

COAL AGE

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A Post-Graduate Course

PHYSICIANS and surgeons who desire to progress take supplementary courses to keep up with the times. In the coal industry, the technical press and in a minor degree travel from mine to mine, even from country to country, is relied on for a similar result. Many find a further opportunity in attending institutes. The Coal Mining Institute of America holds its post-graduate course this coming week. Let us hope it will be well attended. It is a clinic to which we go not as patients but as doctors of mining engineering. He who would advance cannot safely overlook such an opportunity. It is a waste of valuable time to stay at home when industrial experiences are being exchanged.

Twenty-five Years Without a Fatality

VIEW it as you please, the Gay record for safety recorded in this issue is remarkable. A quarter century without a fatality yet producing an average of 100,000 tons a year! Of course, as some will say, the roof is good, but it wouldn't be safe without careful watching, and concentrated mining makes such close supervision possible. The roof is only one of the occasions of accident, even though the most important, and the Gay Coal & Coke Co. has avoided accidents from these other causes also. It has also regular and easy grades, and these are in its favor. Still there is no way of belittling the record. It stands as an unusual achievement.

As said, Gay methods of mining make a complete control of operations easy. Strategic points within the workings are connected to each other and to the surface thus affording direct communication between officials. But the men at the mine can claim much of the credit. They have given continuous and hearty co-operation. Their steady work and fair treatment have inspired loyalty.

More than ordinary care has been taken to choose the best men to occupy responsible positions. No man is allowed to run a locomotive unless he has first served time as a trip rider, and he must be qualified otherwise. Only motormen on regular duty are allowed to operate locomotives. The promiscuous running of locomotives during the night shift by any man who happens to be on the job is not permitted. Only 250 volts is used on the trolley lines. The timbering is done by company men and done systematically and when needed. That is a detail that makes for safety.

Equipment of all kinds is kept in excellent repair. Locomotives and other rolling stock as well as all portable machines are frequently inspected, and any defects found are corrected on off-shifts. Mine track is kept in shape religiously. Wiring and other miscellaneous details are maintained in condition

meticulously. Here good engineering practice has counted. It has not increased costs; it has diminished them and decreased accident.

It would be difficult to find such a chronicle if you searched the records of operations under the blue sky where darkness does not interpose its dangers. The Gay mine affords a record for all the world.

Are Mines So Unhealthful?

WITH a number of useful illustrations Mr. Harrington in this issue vindicates his statement that our mines are not as sanitary and healthful as they well might be. Before accepting his statement, however, we would like to know somewhat more clearly where his facts were obtained. In the West are a number of so-called "lungers" who have gone to a dry climate to enable their weakened organs of respiration to recover from disease. If these men are miners or enter the mines on reaching the West it would not be surprising if they made a bad showing.

His attack on the use made of statistics, American and British, especially British, is not without justification. It is true that miners whose physique is below the average leave the mines and so increase the mortality rate of non-miners. Those who have drawn conclusions from data attainable are mostly men who have no opportunity to make original inquiries to ascertain the life history of several thousand men and draw from these data a more definite understanding of actual conditions. And indeed if they should do so their inquiries would be of only partial value, for local conditions would not afford a conspectus of the whole industry.

The coal dust in one region might be worse than in another as to density, fineness and sharpness. So let us not with Mr. Harrington term the men "sheep like" who draw such conclusions and make such statements. They merely do their best to obtain conclusions from inadequate statistics. Alas that statistics are so inadequate! After all, Mr. Harrington has drawn some conclusions from imperfect figures. How does he know, we would ask, that the farmers and shopkeepers in the cases he instances were formerly miners? How does he know that the miners whom he found suffering from tuberculosis were free of it when they entered the mines? It may be so, but we doubt if he has statistics to show it.

The industry, we feel certain will please Mr. Harrington in the zeal with which it will wet down the coal. But his assurance that the West has led the way in this regard would be disputed by Milton H. Fies, vice-president in charge of the de Bardeleben Coal Co., of Alabama, who gives credit to that state for first wetting down cutter bars. Alabama has gone ahead energetically in this direction.

It is certain that room faces should be better venti-

lated for safety from gas as well as a defense against dust, oxygen depletion, carbon monoxide, nitrous oxides, and hydric sulphide fumes and as a means of stimulating production. Consequently Mr. Harrington has done a service in advocating it.

We Could Do That Ourselves

MANY backward nations have been taken in tow by those that were more progressive and these parental governments have introduced measures resulting in the increased comfort and greater well-being of those whose freedom and self-control were thus restricted. In almost every case the subject nation arrives at a point when it asks, Could not we by adopting the methods of the nation which rules us attain the results that it has achieved? Could we not take back our freedom and run our own affairs? Could not we ourselves do what they are doing for us?

The coal industry is in a like position. For many years it was backward in solving its power problems. Antiquated equipment was all the mines had. They had to burn their good coal to raise steam. They used steam hoists. They wasted power. They had an ill-regulated load. The night duty was almost nil; the day duty was heavy. Bad water levied continuous toll. The mechanical and electrical engineers—where there were any—complained bitterly, pointing out that if such inferior equipment was provided no good results could be obtained, but they were not heard.

The rulers of the mines were mining men; they had little interest in mechanical and electrical details. They spurned advice. They wanted power; and the engineers, who were required to provide it, must supply it cheaply and give it when and where it was needed. Why, the electrical engineers were asked, should they try to regulate the mine in the interest of their own inefficiency? Why demand that pumping be made a night duty? Why talk of smoothing out peaks? Why call for electric hoists when steam would do the work?

This went on till the companies gave up their suzerainty to the public utilities, which promptly put the mines under a regimentation which suited their own advantage. The companies, to save money, began to smooth out their load curves. They watched the meters that the power corporations had installed for the purpose of keeping jealous guard of the coal companies' misdoings. Thus the companies reformed and now they are asking, as all liegemen ultimately do, Why could we not do that ourselves? Why do we have to listen to these outsiders? If we had but heeded the advice of our own mechanical and electrical experts we would be producing our own power today.

So perhaps operators will get down to the business of manufacturing their own power, making mechanical and electrical matters—or electrical and mechanical matters, at your pleasure—their own especial interest. The consolidations of coal companies are making possible large power plants with the economies that go with them, and perhaps we shall herald another era when the power consumed at the mines will in general be produced there. The control of the power companies, however, will have been good for the coal industry. In some cases the electrical or mechanical engineer will be placed in charge instead of in duress. We are waiting to find out if that is what is going to happen. But while there is a doubt, perhaps it would be well for the mining engineer to brush up on his electricity.

He might find himself laid on the shelf otherwise. In any event he should know enough to handle economically the power that his company is purchasing.

E. J. Gealy's story of Illinois shows that in that state the coal companies have not laid down supinely and put into the hands of others an important part of a business that they should have undertaken themselves. It may be that in Illinois engineers have seen their duty more clearly than elsewhere and sold to the operator the value of installing proper equipment for power generation and the need for regulating the use of power so as not to overload plant or transmission lines.

Better than Rock Dust?

WHEN Professor Wheeler was here he assured us that Great Britain was looking for something better than rock dust, but was so well satisfied with it despite its faults that it was prescribed in that country for all dry mines and would probably be required even in those that were naturally wet. Since that time Great Britain has required the use of inert dust in all mines producing bituminous coal.

The only substitutes proposed are salts, soaps and oil. None of these are without their objections, and for the present the dictum still seems to favor incombustible dusts. Every cure will lose its efficiency if not applied frequently, provided more coal dust is deposited, and probably all the substitutes have the disadvantage that in time even without deposition of dust they will lose part or all their efficacy.

So it would seem wise to adopt the method to hand promptly. Certainly no mine will do well to solve the problem by doing nothing. Winter approaches with its menace, and the mine which has made provision of no kind or has provided only for the moistening of the air current will have shown the worst of judgment as a single explosion will abundantly prove.

Many suggestions can be made as to the varying recommendations of experts, but cast your mind backward. The electrical engineers years ago advocated direct-current generators. These machines served that generation well. They justified in a degree the judgment of the electrical engineers; but eventually alternating currents with substations and motor-generator sets and rotary converters took the place of the direct-current generator. The pump men advocated reciprocating pumps and they still have their part to play, but after a while the centrifugal pump proved best for large volumes of water and reasonably high lifts especially for discontinuous service, and the mining public recognized their advantages; thus many have been installed.

If we wait for the final pumping solution our mines will be drowned out. If we delay for the last word in electrical practice our haulage problem will bankrupt us. If we linger till the final judgment is rendered on immunization of our mines from dust explosions our heading and mine faces may be strewn with the victims of our dilatoriness. Consequently it is well to prepare at once to rock dust our mines lest retribution, dire retribution, follow. Who will dare defend himself if his mine blows up, and he is found still waiting for the decision on the best practice that the year 1950 or 2000 may make? We have our 1924 problems. Let us use the only available decision, that of 1924 and preceding years. That is not to say that experts should not study the value and possibilities of substitutes and give the problem the benefit of their careful thought.



Gobbing a Parting by Machinery

With Slabbing System and One Machine Loader Gay Handles 250 Tons of Coal in 8 Hours

Wide Pillars Between Room Pairs Slabbed on Both Sides Concurrently—Mechanical Loader Increases Output per Face Employee 40 Per Cent—Parting from Eight to Twenty Inches Thick Removed by Arcwall Machine

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ON THIS DAY of national thanksgiving the Gay Coal & Coke Co., of Logan County, West Virginia, celebrates its twentieth anniversary as a coal producer. Through this score of years it has mined over 2,500,000 tons of coal, without a single fatal accident.

The State Department of Mines of West Virginia cites this record with justifiable pride. By merit of it the company enjoys the lowest compensation rate that the state law allows. Such a record is well worthy of note, especially as it comes as the result largely of a carefully planned method of operation.

Shortly after the Gay mine was opened, or to be exact, in January of 1905, the management began a series of experiments in mining methods, all of which were based on the principle of longwall operation. These tests developed new safety measures and established the conviction that thick beds of coal can be operated successfully by longwall, even when found under fairly heavy cover. Incidentally, they disclosed the fact that coal can be produced in some beds by a modified longwall system at a lower cost than by room-and-pillar methods, even though the roof neither bends nor breaks freely. Evidence of lower cost is found in continuity of operation, for in the score of years that this mine has been worked it never has been shut down, either by reason of a strike or from any other cause. In weighing this fact, also, it must be remembered that the mines of Logan County have not always enjoyed the economic advantages which they now possess.

At first an attempt was made to produce coal from a continuously retreating longwall face. This system, however, failed chiefly because the roof could not be controlled. From this experience the single-room system

was devised, in which a modification of longwall mining was attained by widening the rooms. Many of the details of this system have undergone alterations, and the plan now employed is the result.

SPECIFIC CONDITIONS FIX ROOM PROPORTIONS

Up until 1915 rooms were driven 10 to 12 ft. wide and 285 to 300 ft. long on 100- to 120-ft. centers. These dimensions were not arbitrary, but specific conditions dictated their exact proportions. The rooms were then mined, one at a time, either advancing or retreating, to a width of 80 to 90 ft. This was done by slabbing the blocks between rooms in longwall fashion, leaving pillars up to 30 ft. wide for roof support. No attempt was made to recover these narrow pillars, and their presence in the abandoned section assured the success of the system, because directly above the coal lies a 30-ft. bed of strong sandy slate which caves with difficulty even in wide spans.

In driving these single rooms sufficient air could not be carried to the faces, consequently crosscuts were driven between adjoining rooms after these had progressed for half their length. Brattices were also used to facilitate ventilation. The inadequacy of the ventilating system and the expense of driving rooms in this manner led to the adoption of the double-room system.

No. 1 main heading (see Fig. 5) from which the old section of the mine was developed, consists of two entries, whereas the No. 2 main, which serves the sections now being worked, has three entries. These are protected by 100-ft. pillars and driven in a southwesterly direction up the pitch, the grade of which is $1\frac{1}{2}$ per cent. Butt entries are accordingly driven level, except

for local dips in the coal measure. This arrangement gives grades favoring the loaded cars.

Where the coal is clean, main and butt entries are driven 15 ft. wide with 40-ft. chain pillars between them. In the sections of the mine now being worked most vigorously, a soft-shale parting, sometimes as much as 20 in. thick, divides the bed into two benches. This makes it necessary to drive the headings 18 ft. wide instead of 15 ft., the additional width being needed for the storage of the refuse, none of which is taken out of the mine. In like manner the thickness of this shale band governs the initial width of the rooms.

In the double-room system, the butt entries are driven at such intervals as will leave a panel 350 ft. wide between them. Pairs of rooms are then driven on 185-ft. centers so as to divide the panel into blocks 135 ft. wide and 350 ft. long. Each room of a pair is driven 15 to 18 ft. wide on 35-ft. centers. These dimensions are shown in Fig. 1, which indicates the plan by which the double-room system is operated.

Driving the rooms in pairs instead of singly and dividing the panels between the butt entries into blocks serves two purposes. Not only does it facilitate ventilation in this narrow work, but it also allows the intervening blocks to be mined from both sides simultaneously. This is accomplished by successive slab cuts advanced toward each other and toward the center line of a block, as shown in Fig. 1.

CHAIN PILLARS AND SLABBED BLOCKS LEFT IN

In order to protect the butt-entry haulage roads, especially when the system is worked advancing, these slab cuts which average 300 ft. in length are gradually

shortened as they approach the center line of the block. This leaves a somewhat triangular stump which is recovered in retreat.

The percentage of unmined coal left when an area is abandoned depends entirely upon the conditions. Chain pillars between rooms are never recovered. Though an attempt is made to mine out the coal in the blocks between room pairs, as in block 2 of Fig. 1, the roof sometimes shows signs of breaking near either or both of the approaching faces as the pillar between them becomes narrow. In this event the pillar is abandoned as is shown in block 3 of Fig. 1. The average recovery of coal for the entire mine is about 80 per cent, which compares favorably with that attained throughout the Logan field.

Track of 32-in. gage is laid parallel to the face and at a distance from it of 5 ft. If the roof shows no weakness the first row of timbers is placed 15 ft. from the pillar. Under weak roof and during the last few cuts finishing a block, this distance is shortened to 11 ft. The average, therefore, is about 13 ft. This measurement is, of course, the average span of unsupported roof along faces before they are cut. Consequently, depending upon roof conditions, the maximum unsupported span in front of a newly cut face including the depth of the machine cut varies from 17 to 21 ft., giving an average of 19 ft. The arrangement of a face may be seen in block 4 of Fig. 1.

