation will be undertaken after the plant at Calvin is completed.

WEST VIRGINIA

Captain Bob Smith of the Litz Smith Co., of Huntington, announces that his concern will open sales offices in Detroit with A. Meters in charge. A. Alexander, who has been associated with Manager Albrink of the Fuel Forwarding Exchange at Russell, joined the Huntington forces.

Under a reorganization of the Tierney Mining Co. and the Tierney Coal Co., interests of Colonel Z. T. Vinson and of Donald Clark, of Huntington, in both companies have been acquired by the estate of the late Laurence E. Tierney. Under the plan of reorganization the name of the Tierney Coal Co. has been changed to the Laurence E. Tierney Land Co., with offices in Bluefield. This company controls about 10,000 acres of coal land in Pike County, Ky., part of which is under lease. Officers of the company, just elected, are as follows: Mrs. Laurence E. Tierney, president; John L. Tierney, vice-president; Dr. L. H. Clark, secretary. Directors of the company include Mrs. Laurence E. Tierney, Laurence E. Tierney, Jr., Dr. L. H. Clark, John L. Tierney and G. C. Wood.

J. W. Knowlton, of Elkins, who has been engineer of tests of the West Virginia Coal & Coke Co. and who recently accepted the position of manager of the coal department of the Southern Power Co., left late in January for his new post at Charlotte, N. C.

Clarksburg capitalists have organized the Dry Fork Sewell Coal Co., with stock of no par value, 25 shares having been subscribed at \$500. This company will have its office at Clarksburg. Identified with the new concern are R. H. Pailerson, E. Ray Burnside, L. J. Shanahan, J. M. Carter, G. M. Barnes, all of Clarksburg.

Statistics have just been made public by the Consolidation Coal Co. showing that that company and its predecessors have produced a total of 233,001,657 tons of coal in the 59 years in which they have been operating. The company mined its first ton of coal in 1864 and by 1871 a half-million tons had been produced. The Watson family has been interested in all the predecessors of the Consolidation just as they are in the Consolidation. The company's year of largest production was in 1915, 11,722,344 tons being mined in that year. In 1913 a total of 11,154,897 tons was mined.

Announcement has been made that the trial of William Blizzard on a charge of murder will be the first case to be brought before the court when the "armed march" cases of Blizzard and his fellow mine-union officials, C. Frank Keeny and Fred Mooney, come up at Fayetteville Feb. 11. The charges are all in indictments found in Logan County and removed by changes of venue first to Jefferson, then to Morgan, and then to Greenbrier County. The transfer to Fayette County came after a jury had disagreed in trial of Blizzard on the murder charge, connected with the killing of Deputy Sheriff John Gore of

Logan during the 1921 march, and after charges had been made of attempts to corrupt prospective jurors in Greenbrier County.

WASHINGTON, D. C.

Appointments to the executive committee of the National Coal Association made at the recent meeting of the board of directors are as follows: J. C. Brydon, (Chairman), president Quemahoning Creek Coal Co., Baltimore, Md.; J. G. Bradley, president, Flk River Coal & Lumber Co., Dundon, W. Va.; Ira Clemens, president, Clemens Coal Co., Pittsburg, Kan.; E. L. Douglass, vice-president, First Creek Mining Co., Cincinnati, Ohio; Michael Gallagher, general manager, M. A. Hanna Co., Cleveland, Ohio; G. M. Gillette, manager, Consolidation Coal Co., Frostburg, Md.; T. W. Guthrie, president, Hillman Coal & Coke Co., Pittsburgh, Pa.; S. Pemberton Hutchinson, president, Westmoreland Coal Co., Philadelphia, Pa.; A. M. Ogle, president, Vandalia Coal Co., Terre Haute, Ind.; P. H. Penna, secretary, Indiana Bituminous Coal Operators Association, Terre Haute, Ind.; S. L. Yerkes, vice-president, Grider Coal Sales Agency, Birmingham, Ala.

David L. Wing announces the removal to the Transportation Building, 17th and H Streets, N. W., of his office for consultant work on industrial economics and statistics: for research work both in the United States and in foreign countries, especially Latin-American; for the conduct of inquiries and the preparation of briefs of fact and reports for submission to congressional committees, and to federal, state and local commissions and boards, and for use in litigation.