Posts of an average diameter of 8 in. are placed on 10-ft. centers, in rows 6 ft. apart. No attempt is made to recover them; in fact their presence for some distance in the rear of the face retards any subsidence of the roof, and so prevents the coal face from being subjected to squeeze. It should be remembered also that the

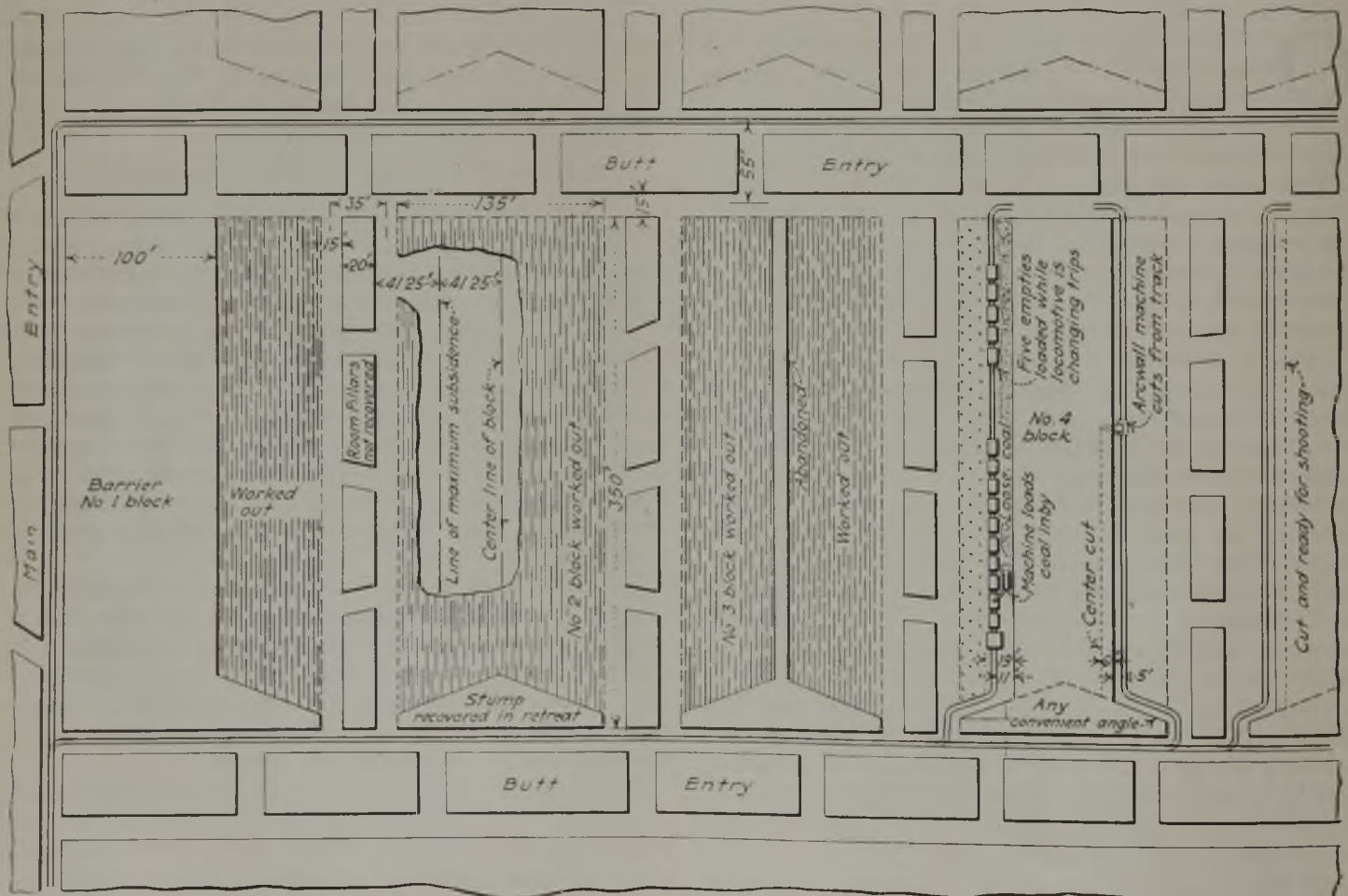


Fig. 1—Double-Room System of Modified Longwall Advancing Used in Gay Mine

Rooms are driven in pairs with a 20-ft. pillar between them which is never recovered. It helps to support the roof while the wide pillars on either side are being removed. These pillars are slabbled from opposite sides, successive cuts advancing toward each other. The faces are center cut, and the two benches drilled by machines on the face track. The coal is loaded mechanically.



FIG. 2

Cutting Face

A heavy shale parting in the middle of the bed is removed by one, two or three cuts of an arcwall machine operated from a face track. This enables the machine to cut to a uniform depth and move rapidly along the face.

blocks are mined at a rapid rate and that the roof is sound. That is why the posts are capable of serving the purpose described. As a rule, the initial set of the roof is not appreciable. Even though the timbers might be recovered with safety, the procedure would be hampered greatly by the refuse from the cutting machine that is piled between them, the machine making its cuts in the soft-shale parting. When clean coal is mined by this system and the roof will permit, many of the posts can be recovered.

Over fairly long spans the roof is self-supporting to the extent that it will not come down for a long time after the coal has been removed, nevertheless there would be more or less bending of the roof strata immediately above the coal were timbers not employed. This bending or subsidence becomes greatest along a line midway between the center of a block and an adjacent room pillar, as indicated in block 2 of Fig. 1.

As this point of ultimate maximum subsidence is approached by the working face, either the diameter of the posts or their number is gradually increased. Conversely as the working face recedes from this line, either the diameter of the timbers or their number is gradually diminished. This practice is not necessary in mining all blocks, but is followed where the roof in the early stages of block extraction exhibits a tendency to bend. The same reason that dictates this practice also forbids recovery of the timbers and of the narrow room pillars. It is adopted in order to avert or delay the occurrence of a local squeeze.

ACRE AND A QUARTER STANDS FOR MONTHS

In one section of this operation a mined-out area having a width of 136 ft. and a length of 400 ft. has been standing for months, without the surrounding coal being apparently affected adversely. The first experiment with a system of retreating longwall on a 300-ft. front, in which the face was mined for a distance of 120 ft. without causing a roof fall, proved that in the use of any modification of this system, under the conditions that exist in the Gay mine, squeezes can be avoided only by leaving pillars at given intervals. Whether the thickness of the cover above the bed is 500 or 1,000 ft., the chain pillar between each pair of rooms serves its purpose with almost equal effectiveness.

Extensive falls of roof, of course, occur in many parts of this mine, although in most instances the lapse of an appreciable interval is required for this action to take place. Such falls give ample warning. The timbers take weight gradually, cracking or brooming as much as 6 in. before they break. Diligence must be exercised in

the supervision of the last few cuts that complete the mining of a block. One of the two approaching faces is abandoned and the track removed. This permits greater concentration of effort along the face being worked and a quicker-withdrawal at the first sign of danger.

MATCH STICKS GIVE WARNING OF MOVEMENT

On off shifts during this stage of the work no mine cars or machines are left along a working face, but timbers are set closer and the roof is watched with extreme care. Mud seams in the roof are dangerous, particularly if they occur near the center line of the block being mined. Cracks are observed periodically for any increase in their width or the advance of one side beyond the other. Slight movement between the two sides may be detected by the falling of small sticks, such as match stems that have been inserted in the crack.

It is manifest that a greater concentration of work for a given area can be attained in the double-room system than in the single-room. Aside from increased concentration, however, this method affords greater safety. Inasmuch as each block is mined from both sides, the time of extraction is only one-half that necessary with the single-room system, and the distance that each face must be advanced to complete the mining is correspondingly less. As a result the roof has less time in which to act before the block is mined out, and should it show signs of weighting its leverage is of less magnitude.

The success of this system is dependent entirely upon concentration and quick recovery, together with the leaving of narrow pillars at given intervals to support the roof until 80 per cent of the coal in any particular area has been removed. The advantage of leaving pillars to support the roof while the coal between them is being worked out is most readily discernible in the room-and-pillar system. If, however, these pillars are not recovered in second mining their presence in the goaf, according to the usually accepted theory, tends to create squeezes. This is particularly true if such pillars are not of sufficient size or number to support rigidly the overlying strata throughout a long period of time.

From the observations of mining men over a term of years, it has been proved that the larger the percentage of recovery, the fewer are the squeezes incurred, other conditions being similar. In the Gay mine, squeezes, when they occur, manifest themselves only on the narrow pillars in the abandoned workings and generally do not affect the faces being mined. Thus a squeeze developing in block 3 of Fig. 1 either would be completely stopped by the chain of pillars between blocks 3 and 4. or would be greatly retarded by them.

Although there are several conditions in this mine that might be expected to prevent the success of this system, squeezes on the working face are rare. The rigidity of the 30-ft. bed of sandy shale, as well as that of an indeterminate thickness of other strata above the coal, stubbornly resists the force of gravity which otherwise would cause immediate caving or subsidence as soon as the coal was removed.

Despite their apparent inadequacy, the pillars left at given intervals, appear to counteract the force of gravity which tends to bend or break the roof. After a pillar has been abandoned it is capable of "holding its own" throughout a sufficient period of time to enable the mining front to progress beyond the limits of any danger zone that may be established.

SHALE BAND CUT OUT BY MINING MACHINE

Quick recovery is highly important. Apparently, 80 per cent of the coal can be drawn from beneath the roof before it has had time to collapse. Before the collapse comes the seat of mining operations has been far removed and is protected by intervening pillars. Chain pillars 40 ft. wide along the butt entries prevent the abandoned panels from squeezing and prevent the squeeze from crossing into an adjoining panel of solid coal. In course of time the roof comes down, thus relieving the pressure and stopping the squeeze.

The clean coal in the Cedar Grove bed (locally known as the Island Creek) which is worked in the Gay mine, attains a thickness of 74 in. A band of soft shale, having an average thickness of 8 in., but sometimes thickening to over 20 in., occurs in the middle of this bed, throughout the sections now being worked. In portions of the bed operated prior to 1915 the coal was practically



Fig. 3—Electric Drill Mounted on a Truck

Mining operations in the Gay mine are highly mechanized. The coal face is drilled by an electric machine mounted on a mine-car truck which moves readily from place to place along the face and is always ready for work.

free of partings, consequently undercutting machines could be employed to advantage. At the present time, a Jeffrey arcwall machine with a 7½-ft. cutterbar removes this shale parting.

Depending upon its thickness, one, two or even three cuts are required to remove this band. A kerf is first made in the top of the band and then widened to the thickness of the parting by one or two additional cuts, the arcwall machine traveling on a track, which is kept 5 ft. from the working face. This distance is accurately maintained in order to keep the depth of cut uniform. The track is laid with 20-lb. rails placed on steel ties

spaced on 2-ft. centers. The light weight of this track permits it to be moved over easily by means of bars to each new position as the face advances. However, in order to provide the necessary rigidity and eliminate trouble in keeping the cutterbar in a correct position, 30-lb. rails are recommended.

A machine runner and his helper can make a double 6-ft. cut along a 300-ft. face in 10 hr., or a triple cut in 16 hr. The best record thus far made by this arcwall machine under the conditions existing, is 1,200 lin.ft. of a single 6-ft. cut in 12 hr. Where the soft-slate band is thicker than the width of one cut and less than two, the second cut is made by traversing the cutting machine.

Four men are necessary to dispose of the "shale bug dust" from a double cut. A 4BU-type Joy loader is used to gather the cuttings from the floor at the face, after the cut has been cleaned out. This machine deposits the refuse on a Jeffrey pit-car loader, because the loading machine is not provided with a swinging conveyor and works with its main axis parallel to the face. The pit-car loader thus serves as an auxiliary conveying unit with its conveyor extending at an angle to the track and discharging the bug dust behind the nearest row of props. This arrangement is clearly shown in the head-piece of this article.

One of the four clean-up men operates the loading machine, two handle the pit-car loader, and the fourth scrapes the bug dust out of the cut in advance of the machine and later on follows after it with a hand shovel, gobbing the material that it has missed. If the arcwall machine has to make three cuts to remove the parting, an additional man, making five in all, is required. Gobbing the bug dust from a cut takes from 5 to 8 hr. depending on the thickness of the parting. Cuttings from an 8-in. band on a 300-ft. face can be cleaned up in 5 hr.

TRUCK-MOUNTED DRILL SINKS ALL SHOTHOLES

The shotholes are made by an electric drill. This is mounted on a mine-car truck which travels on the face track as illustrated in Fig. 3. One man does all drilling, another loads and shoots the holes. As a rule about thirty-five holes are drilled in the upper bench of a 300-ft. face and an equal number in the lower one. These holes are started 12 in. from the bottom or top, as the case may be. The bottom holes, which are shot first, are charged with 15 in. of FF black powder. The top holes are charged with 11 in. of the same explosive. Both top and bottom benches are fired with electric blasting caps as prescribed by law. A permissible dynamite is employed for pop-shots.

For many years the management of this mine has been highly interested in labor-saving machinery, and its present methods are the outcome of experience gained during this time. A 5BU-type Joy machine is now employed in coal loading. It handles 240 tons or more in 8 hr. on the day shift. It is also being used on the night shift, in which it loads about 180 tons in less than 8 hr. Less coal is mined in the night than on the day shift because an insufficient number of mine cars are then available for loading. On Sept. 13 last, one month after the machine was installed, it loaded 250 tons of coal on the day shift and 230 tons during the night, making a total of 480 tons in 16 hr. Less than three weeks after its installation, it had loaded 245 tons in one shift. During this shift, however, 1½ hr. were lost in protracted waits

for cars, and $\frac{1}{2}$ hr. was consumed in moving from one face to another. The time losses mentioned do not include brief periods of idleness occasioned by waiting for trips.

The records above cited were made by inexperienced operators under the supervision of a demonstrator. The



Fig. 4—Coal-Loading Machine at Work

This machine soon displayed its ability to perform the duties for which it was intended. Shortly after installation it loaded out 420 tons of coal in 16 hr., from two long slab cuts. The roof over the working places is strong, neither bending nor breaking freely. For this reason a wide span of unsupported roof is permissible.

management is satisfied if it obtains 200 tons per shift from the loading machine. Judging from results thus far obtained, however, as much as 350 tons per shift from one machine under conditions that prevail in this mine is entirely within the realm of possibility. Before this rate of loading can be attained, however, methods of shooting the coal and handling the mine cars must be adapted to the requirements of the loading machine. Eventually these changes will be made, and the loader will then be given a chance to show what it really can do.

A 6-ft. cut on a 300-ft. face in the 5½-ft. Cedar Grove seam where the coal weighs 83½ lb. per cubic foot in the solid, will yield about 400 tons. Subtracting from this, 50 tons of coal which is loaded by hand, leaves 350 tons for the machine, which is approximately equal to its capacity per shift when satisfactory haulage is provided.

As has been previously stated, a distance of 5 ft. is maintained between the track and an unshot long-wall face. This distance is restricted by the inability of the roof to sustain its own weight in an unsupported span longer than the normal 19 ft., or the maximum 21 ft. It is also governed by the requirements of the cutting machine, which operates from the track. Because of the close quarters in which the loading machine must work, it occupies a position with its body parallel to the face and the rear conveyor swung over the track, as shown in Fig. 1.

MUST MAKE PLACE IN WHICH TO STAND MACHINE

For general purposes this position of the machine is entirely satisfactory, but it requires hand-loading to clear a space at the front end of the coal pile, in which the machine can take its place to begin operation. No doubt it could clear the required space itself by working from a position across the track, but this would cause a loss of time and some confusion. Consequently, about 25 tons of coal are loaded by hand at the front end of the pile.

Three men—a runner and two helpers—comprise the loading-machine crew. Aside from their work on the machine, the helpers trim the coal cars and tram the empties, when a locomotive is not present. They do no

shoveling. The loading machine cleans up the face and breaks down hanging coal quite effectively. Hand-loaders shovel the coal missed by the loading machine and with their hand picks straighten irregularities along the face. This clean-up yields about 25 tons. The machine crew is paid by the day, and the hand-loaders work by the ton.

Details of the track arrangement are shown in Fig. 1. Straight rails are inserted between curves in the rooms, and short lengths are added to adjust the track whenever it is advanced toward the face. A short length of straight track extends beyond the curve into the aircourse on the inby end of the rooms. This affords storage for several cars in the clear of the loading machine when the latter is working at that end of the room.

A 6-ton reel locomotive is kept in constant attendance on the loading machine. This backs a trip of fifteen cars into a room; five of which on the inby end are cut loose, the locomotive remaining with the other ten while they are being loaded. While the locomotive changes trips the five cars detached from the trip are trammed by the helpers to the loading machine. In all trips other than the first one, the locomotive pulls fifteen loaded cars at a time.

LOOP-HAULAGE METHODS MIGHT INCREASE OUTPUT

Although the haulage facilities in this double-room system are vastly superior to those afforded the loading machine in the room-and-pillar method of working, some improvements might be made. In the single-room system of modified longwall mining, as previously used, mine cars moved in a continuous circuit from one butt entry, through the rooms, to the other flanking butt entry. This track arrangement was discarded, however, when the double-room system was adopted. Its application to the present system of mining should increase the output of the loading machine.

Several other changes in the operation of this mine might be introduced with possible advantage. A system of rope haulage that would relieve the locomotive from spotting cars under the loading-machine conveyor might possibly be adopted, but the sharp changes of direction of the track in the room necessary to follow around the entry stumps would interfere with the adoption of any such plan. Any equipment of this kind, however, would necessarily require sufficient power to move a trip of fifteen cars as a unit over grades that in places are against the load.

Room conveyors could not be readily applied to this system under the conditions now existing. This is because of the presence of the shale band in the middle of the bed, which is removed by the arcwall machine. This objection might, however, be obviated by mounting the coal cutter on a caterpillar tractor. In clean coal a longwall machine might be used. In any case, however, the conveyor layout would be complicated by the necessity of getting around the room stumps which are requisite to this system of mining when operated by the advancing method. The room stumps might be eliminated by maintaining a longwall face from butt entry to butt entry, but this change would require that the present system be operated on the retreat.

If a large tonnage were desired from a section, a number of panels between butt entries would be necessary. Room conveyors, aided by a limited length of entry conveyor, would do much to improve transportation in such a layout. They would also render possible

the working of this system in mines having a roof that is weaker than that at this mine, inasmuch as the unsupported span would be shortened to about 12 ft.

As has already been stated, the loading machine does not load out an entire cut in one shift. Each of the other operations at a face, such as cutting, drilling and shooting, is completed in less time than is demanded by the loading machine. As a result, machine-loading in any section must be augmented by hand-loading in order to keep all equipment and crews busy during each shift.

For the first three weeks of its operation, the present

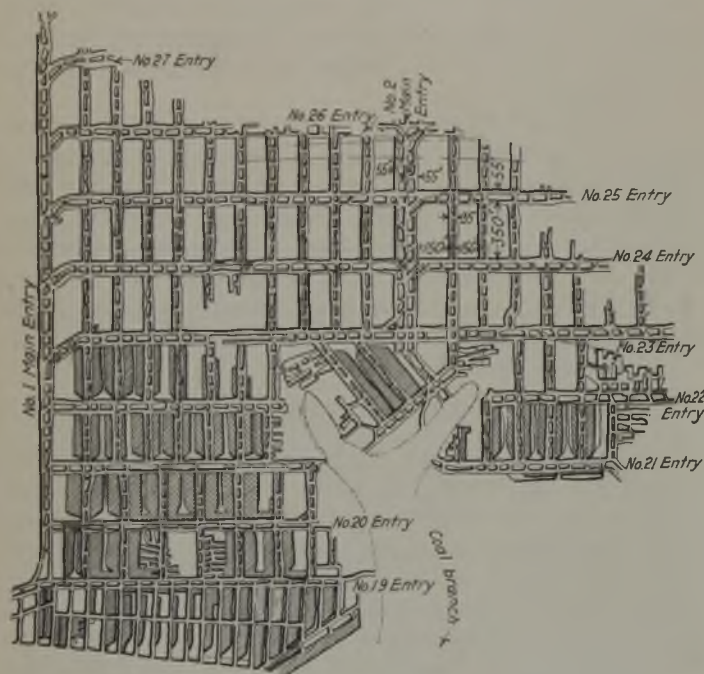


Fig. 5—Map Showing New Section of Gay Mine

Any departure from the system laid out is the result of unusual or unfavorable conditions. Of course, systematic mining is impossible in a tract where the contour lines are irregular. In this mine coal near the outcrop, if recovered at all, is produced by the ordinary room-and-pillar system.

loading machine handled 420 tons in two shifts on full-time days. Needless delays arising from the unfamiliarity of the men with machine operations, occasionally caused the tonnage to fall below this mark. As has been explained, this output is appreciably below a conservative estimate of the machine's capacity in this mine. Nevertheless, the average output per man per shift in the loading-machine section is $16\frac{1}{2}$ tons, $28\frac{1}{2}$ men being required to produce 420 tons of machine-loaded, and 50 tons of hand-loaded coal, making a total of 470 tons in all. The crews and number of men in this section may be listed as follows: Two cutting-machine men, four gobbing-machine men, six loading-machine men (two shifts), one driller, one shotfirer, four haulage men (two shifts), two timber-and-track men, one assistant foreman, and half time for one electrician.

In clean coal, without changes other than the elimination of the four men on the gobbing-machine crew, the output per man per shift in a section of this kind would be 19.2 tons.

Before the introduction of the loading machine, the following men were needed to produce 470 tons of coal when working under similar conditions: Two cutting-machine men, four gobbing-machine men, one driller, one shotfirer, two haulage men, two timber-and-track men, one foreman, one-half time of an electrician, and twenty-six hand-loaders.

A total of $39\frac{1}{2}$ men were thus required to produce 470 tons of coal, giving an average of 11.9 tons per man per shift. The twenty-six hand-loaders averaged 18.1 tons per day, which is a comparatively low figure under the conditions existing in this mine. The output per man per day, however, has no direct effect on the cost of mining if loading is done on a tonnage basis. In the Gay mine the best hand-loaders are employed in driving narrow places where a low output per man would seriously affect the cost per ton by requiring more working places for a given development.

The mine here described is an average-size operation, yielding not over 1,000 tons of coal per working day. Less than half this quantity is loaded by one machine, the remainder being loaded by hand. Prior to the installation of this loading machine, the average daily output per man employed, both within the mine and on the surface, was 6 tons. The installation of one coal loader boosted the daily output per man employed at this operation to $7\frac{1}{2}$ tons, an increase of 25 per cent.

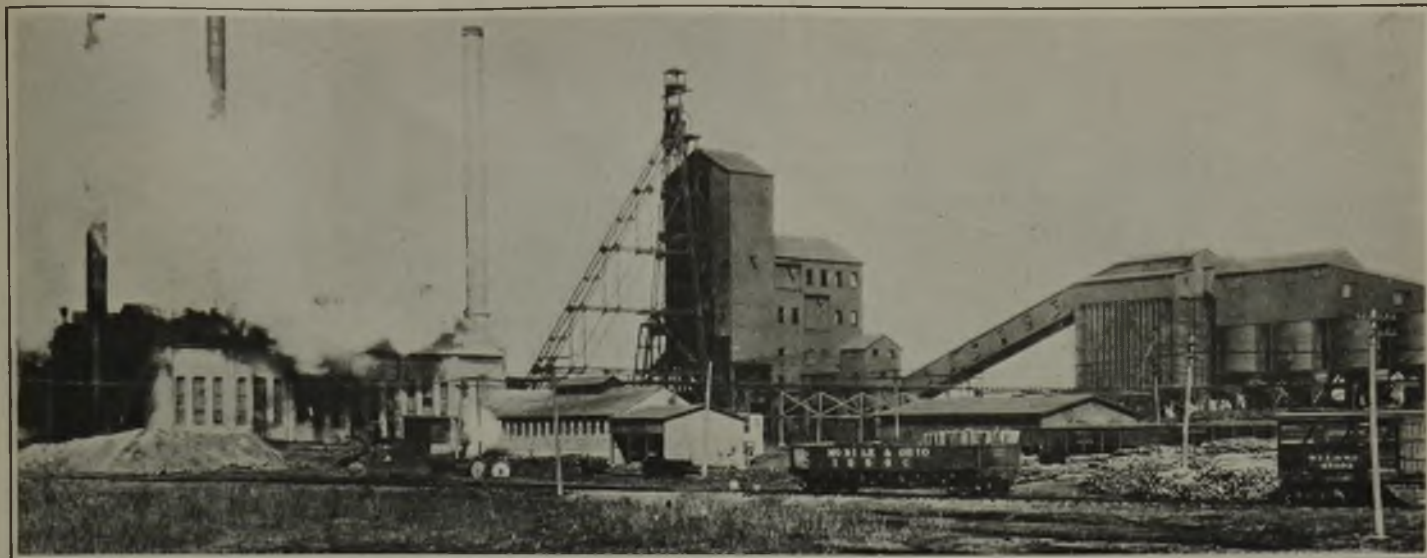
Nova Scotia's Bumps Due to Pressure

George S. Rice, chief mining engineer of the U. S. Bureau of Mines, is about to complete a report on "bumps" in Nova Scotia mines, for the government of that province, to whom Mr. Rice's services were lent for the purpose. Though Mr. Rice is not in a position to anticipate his report as to specific recommendations being made to meet the difficult situation which has arisen in Nova Scotia, he points out that "bumps" occur almost inevitably in deep mines where the coal seam has its roof and its floor of strong hard rock. "Bumps" in deep metal mines are known as "rock bursts," and are caused principally by the weight of the overburden.

Before going to Nova Scotia, Mr. Rice personally had inspected similar occurrences in the Crows Nest district of British Columbia, in the mines of south Staffordshire in England, in the mines near Mt. Rainier, in the State of Washington, in certain coal mines in Utah and in some of the Pennsylvania anthracite mines.

Mr. Rice declares that there are local variations in the contributing causes of "bumps." In south Staffordshire, for instance, falls of rock masses in worked-out areas above transmit shock through the rock which at times is sufficiently severe to set up air blasts. In the Crows Nest region rock movements set up quakes which are felt more on the surface than in the mine. The greatest danger comes from the sudden bursting of the ribs along mine passageways, or by the instantaneous upheaval of the floor. The remedy in all cases, Mr. Rice states, is found in maintaining pillars broad enough so as to prevent overloading, and, as mining reaches greater depths, in adopting either longwall methods or hydraulic sand filling. Where the mines are not suited to longwall advancing, retreating longwall methods must be used.

Mr. Rice is much impressed with the conduct of mining in Nova Scotia. The mines are well managed and modernly equipped. The average intelligence among the mine workers is high and greatly simplifies meeting the unusual difficulties which surround the winning of coal in that province. The fact that the Government should call into consultation a mining engineer from another country, is indicative, Mr. Rice states, of the broad policy of securing all possible information which may contribute to the solution of its problem.



One of the Largest Producers in Illinois

How Some Companies Took Time by the Forelock This Summer and Are Now Being Repaid

Weak Market Spurs Mining Men to Heroic Efforts—Big Equipment Makes Possible Large Tonnage When Winter Demands Flood Operators—Success Will Depend on Co-ordination of Machinery with Mine Development

BY EDGAR J. GEALY
Assistant Editor, *Coal Age*
New York City

TO SAY THAT many of the bituminous-coal executives whose mines were forced to lie idle or work only part time, last summer, were unusually busy during that same period sounds like a paradox. Nevertheless, the statement is true for nearly all the officials were working hard trying to obtain coal orders or devise plans whereby they could mine their product cheaper than their competitors.

As a result of various conferences, all-day sessions and wakeful nights most mine officials had come to realize they were in the throes of a real economic struggle. Some companies which had early appreciated the value of modern mining methods and equipment had placed their orders for labor-saving apparatus and were busy installing the new machinery.

In Chicago, George B. Harrington, president of the Chicago, Wilmington & Franklin Coal Co., was busier than ever directing the finishing touches to Orient No. 2 mine, at West Frankfort, Ill. Here the largest mine hoist in the world was being installed by the Nordberg Manufacturing Co. who built the hoist, and the Westinghouse Electric & Manufacturing Co. who made the two 2,200-hp. motors which drive this double-drum winder.

POWER BILLS ARE TROUBLESOME

F. H. Manley, vice-president of the O'Gara Coal Co., was busy with power bills and new schedules trying to effect every possible economy. He said, "One of the greatest troubles with purchased power is the big minimum charge a coal company must pay when it is idle or working short time. Purchased power versus mine-generated power is a real problem; sometimes you're

glad you have made a decision one way or the other and yet at times you wish you hadn't decided as you did."

At the Peabody Coal Co. office no one was any busier than Carl Lee, electrical engineer. Important things were turning up so fast that he didn't know whether he would be in Sheridan, Wyo., or still be in Chicago at the end of the week. Mr. Lee was working on problems concerning trolley and feeder voltages. At some of his mines he had found that 55 per cent of the electrical energy used was in the form of direct-current and sometimes 30 per cent of the total electrical energy used in all forms was lost in one manner or another.