John H. Libby and Thomas K. Meloy have formed a partnership under the name of Libby & Meloy, industrial counsel, with offices in the Southern Building, Washington, D. C., and a branch office at 61 Broadway, New York City. The firm will make investigations of various phases of industry involving economics and engineering.

CANADA

A wage conference at Sydney, N. S., between representatives of the Dominion Coal Co. and officials of the United Mine Workers adjourned on Jan. 29 until Feb. 5 and issued the following official statement: "The representatives of the Dominion Coal Co. offered to renew the wage contract at the 1923 rates. Representatives of the United Mine Workers offered to renew the contract with an increase upon the 1923 rates of 55c per day for day paid workers and an increase of 20 per cent on contract-rates. The adjournment moved by the representatives of the United Mine Workers was agreed to in the hope that when negotiations were resumed, better progress might be made."

A summary of the coal trade of Canada for 1923 issued by the Dominion Bureau of Statistics shows imports of anthracite to the amount of 5,165,382 tons, valued at \$46,457,902, as compared with 2,705,752 tons, of the value of \$23,795,743, for 1922. Bituminous coal was imported to the amount of 15,822,240 tons, of the value of \$49,899,099, as compared with 10,317,773 tons of the value of \$37,387,285 during the preceding year. Imports of coke were 733,604 tons, value \$5,790,771 as against 336,270 tons, value \$3,094,042 in 1922. Exports of coal from Canada amounted to 1,654,706 tons, value \$10,661,399, as against 1,818,582 tons, value \$11,159,060 in 1922.

Industrial Notes

A. B. Day, who founded the Sanford-Day Iron Works, has organized the Day-Evans Iron Works at Knoxville, Tenn., with a capital of \$200,000. A. W. Evans, engineer of the company, who is in charge of construction work, expects to have rail connection with the L. & N. and Southern rrs. soon. The new company will manufacture mine cars and general mine equipment.

The Ohio Brass Co. recently purchased approximately five acres of land, and buildings just across the Pennsylvania R.R. tracks from its present Mansfield plant. The tract is triangular in shape and is bounded by three trunk-line railroads—the Pennsylvania, Erie and Baltimore & Ohio. The purchase was made from the Aultman-Taylor Machinery Co.

New Equipment

Safety Powder Flask

Every mine owner and the workers in his mines know of the ever-present danger of powder explosions due to what have seemed unavoidable accidents with the old powder flasks. Loss of life and money is the usual result when the powder burns. It is claimed that the new Fannon's "Safety-First" Powder Flask, manufactured by the American Safety Mine Appliances Co., of Knoxville, Tenn., gives absolute control of the explosive powder. The illustration herewith shows how every possibility of accident is done away with.

A few of the safety features of the



Flask for Blasting Powder

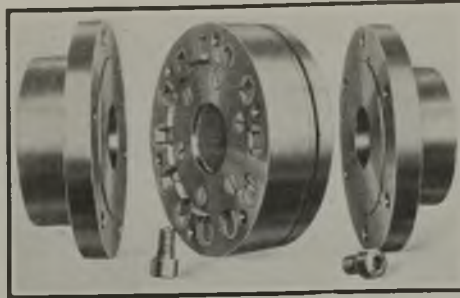
The design of this container prevents spillage and permits easy filling with little danger.

new powder flask aside from the hand-gripped trigger are that it prevents spilling of powder in making cartridges, prevents miners from sticking picks into kegs, and is safe from fire by bystanders—sparks or flames cannot enter the flask.

High-Speed Flexible Coupling

Couplings operated at speeds between 3,000 and 9,000 r.p.m. need to be made of steel and should at the same time provide for easy endwise movement. For these conditions the Smith & Serrell Co., of Newark, N. J., has developed a high-speed flexible coupling suitable for from 6½ to 98 hp. per hundred revolutions. This coupling is very easily accessible for inspection and for repair without moving either of the connected machines. It is of the laminated spring construction which provides flexibility and durability. As far as possible all parts are made interchangeable.