ENGINEERING ECONOMICS IS ESSENTIAL

The solution to this problem, he said, depended upon the economic limit to which the loss may be reduced. Copper feeders cost money to buy, install and maintain, and although he hoped to effect every reasonable economy he did not care to have any of his mines operated as copper producers after the coal had been extracted. Mr. Lee said, "The industry needs to use more engineers, but we must not forget the practical side of engineering." By this he meant what I have often contended. We need business engineers, men who understand the economic and investment side of engineering.

The St. Louis operators were by no means idle. W. Kavanaugh, president of the Southern Coal, Coke & Mining Co., had all his men working on plans to reduce mining costs; in fact, his enthusiasm for coal-loading machines was prompting him to make still further improvements in his equipment to meet the particular

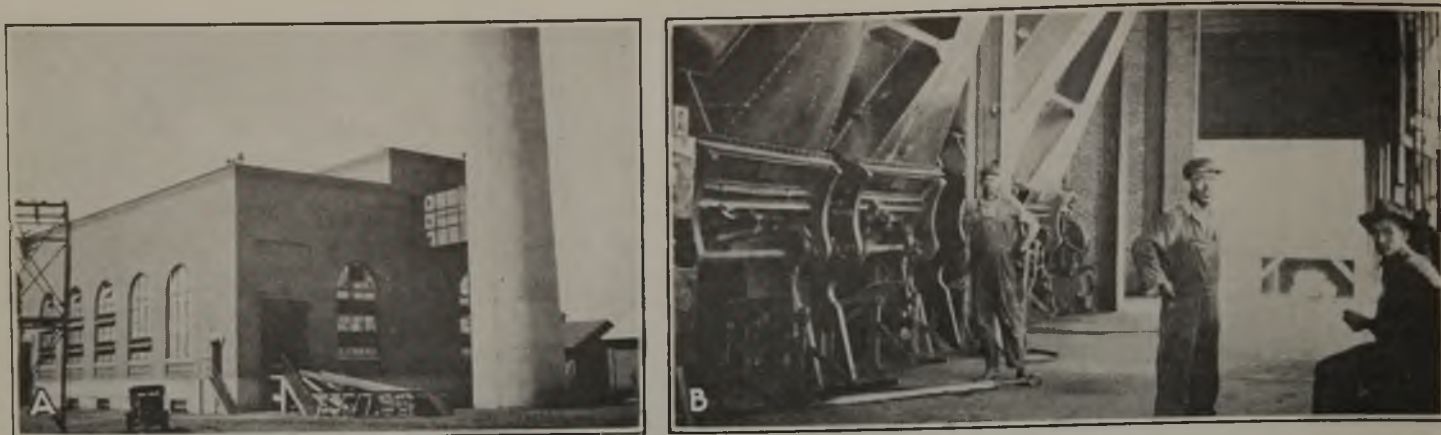


Fig. 1—Modern Mine Power Plant Operated Like a Public Utility Sells Energy to Nearby Town

This relatively new plant is capable of taking care of all the mine-load and power requirements of the town of Staunton, Ill. Accurate records are maintained of all the processes involved in the burning of fuel, raising of steam and generation of electrical energy. Power costs are always

available to check the efficiency of the plant against that of other modern stations. The night load and day load of the town are carried at a low cost to consumers. An idle plant during the seasons of reduced coal demand eats into the profit of a coal company, but this plant depends

upon the town load to help pay its carrying charges. A shows the exterior of the well-designed building which houses three 750-kva. turbines and the boiler plant. B shows the automatically-operated stokers in the boiler room that keep the furnaces properly supplied.

conditions in his mines. "Slow periods are the times to spend money," he said, "because that is when nearly everybody else lets his property slip backward."

The Consolidated Coal Co. of St. Louis was just completing a transmission line from its new mine power plant, shown in Figs. 1 and 2, to the town of Staunton, Ill. C. L. Moorman, chief engineer, knows that unusual economies in mine power-plant stations can be realized by raising the all-day load factor by adding loads to off-peak periods. Within a short time the municipally-operated power plant at Staunton is to be abandoned, and power supplied from the coal company's generators. This plan, whereby a mining company creates its own market for coal by converting it into electrical energy, provides for a more continuous operation of the mines and at the same time pays the carrying charges on equipment during periods when it would otherwise be idle.

MINE POWER PLANTS CONSPICUOUS

One of the outstanding features of the Illinois coal field is the large number of coal-mine power-generating plants and the many novel ways in which the problem of water supply has been handled. High concrete or brick smoke stacks are evident in nearly all sections. Spray ponds, artificial lakes, reservoirs and streams are

closely adjacent to most of the plants. The Superior Coal Co., at Gillespie, has a plant which gets its water supply from two large ponds. "The water is circulated from one to the other and has plenty of opportunity to cool," said D. D. Wilcox, mining engineer. Donk Bros. Coal Co.'s plant near Edwardsville, where W. J. Clark, general superintendent, has his headquarters, is equipped with a spray pond similar to that of the Consolidated Coal Co. near Staunton.

LARGE POWER PLANTS NEAR MINES

Arguments often have been put forward that the coal-mining companies cannot generate a large quantity of power near the coal mines. Indeed, this is somewhat amusing when we consider certain aspects of the question. On the Missouri River near St. Louis where there is plenty of water, stands one of the largest power plants in the world. If a nearby coal company had decided to build and operate such a plant as this it would have had to go no further from its mines to locate its plant where it could get sufficient water than the present power company has to go for its coal. However, if the coal company owned the power plant it would then be in the power-selling business, which after all is something for mine operators to consider. It is not a bad industry with which to be connected.

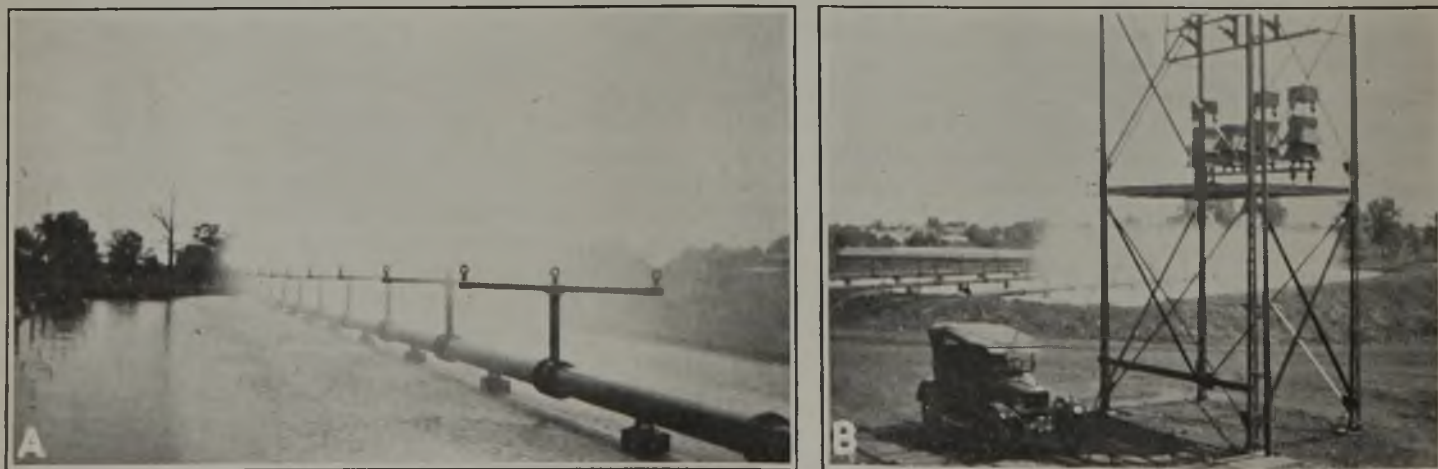


Fig. 2—Spray Pond Cools Water Used in Consolidated Coal Co.'s Plant near Staunton, Ill.

Several parallel pipe lines extend over a large pond adjacent to the power plant. Depending upon the load and weather conditions any number of sprays may be put into service. High-voltage distribution lines connect the plant with the mines and surrounding towns. A shows the spray pond arrangement, and B is a picture of one of the switching towers. Lightning arresters protect all lines and power delays are much less frequent than on some systems which extend over large areas



Fig. 3—Large Smoke Stacks Dot the Countryside

This is one of the latest type of stacks built at coal mines in southern Illinois. As one travels through the region it is an easy matter to locate a coal mine, not because of big breaker structures, as in the anthracite region, but because of the numerous concrete and brick smoke stacks. Almost every mine has a power plant.

One's prejudices are again shocked if one thinks a power plant cannot be located near a coal mine, when one stands at the top of the tippie of the O'Gara Coal Co.'s No. 12 mine near Harrisburg, Ill., as shown in Fig. 7, and can almost touch the smoke stack of the coal company's power plant. Here also the Central Illinois Public Service Co.'s smoke stacks are so close that one questions whether they are not part of the same plant. The water used at the public-utility plant is just as near to the coal company's property as to the power company's station.

The concrete tipples, smoke stacks and fans at this mine recently were described by Ralph Brown, general superintendent. The fans are built to last a long time, as evidenced by the illustration, Fig. 8.

FORESIGHT BETTER THAN BACKSIGHT

Someone has said, "In time of peace, prepare for war." There's nothing pleasant in this slogan, but there was in the friendly, industrious spirit around the mines of the J. K. Dering Coal Co., near Eldorado, Ill. All the men, from Lee Haskins, general superintendent to the repair men were happily engaged on some job or another perfecting the mining system, installing new generators, repairing locomotives or merely greasing the hoisting cable. Each man was quite sure that the grade of coal was excellent, the mine well developed and sufficient new machinery had been installed during the summer in preparation of the palmy days of winter coal demand.

At no place was mining activity more intense than at West Frankfort. Electrification was being put into thorough operation at the Old Ben Coal Corporation's No. 9 mine. Here one of the largest single-motor mine hoists in the world was being installed. The electrical and mechanical equipment used with this hoist, shown in Fig. 9, consists of a 43,000-lb. flywheel on a motor-

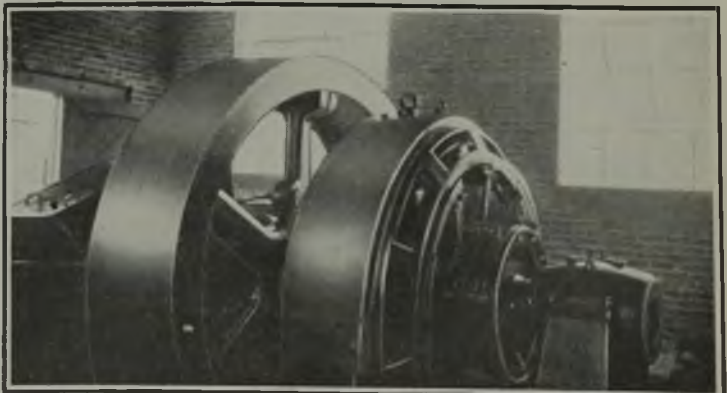


Fig. 4—Additional Labor-Saving Equipment Necessitated this Addition to a Mine Power Plant

During this summer the J. K. Dering Coal Co., added so much new equipment to the mines that it became necessary to install more generating capacity. All the new work on the boiler plant and generator

room was done this summer; now everything is ready for winter. Inside the mines, feeders and trolley circuits have been extended to the new workings. The illustrations show the additions to the

power-plant building, the new boilers and one of the new generators. Ample space was added to the boiler room for more boilers which will be installed when more generating capacity is necessary.

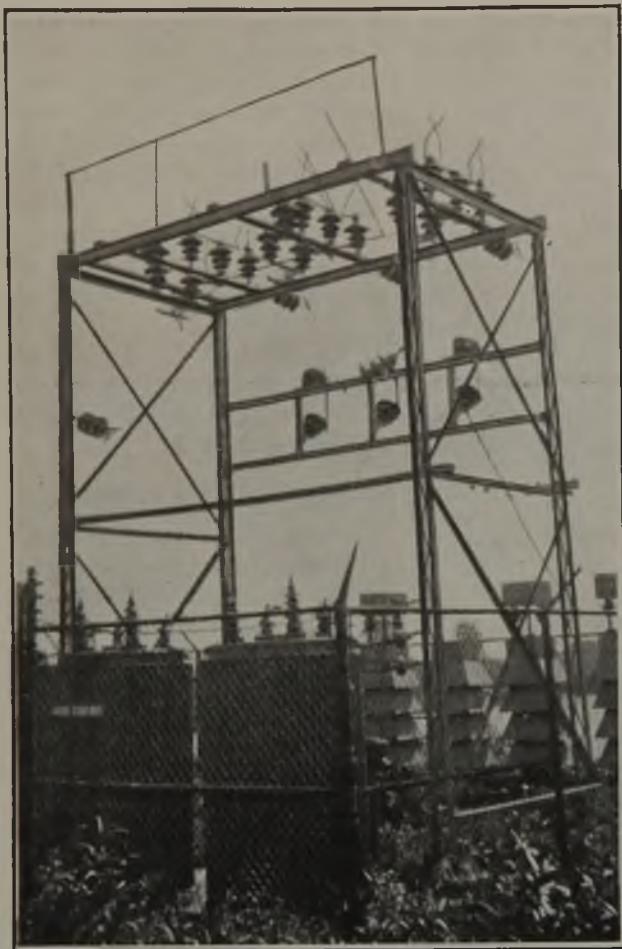


Fig. 5—Connecting Link Between the Generators And the Machinery at the Coal Face

From a new power plant, recently completed at the Donk Bros. Coal Co. mine near Edwardsville, Ill., power is transmitted to other mines owned by the company. High voltages are not uncommon in this mining territory. Large quantities of power are now needed at all modern coal-mining plants because of the increased use of machinery.

generator set equipped with a 1,500-kw. generator and a 1,000-hp. motor which supplies energy to a 2,200-hp. direct-current hoist motor made by the General Electric Co. The hoist itself was made by the Nordberg Manufacturing Co. and is a double-drum of cylindro-conical type, the smaller diameter being 7 ft. and the larger diameter 11 ft. All parts are electrically and



Fig. 6—Well-Equipped Mine Using Its Own Power

A neat-looking group of coal-mine buildings all made of concrete greets the visitor's eye when he approaches Thermal Mine No. 4 of the Donk Bros. Coal Co. The smoke stack is a typical marker for coal mines in this region. A central warehouse for all the company's supplies and repair parts is one of the most striking features of this place. Accurate record is kept of all materials which pass through the warehouse, and each month, W. J. Clark, the superintendent, gets a report of the operating cost of each machine used around the mine.

mechanically interlocked through relays and gears. A direct-connected 125-hp. alternating-current motor is provided for inching and repair work. Somewhat earlier in the year the Old Ben Company installed several other large hoists at No. 12 and No. 14 mines near



Fig. 7—Coal, Water and Power Closely Associated

The stack in the foreground belongs to the O'Gara Coal Co.'s power plant at No. 12 mine. In the background appears one of the largest public-utility plants in southern Illinois. It answers the question: Can large power plants be located near a coal mine? The picture was taken from the top of the mine tippie.



Fig. 8—Fan with Duplicate Drive, Always Ready to Do Its Work

This fan is built in a concrete housing and can be driven from either side. In the brick building in the picture is a steam engine which can be placed in service quickly should something happen to the driver located on the other side of the fan.

Christopher, Ill. The complete units, consisting of the hoist, motor and control were designed by the Allis-Chalmers Manufacturing Co. This giant hoist motor and the \$13,000,000 loan just floated are evidences of the permanence and stability of the Old Ben operations.

There is another point of interest near West Frankfort and that is the Orient No. 2 mine of the Chicago, Wilmington & Franklin Coal Co. Here we see that big two-motor double-drum hoist, illustrated in Fig. 10, of which Mr. Harrington is so justly proud. There are no overhead wires around the mine, all conductors are placed in concrete ducts. The repair shop, steam-generating plant, wash-room, etc., are models which indeed show the handiwork of the Stone & Webster Co. and Allen & Garcia.

Joseph Lewis and John Rodenbush, superintendents at this mine, feel sure that the world's record will be broken when they get the new mine properly developed and the equipment well primed.

Illinois, like many other coal-producing states, is rapidly turning to the use of more and better mining equipment. If there is a danger in this great progressive scheme it probably lies in the improper care and correlation of the machinery now being installed. It is sometimes a relatively easy problem to prove, on paper, the efficiency of a given plan or piece of equipment, but it is a different matter to operate important equipment year in and year out and get best results from it. Paper savings and profits cannot materialize without effort. It is folly to purchase and install expensive apparatus and not provide for proper supervision. Many a good machine has failed to produce the desired results because it has never been kept in tune with the ever-changing mine requirements and conditions.

LACK OF CO-ORDINATION MEANS FAILURE

A newly electrified machine or mine may work perfectly the first few months after the manufacturer or consultant has left the job, but before long conditions change, not so much through imperfection in machinery but because of lack of co-ordination of salient parts of the system. There is a need, an urgent necessity, for more engineering skill at the coal mines. Our industry has turned to the use of some of the largest types of machines ever made and has installed the equipment with



Fig. 10—A Large-Sized Power Plant Is Needed to Drive This Two-Motor Hoist

Two 2,200-hp. direct-current hoist motors, one on each end of the drum shaft are required to run this big hoist. Special connections between the generators of the motor-generator set and the hoist motors made it possible to obtain many of the advantages of high voltage and yet not strain the insulation of the windings.

the expectation that it will always fit changing mine requirements.

One cannot conceive of a large generating plant being operated without high-grade supervision, yet many mining companies have enormous electrical connected loads which just run themselves. The performance of machinery at the mines means financial success or failure today, and in many instances it means life or death to the workmen. It is to be hoped that the mining companies will realize the importance of keeping their equipment well balanced.

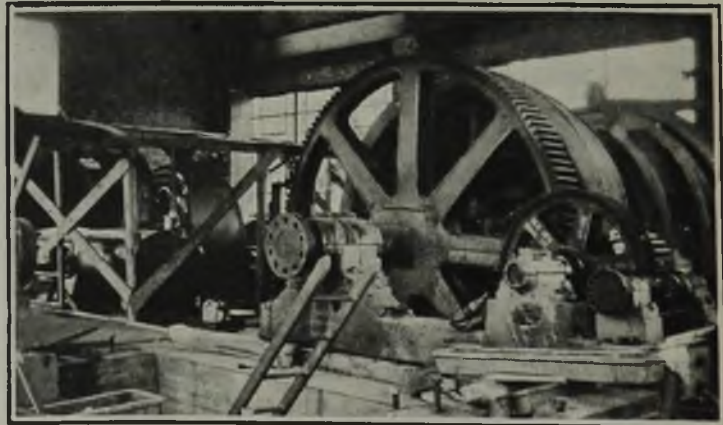
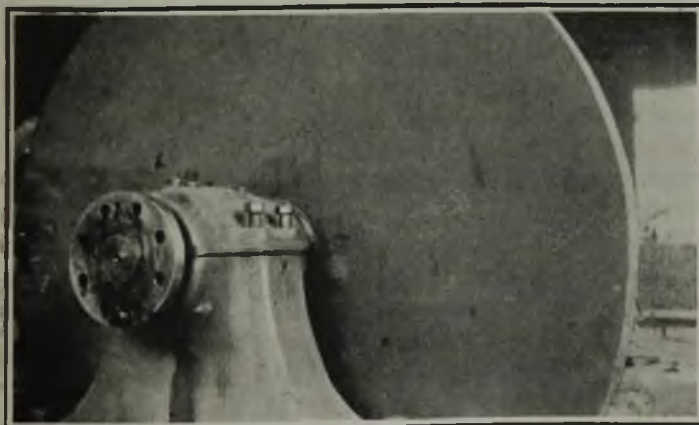


Fig. 9—Parts of One of the Largest Single-Motor Mine Hoists Ever Built

Electricity and electric equipment has been called upon to perform all manner of service in the coal industry. The installation of this new hoist marks the passing of a big steam-driven hoist which has earned its reward. The day these new parts were being put in position the steam hoist was busy shooting out its exhaust

with a bang, bang, bang which seemed to make you feel it was incensed at its successor the electric motor. Yet with each great puff of steam one could hardly help but realize the tremendous waste of energy continually going on. The photographs show the hoist-motor frame in its shipping case, the large 2,200-hp. direct-current

hoist-motor armature, the 43,000-lb. fly-wheel, used on the motor-generator set, and the hoist drum. Note the two half couplings on the hoist mechanism, one is for the regular hoist motor and the other for an auxiliary alternating-current motor used for shaft repair service when slow speeds are required.

Machine in Royal Mine Makes Dust and Distributes It

Relies on Ventilation to Carry Dust Over Thousand Feet of Space—Dust Barrier Formed at Each Machine Location

BY SAMUEL TESCHER

General Superintendent, The Royal Fuel Co.,
Denver, Colo.

FOR THE PAST six months the Royal Fuel Co., has been experimenting with rock-dusting equipment in its Royal mine at Aguilar, Colo. It now has in operation at this mine a machine that has been found to be highly economical and efficient in the crushing and distribution of rock dust.

As may be seen in the accompanying illustration it consists of a motor, crusher and fan mounted on one shaft. The whole equipment is placed upon a common bedplate which in turn may be mounted on an ordinary mine-car truck. It thus may be taken into the mine and readily moved from place to place. The advantages of this machine are: (1) Low first cost, (2) mobility, and (3) a decrease in the cost of rock dusting through elimination of the expense of collecting, crushing and sacking the material and then taking it underground.

Inasmuch as many mines are located in coal formations that contain shale it will be perceived that this machine affords a real economy. By its use no dust is lost in crushing, grinding or sacking. Neither is there any danger of the dust becoming caked by moisture before being applied.

The machine now in operation crushes and distributes about 2,000 lb. of shale dust per 8-hr. shift. This is ground so fine that about 80 per cent will pass through a 100-mesh screen. The dust is exhausted from the crusher by means of a fan by which it is simultaneously blown into the air current in the mine. It has been found that the dust not only travels in the air but spreads throughout the mine much as smoke does.

At present this machine is being moved over approximately 1,000 ft. intervals throughout the mine. The

deposition of rock dust is, of course, greatest near the machine and so acts as an effective rock barrier. Thus not only is a 1,000-ft. zone of the mine passages rock dusted but an effective barrier is established.

The fan suction acts in such a way that only the finest rock particles are withdrawn from the crusher. Material that is too large to be effective, automatically remains within this machine until ground down to the desired fineness. Tests conducted on an entry show that at a point 150 ft. from the machine all the dust deposited on the surface of the mine workings will pass a 100-mesh screen.

DUST CLOUD VISIBLE 7,000 FT. FROM MACHINE

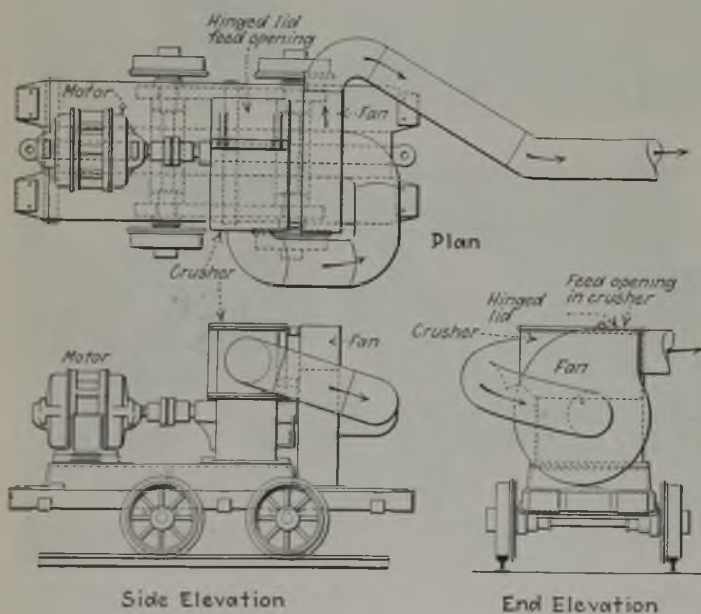
This machine requires only one man for its operation. He feeds the shale into the crusher in approximately 1½-in. pieces. From this point on, the operation is automatic, that is, the machine crushes and blows the dust into the air in one operation. A fine "smoke screen" has actually been observed issuing from the upcast shaft when the machine was located at a point 7,000 ft. from this opening.

By means of this device all the mine workings can be effectively rock-dusted. It has been found that operation of this machine at the mouth of a panel containing fifteen rooms on each entry effectively coated all the roofs, ribs, floors and crosscuts as well as the working faces.

Many mines throughout the country can hardly afford to install an expensive plant for the preparation of rock dust. If, on the other hand, they purchase material already ground, this entails at least the expense of its distribution. In many of these same mines may be found enough shale to answer all purposes if it could be properly pulverized and distributed. Under these conditions such a machine as this would prove highly economical. It can, of course, be moved from place to place throughout the workings and in gaseous operations where it is impractical to station such a machine in the return airway, it may be located in the intake airway and the dust, by means of galvanized iron pipes 6 or 8 in. in diameter, may be conducted through doors or stoppings into the return.

Dust from this machine is distributed in a manner exactly similar to that in which coal dust is deposited. That is, it floats through the air so that particles of coal dust are covered by particles of rock dust of approximately the same size. Tests have demonstrated that this dust travels several hundred feet and finds its way into places that are not directly in the air current.

At the Royal mine the cost of rock dusting has been investigated from all angles. It has been found that this machine makes and distributes rock dust for approximately \$7 less per ton than any other means that has been tried. First cost, as well as maintenance charges, are low and the labor expense after the shale is delivered within the mine consists of the wages of one man only. At the present time the total expense of crushing and applying one ton of shale to the mine surfaces by this method is \$10.50. This includes the cost of mining the shale, hauling it to and into the mine, crushing it, blowing it into the air, moving the machine from place to place, as well as the cost of the electric power consumed in the operation of the machine. All charges have been included in the above figure except the depreciation of the machine itself. Naturally, this item is small. The Hendrie & Bolthoff Mfg. & Supply Co., of Denver, Colo., is agent for this machine.



Grinds Rock and Blows Dust Into the Air

Motor, pulverizer and fan are all mounted on one shaft. The fan withdraws the fine dust from the pulverizer and blows it into the ventilating current. The mine air carries and deposits this inert material exactly as it deposits coal dust. The mine can be effectively rock-dusted by moving the machine through the entries by approximately 1,000-ft. steps. Fine dust may be carried by the air for over a mile.

Is Coal Industry Blind To Health Hazards Of Mine?



**This Frank Expert Says We, "Sheep-like," Accept Misleading Statistics
— Coal Mines "Contribute Far More Than Their Share of Death
and Disease"—Rock Dust, Water and Better Ventilation Needed**

BY D. HARRINGTON

Consulting Mining Engineer, Salt Lake City

COAL MINING is pre-eminently no occupation for the physically weak. There are comparatively few underground occupations in our coal mines, except possibly a few provided for pensioners, which do not demand utmost physical strength and endurance. In fact, it is not at all uncommon to hear coal-mine managers state that what is needed in underground workers is that they be "strong in the back and weak in the head," a sentiment with which, however, I am decidedly not in accord.

This demand of the industry for maximum physical fitness is brought about largely by the contracting system of work and tends automatically to eliminate those who in any manner become disabled. While this elimination does not always apply to those partly incapacitated by physical injury (many of whom are in some manner taken care of by the employer), those unfortunates who become weakened by disease are usually forced to leave the mines to go to near-by farms or into some "easy" occupation.

It is largely due to this situation together with the sheep-like acceptance of half-baked statements and misinterpreted statistics, largely of English origin, that there has grown an impression, in fact a positive belief, that coal mining is one of the most healthful of occupations, when as a matter of fact our coal mines contribute far more than their share of disease and of total or partial disability or of death from disease.

Acceptance has been so nearly universal of English and other European statistics as to illness and mortality rates among coal miners that there are available few reliable statistics or tabulated data as to illness and mortality of the coal-miners of the United States. Though there have been a few investigations of these

matters by commissions, the study has usually been superficial and academic. Too often these investigators have based their reports on compilations of available literature largely copied, rather than on information obtained from actual study and observation at the mines. I have had access to some studies, however, which *did*

go into fundamentals, and though I am not able to publish all the data available, some of it will be given in outline.

In a detailed study at one coal-mining locality an effort was made to examine physically about 25 per cent of the men employed, selecting, as far as possible, men who had worked largely or wholly in this particular coal-mining region. It was found that over 30 per cent of those examined had pneumoconiosis, or lung-dust trouble, and practically 30 per cent more were suspected of it or had symptoms of dust trouble. In addition about 90 per cent of those examined had defective teeth.

In a similar study in another coal village in a wholly different region, but also in the United States, it was found that over 35 per cent of those examined had definite lung trouble or pneumoconiosis and an additional 25 per cent had definite symptoms of it. Here again it was stated that a large number of men had trouble with their teeth, though the exact figures were not set forth. In both studies about 95 per cent of those examined were less than fifty years of age.