In the outer member of the coupling are keepers into which the laminated springs fit. These keepers can slide endwise; thus the bearing between the bundle of springs and the keepers is



Flexible Coupling for Turbine Drives

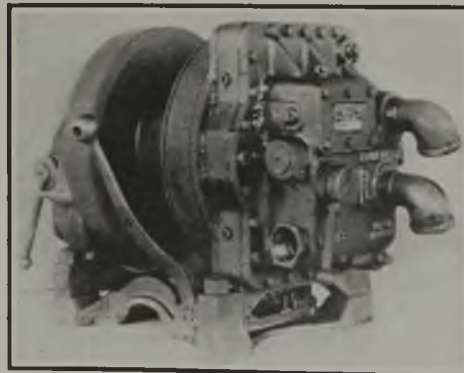
A high-speed steel coupling with flexible radially mounted spring bundles set so as to quickly adjust the two coupling members when driven at high speeds.

constantly upon a surface bearing rather than line or point contact. The bundle of springs also can slide in a vertical direction, making the coupling flexible in all directions.

New Model Air Hoist

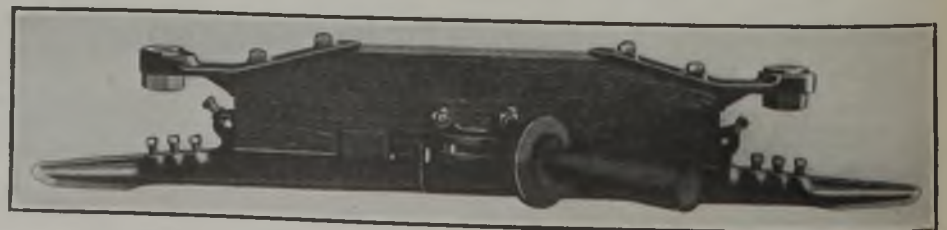
More powerful air hoists of the Little Tugger type are now being manufactured by the Ingersoll-Rand Co., of 11 Broadway, New York. They were developed and perfected to meet the demand for a more powerful single-drum hoist than the 1H and 5H types.

Besides having increased power and durability, the manufacturers claim a



Air Hoist for Mining Service

much greater air efficiency than heretofore known in a machine of this type. This low air consumption is due to the fact that the motor runs in one direction only and has a specially designed piston. The air consumption per delivered horsepower varies from 25 to 30 cu.ft. per minute over a range from 5 to 11 hp. at air pressures running from 50



Section Insulator Switch of Heavy Construction

This new switch is capable of carrying heavy feeder line currents into any section of the mine, thus making possible the combination of trolley and feeder switch in one.

to 80 lb. per square inch at the throttle. The new hoists, known as the 10H class are made in three types, each type specially suited for its particular field of operation.

The slushing hoist has deep-flared flanges which serve to eliminate rope and drum wear when the rope is not led on straight. The general-purpose hoist differs from the slushing only in the provision of a drum with straight flanges and the addition of a brake band and other brake details. The 10HL, or large-drum, hoist differs from the general-purpose hoist only in size of drum and base. This hoist is intended for work where a large drum and exceptional rope capacity are needed.

Heavier Designed Section Insulator Switch

A heavier design for all the needs of modern heavy electric haulage—greater current capacity, ruggedness, and mechanical strength for withstanding constant passage of high current locomotives—and a method of suspension which simplifies the problem of roof clearance are features of a new Ohio Brass Co. section insulator switch.

Like other O-B section switches this new design provides an underrun for the trolley wheel, even though the switch itself may be open. This is provided for in the rigid underrun across the circuit-breaking section of the switch. All parts of the switch are heavy for severe service with heavy locomotives and heavy motor currents. The approaches, the underrun and the knife-blade circuit breaker and clips are designed for a heavier than ordinary rating, ample for all requirements—even to carrying the feeder line through the switch. Lugs on each end of the switch permit installation of feeder connections and allow for opening the feeder circuit as well as the trolley circuit when the switch is opened. The switch is designed for 4-0 trolley wire and will take feeder wire up to 4-0.

The two suspension brackets are set so that the hanger support is below the top of the switch. Thus it is possible to keep the trolley height even with one of these switches without cutting into the roof for clearance. Standard insulated hangers should be used with a section insulator switch, for by this scheme of support they may be used without serious problems of clearance. Hangers are installed just as they would be for trolley clamps, and the switch is attached without further roof drilling or chipping.