In the first case cited, there were no mining machines used and the dustiness of the air was due almost wholly to picking down the coal and shoveling it into cars. Face workers were the ones with the most definite lung involvement, and the worst cases had had from nine to fifteen years of experience in working in coal mines. In the second case studied, the coal was undercut by

WHY DAN SPEAKS OUT

THE AUTHOR of this article has a lot of pointed things to say about the health hazards of coal mining. With customary vigor he hauls off and says them. He is not a doctor and doesn't want anybody to think he claims professional medical standing. However, he has spent a number of the long years of his coal-mining experience studying health as well as safety in coal mines in co-operation with several doctors of the United States Public Health Service and with brother engineers of the Bureau of Mines. In many cases he has been in charge of the investigations that were being made. After having a part in more than one hundred such investigations in both coal and metal mines of 25 states he believes some frank words ought to be spoken to this industry. Therefore he speaks out.

short-wall mining machines and those most definitely affected by dust had averaged twenty years work in coal mines though several had definite lung involvements after two years, the men thus quickly affected being for the most part machine runners. It was found, indeed, that machine cutters were by far the most generally affected, with face loaders next in order.

WATER ON CUTTING CHAIN PREVENTS DUST

In one coal-mining district in the West, after the mine-village doctor had advised one after another of the machine runners to leave the mine, the company made a study of the situation and found that the dust irritation was so great that the breathing capacity of the machine runners was much limited, and in numerous instances hemorrhages resulted. To prevent this water is used on the cutting chain. It is said that this efficient remedy for "killing" coal-mine dust was used in the Utah district as early as 1913.

I have at hand a large number of instances in which machine runners and other coal-mine workers have been almost wholly incapacitated by breathing coal dust, having the typical shortness of breath of the metal miner afflicted with silicosis. In several cases hemorrhages resulted; and in a few cases, death. It was this health problem in connection with machine runners that aided materially in the ready acceptance by Utah coal operators of the new safety order now in effect requiring use of water on the cutting chain. Though a few Utah machine runners are indifferent to the new system, none are openly antagonistic and by far the greater number enthusiastically favor this use of the water.

After about eight years of more or less continuous study of the effect of dust on health of miners in mines troubled with the dust of coal, limestone, hematite, silica in various forms, shale, etc., I am convinced that though some dusts are more quickly or more definitely dangerous to the health of underground workers than others, nevertheless any dust found in underground air and breathed by workers in large quantities and finely divided form (say less than $1/2,500$ in.) is likely ultimately to be harmful. In case of machine runners cutting dry friable coal, the machine runner in some instances has been "put out of commission" in less than three years.

Dustiness tests of coal-mine air at faces that are being undercut in coal by modern electrically driven shortwall mining machines show that when a spray of water is directed against the ingoing side of the cutter chain, the number of particles of dust in the air is only about one-twentieth of that found when water is not used. The quantity of dust in the air when cutting dry is twenty to thirty times as great as that allowed at working faces in South African gold mines.

It has been determined that, at dry coal faces, picking

and shoveling at even a medium rapid rate makes the air ten to thirty times as dusty as it was when the shift started. Much of this dust is later eliminated from the miner's respiratory organs, but it is pretty well established that a large quantity remains, ultimately clogging them enough to prevent them from performing their functions.

Much nonsense has been written about the coal miner's immunity from respiratory disease and about his being able to resist silicosis when engaging in work in metal mines after having worked previously in coal. It was even proposed a few years ago to introduce coal dust into metal mines having known dangerous dust with the idea of neutralizing the dangerous metal-mine dust by coal dust. In present-day slang, "This is all pure bunk."

TWO KINDS OF "SH-H-HI" MEN

PEOPLE in the coal mining business keep altogether too quiet about the dangers of mining to suit Dan Harrington, author of this article. Camp doctors "soft pedal" it, he says, because they are either ignorant from not going down and studying underground conditions or else they are afraid they will be blamed for having a bad camp record. Rock-dust advocates "soft-pedal" it, he says, because they think operators will figure that rock dust is as hard on the men's health as coal dust and therefore rock dusting will get a set-back. As a matter of fact, he holds, rock dust should not be put in places where much of it will be stirred up into suspension. It will serve its purpose elsewhere in the mine if water is used around the working places, and thus will add nothing to the miners' health hazard.

In one large coal-mining locality in which a study of adult mortality statistics over a period of several years was made, it was found that, *eliminating mine accidents*, over 25 per cent of the miners who died, had death certificates which read "*tuberculosis*," whereas deaths of non-miners from the same cause in that region were only about 7 per cent and but 16 per cent of the deaths of adult females were from tuberculosis. The death rate of miners, non-miners and adult women from influenza was about equal, being around

7 per cent. However, deaths from pneumonia showed miners over 45 per cent, non-miners a little over 28 per cent and adult women a little over 22 per cent.

In this mortality survey, it was shown that, eliminating deaths from accidents, the total deaths from respiratory diseases were: Miners 80 per cent, non-miners 43 per cent and adult women 45 per cent. This would seem to establish the fact that in at least this *one* large coal-mining locality the coal miner is not immune to respiratory disease or even to tuberculosis.

The fallacy of the coal miners' immunity from respiratory disease arises from a number of causes. Where coal miners' mortality records are available they usually show at least 25 to 50 per cent of deaths due to accidents. Hence the percentages of remaining causes of death are from one-fourth to one-half or even two-thirds too low to indicate prevalence of disease. For instance, in one coal-mining region a mortality study showed but $4\frac{1}{2}$ per cent of deaths were caused by tuberculosis; but when the deaths from accidents were eliminated and only deaths from so-called natural causes considered, the tuberculosis death rate jumped to over 16 per cent.

FARMERS DRAWN FROM MINES DIE OF PHTHISIS

In a certain coal-mining region it is pointed out that the mortality of miners from tuberculosis has been less than among farmers and storekeepers of the same neighborhood. However the facts are that more farmers and storekeepers of that immediate region died of

the disease than did farmers and storekeepers in other parts of the same state. It appears then, that partly disabled coal miners who had left the mines, probably diseased, and who had gone into farming and store-keeping near the mines were responsible for the high tuberculosis mortality of that territory and that the comparison between the tuberculosis deaths of miners with outside people of the immediate region is not a fair comparison.

DATA ON ACTUAL CONDITIONS SUPPRESSED

Another definite reason why the presence of respiratory disease among coal miners has not been generally known is that for one reason or other those who realize the actual situation suppress the data. Those who are most likely to know about the matter are the doctors in the mine villages. Seldom does a coal-mine doctor write his views for publication, generally because he is too busy, frequently because he doesn't know how to do it and often because he is afraid that his standing with the company will be injured if he gives undue publicity to health danger from dust or from other cause.

The mine doctor knows that the coal operator in most parts of this country would much dislike to be compelled to spend the money necessary to preserve the health of his employees as menaced by the presence of dust, though he ought to do it for the benefit of his own purse, as the dust at the face causes much lost time due to sickness, causes many men to leave coal mines when they should be in the prime of life and certainly is a menace as a possible participant in an explosion.

Oddly enough the "soft pedal" is also placed upon the health danger of coal dust by the enthusiasts who advocate rock dusting to prevent explosions. They feel that if it becomes known or realized that fine coal dust in large quantities in mine air is dangerous to health, those mining companies who might use rock dusting would be afraid to do so, knowing that, if coal dust is dangerous to health, then rock dust or a combination of the two would be worse.

ROCK DUSTING IN ENTRIES NOT HARMFUL

As a matter of fact, if the rock dusting is confined to well ventilated places such as main air entries or is placed in unventilated places where there are no men, animals, machinery, etc., to stir the fine rock dust into the air, rock dusting of coal mines is perfectly safe as regards health because there should not be, under such conditions, in the air of such places a sufficiently large quantity of finely divided dust to injure the respiratory organs. However, if rock-dusting methods are introduced at or around the working face where air is usually still and if no water is used, the health hazard will undoubtedly be increased.

The obvious remedy is to rock dust well ventilated entries and non-working dead-air places, but around the working face to use water freely. The best plan is to use a water spray on the cutting chains while cutting, to spray faces, ribs, roof, floor and coal piles several times a day, to sprinkle tops of loaded cars before they leave the face and to wet down at least once daily the region of every room neck or entry face for several hundred feet until the rock-dusted region is met.

If both water and dust are used, the water will aid the rock dusting, the rock dusting will aid the sprinkling and both will promote the health of the

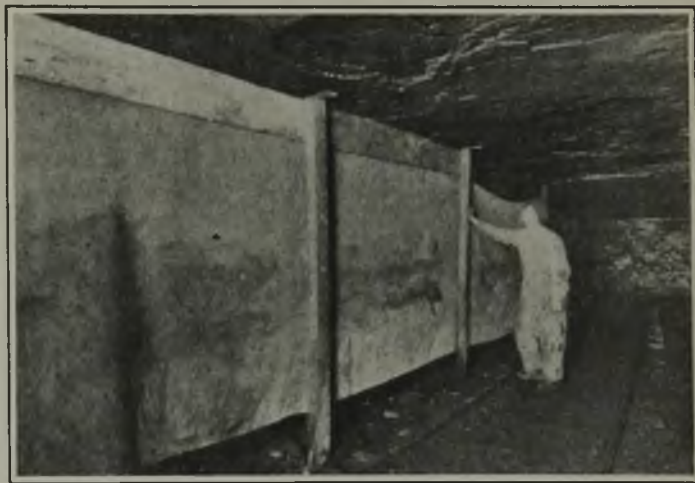
workers and the safety of the mine as well as that of the workers.

Respiratory disease under such names as miner's consumption, anthracosis, pneumoconiosis, tuberculosis, miner's asthma, bronchitis, pneumonia, etc. cause, in my opinion, more deaths and far more misery, lost time and other humanitarian and economic losses among our coal miners than do mine explosions, and it appears that dust inhalation—chiefly of coal dust—is mainly responsible. Except in a few mines and in only one state, Utah, where water must be used at the working face, there is little or no effort being made to combat the menace.

HEART TROUBLE AND BAD TEETH COMMON

In a mortality study of a large coal-mining region it was found that if accidental deaths were eliminated, the death rate among coal miners from diseases of the heart was about twice as high as the rate for non-miners and four times the rate for adult women. Apparently the intense effort exerted by the contract underground worker is responsible for this.

As previously mentioned, physical examination of miners (and this applies to both coal and metal mining) indicates that at least three out of four of our mine workers have defective teeth. In view of the fact that later-day medical thought assesses many of our present-day ills against defective teeth, mining com-



This Line Brattice Is a Doubtful Health Safeguard

If it were tight enough and not open at the bottom it would be a good conductor of clean air clear up to the working face in this room, thus doing its bit to move out gas and a good deal of dust as fast as they floated into the working atmosphere. If brattices are poor the chances are that men at the faces will breathe enough gas into their lungs to reduce their efficiency even if it does not drive them home to lose time both for themselves and their employers.

panies should ascertain and apply the remedy. The frequency with which defective teeth are found among miners would justify most mining companies in employing the partial or full-time services of a competent dentist to give service to miners at nominal rates or free. State mining departments, state and local health bodies, the Federal Government, should conduct a definite widespread campaign as to care of the teeth.

Carbon monoxide poisoning due generally to breathing fumes from explosives—hence due to poor ventilation or to poor blasting methods—causes some death and much illness among miners with more or less permanent ill effect. In some poorly ventilated mines the air at a considerable number of working faces contains from 0.01 per cent to two, three or possibly four times that quantity of carbon monoxide, and workers have up to as much as 30 per cent of their blood put out of com-

mission at least temporarily by having that quantity of blood saturated with carbon monoxide.

Though some workers at least seem to establish a tolerance so that the carbon monoxide they breathe does not appear to have any particular ill effect on them, others have more or less continuous headache, some have acute nausea, others lose appetite and a more or less general result is chronic irritability. The permanent net result is difficult to ascertain, but certainly some time is lost, and if there were no other ill effect than the irritability (which is easily understood after one has had a carbon-monoxide headache) it is certain that it does not pay any mining company to allow this "disease" in its mine.

Probably the best remedy is to have strong currents of fresh air at all times sweeping over and past places where men work and especially places where explosives have been used or where carbon monoxide may be present from any other cause such as a more or less covered mine fire. Use of black powder and fuse, or of dynamite and fuse, or of coal dust or other flammable tamping material, all tend toward formation of carbon monoxide when blasting. Black powder, dynamite, fuse and combustible tamping material should all be eliminated from coal mines and all shots fired electrically using permissible explosive and inert tamping material. Any coal mine which, in this day, allows any kind of blasting during the working shift certainly shows the minimum regard for the health of its workers or the safety of either mine or miners.

NITROGEN COMPOUNDS MAY CAUSE INJURY

There may also be acute poisoning from oxides of nitrogen released by blasting in poorly ventilated places, though this form of poisoning is much more rare than that from carbon monoxide. The immediate remedy for either is withdrawal to fresh air. If the victim is unconscious give artificial respiration and feed oxygen if available, but of course get the patient to the doctor or hospital as soon as possible. To aid in removal of "powder headache," the breathing of pure oxygen is probably the best remedy, though breathing a combination of oxygen and carbon dioxide in proportion of about 9 parts of oxygen to 1 part of carbon dioxide is held by some authorities to be even better than oxygen alone.

In some non-gaseous mines where ventilation can be, and frequently is, neglected, places are occasionally encountered where the oxygen content of the air will not sustain the flame of a safety lamp. Hence it is below 17 per cent though there may be enough oxygen to feed the flame of a "carbide" lamp which requires only 11 per cent. In such places men have more or less continual headache, they lack vitality and upon making any great exertion they begin to puff and are compelled to slow up. Here again is found irritability. If the air temperature is above 80 deg., as found often in metal mines, though more rarely in coal mines, an oxygen reduction of only one-half of one per cent (from 20.9 to 20.4 per cent or less with a correspondingly slight rise in carbon dioxide) will also give essentially the same symptoms as have been just outlined.

I have no definite data available as to whether there are permanent ill effects from long-continued breathing of depleted atmospheres such as those referred to, though old timers who worked many years ago both in Great Britain and in the anthracite and other mines of the United States, say that much of the so-called miner's

asthma came from long-continued breathing of "poor air" in the poorly ventilated mines of those days. There is absolutely no doubt, that these depleted atmospheres make men slow up in their work and cause them at least temporary ill effects such as headache, irritability, lack of appetite, etc.

Though coal miners in the United States usually have ideal underground working temperatures (from 40 to 65 or 70 deg. F.) some coal mines (and many metal mines) have working temperatures in excess of 80 deg. F. Though there is some doubt as to the permanent ill effects of working in temperatures over 80 deg. I am convinced after much underground experimental work and study of the subject, that long-continued work in underground air with temperatures



Water Helps Reduce Health Hazard

Mr. Harrington believes in keeping down coal dust at the faces by using a spray on cutterbars but water should be used frequently also to soak down active rooms and entries leading clear back to the end of the rock-dust zone. If this is done the proportion of fine coal dust in suspension ready to injure the respiratory organs of miners will be small indeed.

above 80 deg. F. is likely to reduce vitality, especially where there is much dust present, or high humidity or lack of movement of air or even slight atmospheric impurity.

BELOW BLOOD HEAT AIR MOVEMENT HELPS

Though air movement is of great help when temperature is high, excessive velocities (say over 200 to 300 lin.ft. per minute) hurt rather than aid when the air temperature is above the temperature of the blood (about 98½ deg. F.) though velocities up to 100 or more feet per minute give relief when the air temperature is below 98½ deg. and over 80 deg.

One of the most significant features brought out in a study of effect of high underground air temperature was that a certain quantity of work at a definite rate of working which was quite easy (almost child's play) when air temperature was 70 deg. became more difficult with air at 75 deg., still more difficult at 80 deg., thoroughly hard at 85 deg. and utterly impossible of fulfillment at 90 deg.

In practically all cases the air was nearly saturated with moisture, air velocity was slight or practically nil, the work was done on separate days for each temperature and was performed by the same persons, all of whom were in good physical trim and all of whom experienced essentially the same effect. From this it will readily be seen how essential it is that underground working atmospheres be kept below 90 deg. F. even if

no account is taken of the health feature and nothing is considered except efficiency.

A temporary but acute and at times financially costly disease is found in some wet coal mines where small quantities of hydrogen sulphide issue and attack the eyes of workers. The men's eyes become blood-shot, and get to be so painful that they are forced to spend days, sometimes weeks, in a dark room, and in addition their eyes must be treated by the doctor. The disease is called locally "pink eye" and apparently is not permanently harmful, and fortunately, too, the condition in the mine which leads up to it, is usually temporary as the gas (hydrogen sulphide) disappears after the affected part of the mine is left open for a limited time, also the area affected is generally not large.

While it is claimed that hookworm is prevalent in some of the coal mines in the South, I am not familiar with the situation; however, the almost universal lack of provision in coal mines for removal of human filth, gives the hookworm maximum opportunity to spread provided other conditions such as temperature, humidity, etc. are favorable.

COAL-MINE DOCTORS ARE INEFFICIENT

I have had an opportunity to become acquainted with a large number of coal-mine doctors and in general they appear to be, in slang terms, "poor fish" though this is not universal. Only two of these mine doctors that I have met have made it a practice to go underground to see under what conditions those entrusted to their care do their work; as a consequence the coal-mine doctors really know little or nothing about underground conditions, and hence cannot aid in the improving of underground health.

Though a few coal-mine doctors help the Bureau of Mines safety car men in their training of underground employees in first-aid methods, many of them handicap the first-aid instructor because they think he is trying to do doctor's work or seeking to train the employees to do it.

Only rarely does the coal-mine doctor take any definite intelligent action for better mine-village hygiene such as construction or maintenance of sanitary latrines, or the filtering or purifying or safeguarding of the water system, or the giving of health or sanitation lectures or talks. Very few coal-mine doctors endeavor to obtain for the miners washhouse facilities, or insist on their proper maintenance, where they are available. And but few physicians in mining villages know how to treat a man who has been gassed underground.

On one occasion where a number of men were brought out of a coal mine unconscious from coal-mine explosion fumes, a galaxy of coal-mine doctors, assembled from the surrounding country, were helpless as babes as to the proper measures to be taken, and if it hadn't been for intervention of a rank outsider, who did know what to do, several of the gassed men undoubtedly would have died.

It would appear that one of the functions of the coal-mine doctor should be that of preventive hygiene; at any rate he should, at least occasionally, go underground and ascertain how or under what surroundings his patients or prospective patients work. In fact, it would appear that coal-mine doctors should have some more helpful functions than doling out a few pills or setting an occasional broken bone.

One of the most essential factors toward making our coal mines healthful is the consistent periodic physical

examination of all employees. If upon being employed, physical examination were made, the applicants proper sphere of work could be determined with some degree of certainty instead of "going it blind" as is now done. Examination semi-annually or annually would check up the physical condition of each individual, so that steps could be taken in time to help correct defects in individuals as well as to locate underlying causes of trouble.

While I emphatically dissent from the often-repeated statements that coal mining is one of the most healthful of occupations, on the other hand, there is no good reason why it should not be made so. And if by the use of water, precautions are taken against making dust at the face, this can be done readily. If the spreading of dust is checked by the use of tight cars, by sprinkling on the top of loaded cars, and by the removal or quick dilution by good ventilation of such dust as will inevitably be made, the danger from respiratory disease will be practically removed. Modern up-to-date blasting methods together with good ventilation will prevent diseases from gases and high temperatures. In fact coal mines can practically eliminate health hazards and make coal mining actually one of the most healthful of occupations.

Cup-Shaped Cutter Bit Makes Big Power Saving

Eastern Kentucky Company Now Realizes the Inefficiency of Common Bits—New Bit Cuts Four Times as Many Places as Standard Bit

BY J. H. EDWARDS
Associate Editor, *Coal Age*
Huntington, W. Va.

THE North-East Coal Co., of Paintsville, Ky., has developed and is now using a mining-machine bit which is proving of interest to operators and under-cutter manufacturers. The new shape of bit is the idea of E. L. Burton, who is the blacksmith at the No. 1 mine. The service being obtained and the results of electrical test justly lead the North-East company to believe that they have a bit which is superior to any other now available.

A wide, "hollow-ground" cutting face is the distinguishing feature of this bit. The wide face provides cutting clearance and eliminates any wedging effect. The bits are hand-forged from ordinary pick-points which have been purchased from the mining-machine manufacturer. The only special equipment used in



Central Shop of North-East Coal Co.

This shop is well equipped with machine tools for handling the general run-of-mine repair work. Part of the building is reserved for armature winding. The open door at the left leads to an office provided for the shop foreman.

Actual Power Tests on Machines Equipped with "Burton" and Ordinary Type Bits .

Type of Bit	Mine	Length of Cut, Ft.	Feed of Machine In. Per Min.	Minutes to Sump and Cut Face	Average Volts	Average Amperes	Average Kilowatts	Watt-Hours Per Lineal Ft. of Cutting
Burton.....	No. 1	19	24	9 5	197	54 8	10 8	90
Pick-Point.....	No. 1	17	24	15	198	92 6	18 3	269
Burton.....	No. 1	28	18	18 5	216	51	11	121
Pick-Point.....	No. 3	13	24	13 5	188	88	16 5	284
Pick-Point.....	No. 3	21	18	24	219	48	10 5	200
Pick-Point.....	No. 7	25	18	21 5	215	67	14	205

forming it is a home-made anvil dolly. This is a block of steel the top of which is about 2 in. square. A groove about 1 in. wide and ½ in. deep is cut through the center, and in the bottom of this groove is a tapered V-shaped projection which, when the bit is placed upon it and hammered, hollows and spreads the face.

An ordinary pair of bit tongs is used, and the cutting angle to be formed is gaged by the angle of the tongs. The cutting face of the bit is ground slightly on an 8-in. emery wheel. Because of the hollowed face the wheel comes in contact with but a small area of metal, this area comprising the point and a narrow strip on each edge.

The bits are resharpened with the same tools and in the same way as they were originally formed from the standard bit, but, of course, the sharpening requires less time. Even the original grinding requires but a fraction of a minute for each bit.

The accompanying table summarizes the results of several electrical tests which the North-East company has made on shortwall machines equipped with the Burton and with the ordinary pick-point bits. Note the exceedingly good showing of 90 and 121 watt-hours per lineal foot of cutting in the two tests of Burton bits as compared to the results 200 to 284 with the ordinary bits. The two first tests, which are set apart at the top of the table were staged as competitive tests and therefore were carefully arranged as to similarity of conditions. The cutting in these two tests was done on the

same entry and on the same side of the entry using the same shortwall machine operated by the same crew. The Burton test was in Room No. 2 and the pick-point test in Room No. 3. The officials of the company feel that these two tests afford a true comparison of the two bits.

The last three tests listed in the table were made at random to determine the power required by the old-type bits under everyday conditions. These bits were hardened by the common "heat and plunge" method, but the points of the Burton bits and of the pick-point bits used in the one competitive test were hardened and then tempered to a straw color. In all cases plain water was used for hardening and tempering. All bits tested were of the ordinary grade of bit steel and were formed to a cutting angle of 35 to 37 deg.

Much care was taken in making the power tests. Re-



One of the Mines at Thealka, Ky.

It was in mine No. 1 that the carefully arranged competitive test was made between the "Burton" and the ordinary pick-point bits.

cording electric meters were not available, therefore simultaneous readings of indicating meters were taken every 30 sec. during the sumping and cutting. The values in the table are averages of these readings, and therefore are of sufficient accuracy to give a fairly true indication of the actual power taken by the machines.

NEW BIT INCREASES PLACES CUT

So far no mention has been made of the more practical and perhaps more important advantages of the Burton bit. Mining machines so equipped are now cutting an average of nine and a maximum of nineteen places with one set of bits as compared to an average of two and a maximum of four with the old pick-point bits. When using the old bits it was frequently necessary to "spot" during the first cut and in some cases bits were spotted three times while cutting a single place.

As to the character of cuttings or so called bug dust, no definite tests have been made, however, it is certain that the cuttings are coarser with the Burton bit. This is due to the sharp cutting edge and to the wide cutting face providing the clearance which eliminates any rubbing or wedging effect, thus actually cutting the coal instead of grinding it away.

These recent investigations and tests made by the North-East Coal Company were not confined to the Burton bit. Other types were made and tried, also several of the special arrangements now on the market were put into service but none of these were able to make as favorable a showing as did the new Burton bit.



Showing Details of "Burton" Bit

The one on the left has not been used since being re-formed into the Burton type. That on the right has been used and re-sharpened several times.



News Of the Industry



Illinois Miners, Says Fishwick, Are Willing to Give New Methods And Untried Machinery a Chance

Springfield, Ill., Nov. 22.—Miners and operators of Illinois are scanning the horizon for a Moses to lead them out of the darkness of present day economics into the light, Harry Fishwick, of Springfield, vice-president of the Illinois Mine Workers, declared today at the annual meeting of the Illinois Mining Institute.

Other speakers included D. D. Wilcox, operator, of Gillespie, president of the institute; A. J. Moorshead, president of the Madison Coal Corporation; D. J. Parker, safety engineer of the U. S. Bureau of Mines; J. W. Pearce, of the Goodman Mfg. Co., Chicago; Harley Smith, operator, of Chicago, and Martin Bolt, director of the Illinois State Department of Mines and Minerals.

Harry Fishwick's remark regarding the need of a Moses followed the suggestion of Mr. Moses, an Illinois operator, that the Illinois miners should submit to a reduction. "We are all living in a different age than formerly," Mr. Fishwick said. "We are all living better and we don't want to go back. We want to be respectable. I can speak for thirty or forty thousand miners in Illinois who haven't a job. It calls for a Moses to meet that problem. The capacity of Illinois mines is about two hundred million tons. About eighty million tons is consumed in Illinois, but only thirty million of that is Illinois coal."

Mr. Fishwick then gave his pledge on behalf of Illinois miners to stand by their "contract to try any new and untried machinery or systems of mining," but avoided any reference to the possibility of a separate scale. "We stand committed to the word of our contract," Mr. Fishwick said, "and will live up to it even if it takes our hide off. Where my name was placed on a contract, my honor stands with it to do the utmost to carry out every word, without thinking what effect it may have on my political future."

Mr. Fishwick condemned expansion of mining and declared that there should be federal legislation to prevent opening mines where not needed. He said it was the duty of this generation to "preserve for future generations at least their share of anything dug out of the earth for the benefit of all people."

"This generation," he added, "has no right to waste the prodigal resources of this country. I do not think that coal was placed in the earth so the twentieth century might waste it as it

pleased and leave the following generations, like Lazarus, to subsist on crumbs from the rich man's table.

"We should all try to forestall this calamity. To my mind we haven't the right to waste or develop any operation when we can't promise that a market will be ready for the product. We need not go far afield to find something wrong with the industry."

J. W. Pearce, of the Goodman Mfg. Co., which has two loading machines in operation in this state, spoke of the possibilities of mechanical loaders. Mr. Moorshead, president of the Madison Coal Corporation, urged the operators present to visit other mines and copy the cream of the ideas there for their own use. Mr. Parker, of the Bureau of Mines, bespoke a closer co-operation between the State Department of Mines and the federal bureau, that mine accidents might be lessened.

In the election of officers Harvey L. Smith, Chicago operator, was named president; E. G. Lewis, superintendent of the Chicago Sandoval Coal Co., at Sandoval, was named first vice-president; William E. Kidd, Peoria district mine inspector, second vice-president; Martin Bolt, secretary-treasurer, and J. A. Jeffries, St. Louis; L. E. Young, St. Louis; John Land, West Frankfort; George K. Larrimore, Springfield, and F. F. Tirre, St. Louis, members of the executive board.

Priority Orders Upheld in Supreme Court Ruling

Congress has the constitutional right to authorize the issuance by the Interstate Commerce Commission of priority orders in the use of railroad cars in times of emergency, the Supreme Court held last week in an opinion delivered by Justice Holmes in a case brought by Edward P. Avent, Jr., of Michigan, from the federal District Court at Cincinnati, Ohio. That Congress has such power "no longer admits of dispute," the court declared.

Congress did not exceed its authority, the court declared, when in the Transportation Act of 1920 it authorized the commission, whenever it is of the opinion that shortage of equipment, congestion of traffic or other emergency exists in any section of the country, to suspend its rules as to car service and to make such reasonable rules with regard to it as in the commission's opin-

Rate War Is Starting

Will the coal freight rate fabric of the Midwest and Northwest be completely upset and reconstructed again soon? This is a possibility in view of events of the week. The Interstate Commerce Commission has called to Washington for a Wednesday session representatives of many Midwestern lines as a result of the powerful protest the Illinois and Indiana coal producers have made against permitting the C. & O. and the N. & W. to make drastic reductions Dec. 5 on West Virginia and Kentucky coal going to Iowa and the Northwest. The L. & N. has announced a 15c. drop on coal to Minneapolis and St. Paul on Dec. 6 to meet the other two roads. These two cuts practically shut the Midwest mines out of a great market in which they have already suffered by the recent Lake Dock rate decision and there is much talk of a general reconstruction of rates. Meantime the Midwest hopes the commission will suspend the new low tariffs to the Northwest now dated Dec. 5 and Dec. 6.

ion will best promote the service in the public interest, and among other things to give direction for preference or priority in the transportation or movement of traffic.

In July, 1922, during the railroad shopmen's strike, the commission issued an emergency order regulating the use of coal cars at mines. It classified the different demands for coal and provided the order in which shipments could be made to meet them. In this order the making of gas fell into the second classification.

While the emergency order was in effect Avent ordered a shipment of coal from Kentucky to Union City, Mich., upon the representation that it was to be used by a gas company there. When the coal reached its destination it was diverted by Avent to a portland cement company, which was in the fifth classification. Avent was indicted for fraudulently inducing the railroads to ship the coal in violation of the commission's order. He pleaded guilty and was sentenced to a fine of \$2,000.

As the case presented other questions aside from the challenge of the constitutionality of the commission's preference order, it was sent to the Sixth Circuit Court of Appeals for such action as it might be necessary for that court to take in view of the decision rendered by the Supreme Court.

Adopt Plan to Curb Waste of Timber And Encourage Reforestation

A broad program looking to drastic reduction in the waste of forest products and definite encouragement of reforestation was agreed upon at the National Conference on Utilization of Forest Products held in Washington, D. C., Nov. 19 and 20. Not only did the conference adopt the program but it provided a permanent organization to see that the program is carried out. This action is in contrast with many conferences where the enthusiasm is confined largely to the meeting itself and no provision for carrying on is made.

In providing the means for carrying out the resolutions of the conference a going organization was chosen. In view of the marked success which has followed the work of the Central Committee on Lumber Standards, of which John W. Blodgett, of Grand Rapids, is chairman, it was the sense of the conference that its scope should be enlarged so as to include in its objective the purposes of this conference, which are related to the work it has been doing.

The Central Committee on Lumber Standards was established two years ago at the suggestion of Herbert Hoover, Secretary of Commerce. Through it the industry has agreed upon a program of standardization and an elimination of excess variety which Secretary Hoover estimates will result in an annual saving of \$250,000,000. With the experience it has gained in this work and with the assistance of additional members with accurate knowledge of the two thousand uses to which forest products are put, another striking manifestation of beneficial co-operation among industries is predicted. The name of the committee is to become "Central Committee on Utilization of Forest Products."

Eminent Committee Chosen

It is generally agreed that the successful outcome of the conference was due in no small measure to the committee on permanent organization and program, which was comprised as follows: A. C. Goodyear, president, Great Southern Lumber Co. (chairman); A. R. Joyce, Joyce-Watkins Co. (secretary); O. E. Bradfute, president, American Farm Bureau Federation; O. M. Butler, secretary, American Forestry Association; E. L. Carpenter, president, Shevlin-Carpenter-Clark Co.; Harry B. Curtin, president, National Hardwood Lumber Association; E. J. Curtis, vice-president, the Curtis Co.; W. Z. Georgia, president, National Wood Chemists Association; Elliott H. Goodwin, vice-president, U. S. Chamber of Commerce; Henry Graves, dean, Yale Forestry School; Charles A. Herty, president, Synthetic Organic Chemical Manufacturers' Association; Elmer C. Hole, managing editor, *American Lumberman*; John E. Lloyd, president William M. Lloyd Co.; B. S. Masters, National Association of Box Manufacturers; John C. Merriam, president, Carnegie Institution; J. Malcolm Muir, Associated Advertising Clubs of

the World; Warren R. Roberts, American Mining Congress; C. H. Sherrill, president, Sherrill Hardwood Lumber Co.; Henry W. Stokes, president, American Paper & Pulp Association; E. H. Stoner, president Western Pennsylvania Lumber Co.; R. Y. Stuart, commissioner of Forestry of Pennsylvania; W. B. Swift, International Harvester Co.; W. A. Thomas, president, Statesville (N. C.) Furniture Co.; Frank G. Wismer, president, National Lumber Manufacturers' Association.

It was this committee of men of large affairs who drew up the plan of campaign for the nationwide effort which is to be put forth. This is the way the committee states the problem:

"An adequate supply of timber is essential to the industrial development of the country and to the maintenance of present standards of living, as well as to the prosperity of the people and industries dependent on the forests.

"Regional timber shortages and consequent high cost already are making themselves felt to manufacturers and users alike and will become increasingly serious during the many years needed to get into effect an adequate program of timber growing.

"More careful utilization of forest products offers an immediate means of prolonging our supply of timber and should be recognized in the national program of forestry as of equal importance with timber growing and protection.

"Knowledge of better utilization has outstripped practice and should be applied wherever economically feasible as a necessary measure to reduce the drain on the forests.

"Through further research, understanding and co-operation it will be possible still further progressively to reduce the drain on the forests.

"Reducing needless drain will tend to lower the cost of raw material, will create additional sources of profit from material now wasted, and will lengthen the life of plant investments by prolonging the supply of raw material.

"The task of reducing these losses is a joint responsibility of the industrial, commercial, agricultural, governmental, educational and professional interests, and the general public."

Western Kentucky Strike Is Slowly Breaking

It is reported from Central City, Ky., that the Gibraltar Coal Co. on Tuesday, Nov. 18, started cleaning up its mines three miles from Central City, and expected to start shipping this week. This is the second mine within five miles of the heart of the strike zone to start operations within a week, the Oakland Coal Mining Co. having started a few days ago. Miners are a little slow in reporting, but it is believed that crews will come in faster if there is no trouble.

Complete Storage Report Of Engineers Now Ready; Consumer His Own Doctor

The report of the Coal Storage Committee of the American Engineering Council has been completed and will be issued to the public this week. James Hartness, former Governor of Vermont, president of the Council, says that the survey, called the biggest undertaking of its kind ever carried on in this field, shows that storage is the remedy for the nation's coal troubles and that the consumer should take the initiative in setting in motion the cycle necessary to provide at all times abundant fuel at less cost for industry and the home. Most of the recommendations of the committee have been published.

John Hays Hammond, who was chairman of the U. S. Coal Commission, appointed by President Harding, writes in the foreword to the report:

"This report on an engineering survey of the possibilities of improving the method of purchase, delivery and storage of coal should appeal to producers, carriers and consumers as the key to the solution of many of their troubles. The President's Coal Commission, learning of the purpose of the American Engineering Council to make such a study, assigned to it the task of conducting an extended engineering survey of the storage of coal.

"The commission and other government departments have collaborated with the American Engineering Council extensively, the survey has been conducted by over 400 engineers in leading industrial centers, and the report has been formulated by a committee of prominent engineers.

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

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

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

Unions Threaten Boycott Against Stone Unless He Employs Union Miners

Special to Coal Age

El Paso, Texas, Nov. 24.—The United Mine Workers, failing to get the American Federation of Labor to condemn the Brotherhood of Locomotive Engineers for running the Coal River Collieries, in West Virginia, open shop, finally won a point Saturday in the Federation convention here. The convention unanimously passed a resolution empowering the executive council to exercise its good offices to adjust the dispute between the miners and engineers. If a settlement is impossible the council is to "advise the membership of all facts in the premises." This was a substitute for a resolution filed by William Turnblazer, a miner, at the beginning of the convention.

Advising the membership of "all facts in the premises" is a euphemism for a boycott. To warn the organized workers of the United States that Mr. Stone, head of a powerful labor union, is unfair to union labor in his capacity as director of the Coal River collieries would be followed by the withdrawal of trade unions from association in all capacities with the engineers' financial enterprises such as banks and mines, according to leaders of the Federation.

"One More Chance" for Stone

The resolution, presented by the Committee on Boycotts, of which Frank Farrington, president of the Illinois miners' union, is chairman, was a substitute for two resolutions which asked the convention at this time to present all the facts in the case to the affiliated unions. Representatives of the railroad unions in the Federation appeared before the committee and pleaded for "one more chance" for Mr. Stone, whose union is not affiliated with the Federation. The committee complied with the request and in its substitute motion stated:

"Your committee finds that a strike has been in effect at four mines of the Coal River collieries in West Virginia since April 1 of this year, due to the failure of this company to renew its wage agreement with the United Mine Workers. We find further that the officers of the United Mine Workers have made repeated but fruitless efforts to reach a settlement with Warren S. Stone, chairman of the Board of Directors of this corporation, which assumes responsibility for its labor policy. We find also that this coal company has served eviction notices upon the union men who are on strike and has resorted to the employment of strikebreakers.

"In view of these facts and as a further constructive effort, your committee recommends the following:

"That the Executive Council of the American Federation of Labor be instructed to exercise its good offices to secure a settlement of this unfortunate controversy at the earliest possible date; that in the event of failure of such negotiations the Executive Council be instructed to advise the membership of the American Federation of Labor of all the facts in the premises."



Holds One Job Ten Years

Many producing companies are subject to much annoyance because of the rapid turnover in labor. Frank Furrence, pictured above, does not cause his employers much worry in that regard, however, as he has been with the same company for ten years. He has been a loader for the Island Creek Coal Co. at Monaville, W. Va., for the last nine years, working so steadily that his brass checks are so nearly worn out that he needs a new set.

John L. Lewis, president of the United Mine Workers, said that the officials of the miners' union were fully in agreement with those who offered the original resolutions and with the committee on boycotts.

He desired to spare the convention a long debate on the resolution, and spoke of having heard "mutterings in some quarters" of an intention to provoke a long debate. He warned those who had such an intention that the mine workers "can engage in a debate *ad infinitum*" if there were opposition to the committee's report. He would discuss the case in detail. Otherwise he would say nothing.

The motion was put. Discussion was called. There was no response and the resolution was adopted unanimously.

By his action Mr. Lewis disarmed his antagonists in advance and prevented a debate that would have lasted four or five hours and which would, undoubtedly, have been extremely acrimonious.

John L. Lewis, president of the miners, and Ellis Searles, miners' union publicity man, consider that the resolution strengthens the miners by enlisting the full influence of the Federation on their side. The resolutions committee proposed the substitute as more constructive than Turnblazer's report, which was altogether denunciatory. William R. Johnson, president International Machinists, previously opposed condemnation of Stone as unfortunate for the labor movement, but did not oppose substitute resolution.

The new situation gives the miners a chance to drag the whole case into the public eye again, which is all they hoped for.

\$2,000,000 Electric Program Launched at Frick Plants

The H. C. Frick Coke Co. has awarded contracts for the complete electrification of five more plants and partial use of this power in two more in Fayette County, Pennsylvania. The work will commence at once and will require several months to complete. A total expenditure of \$2,000,000 is involved.

The five plants to be totally electrified are Leisenring No. 1, Lambert, Gates No. 1 and No. 2 and Ralph. At Leisenring No. 3 and Redstone electricity will be used for all work except hoisting coal. The maximum power demand for the seven mines will be 8,200 hp.

The company has been increasing operations during the past week. A total of 240 ovens was fired at York Run, Phillips, Continental No. 1 and Hecla plants. On Monday 175 ovens were added at Southwest and on Tuesday 200 were added at Lemont.

The plant of the Republic Iron & Steel Co. at Republic was reopened after being idle for a year.

At the Lynn plant of the Snowdon Coke Co. near Brownsville, 102 additional ovens were fired. There are now 270 ovens out of 300 in operation.

Effective immediately the Brier Hill and Nemaquin plants of the Buckeye Coal Co., a subsidiary of the Youngstown Sheet & Tube Co., will go on full time. These mines ship raw coal to Youngstown.

Pittsburgh Mining Institute May Be Formed

Mine officials and those who aspire for this ranking in the Pittsburgh district are said to be discussing the formation of what may ultimately be termed the Pittsburgh Mining Institute. The purpose of the body, if it becomes a reality, will be to provide a clearing house for information on coal mining. It is proposed to meet two, three or four times a year for the discussion of practical problems.

At the tenth annual banquet held under the auspices of John I. Pratt, state inspector of the Seventeenth bituminous district of Pennsylvania, attended by mine workers, mine officials and affiliated interests, and held at Kaufmann's store, Pittsburgh, on the evening of Nov. 22, Bill McCoy proposed that such an institute be formed and John I. Pratt was requested to appoint a committee to consider the advisability of that step. About 1,100 persons were present, an attendance that is said to be a record for affairs of this kind.

The speakers of the evening were Capt. Edward Steidle, supervisor of the co-operative mining department, Carnegie Institute of Technology, who in a few words greeted those in attendance; A. R. Pollack, general manager of the Ford Collieries, who talked about the responsibility for safety in bituminous mines; Rush N. Hosler, general manager Pennsylvania rating compensation bureau, who interpreted accident and lost-time statistics in Pennsylvania mines, and William J. McCoy, who talked briefly on mining education.

Union Drive in West Virginia Makes Scant Progress

The United Mine Workers has begun a drive to recover some of the ground lost in the southern West Virginia coal fields. A large force of organizers, at the instance of John L. Lewis, president of the union, have been holding meetings on Coal River and elsewhere in the Kanawha field in an effort to get the men back into the union and shut down the mines so as to bring about a recognition of the union. The effort has been attended by only partial success, for although some of the men who have been working non-union for the last two years have gone on strike, enough have remained at work to prevent serious interruption to operations.

Even two of the mines of the Coal River Collieries Co., owned by the Brotherhood of Locomotive Engineers, are operating. The third mine, it is understood, has been shut down. Other plants in the Boone County field have been shut down for a day or so but production has not been materially impaired. It is learned that where one or two companies have signed an agreement with the union operators are cutting expenses by not paying for certain kinds of work such as dead work.

So long as the market price of coal is low, some operators feel that the miners will work for the lower wage scale, but whenever the price of coal goes up, the miners will demand the higher scale and will rejoin the union unless they receive such increase.

Slump in Coal Output Shown In Railway Report

There have been 6,916,658 tons less of bituminous coal dumped at Lake Erie ports during the present season up to Nov. 2 than were dumped during the same period of 1923, according to the report of the Car Service Division of the American Railway Association submitted to the Board of Directors at a meeting of that body held in New York on Nov. 18 and 19. During the period ending Oct. 1 bituminous coal on hand at the Head of the Lakes totaled 4,911,439 tons, a decrease of 181,462 tons when compared with the corresponding date of the previous year. The report says that during the season up to Nov. 2 there were dumped at Lake Erie ports 21,001,413 tons as compared with 27,918,071 tons during the corresponding period of 1923.

Dumpings last year were greatly in excess of any previous year, the report says, and resulted in heavy carryover of coal at the Head of the Lakes at the beginning of the 1924 season, which with the coal dumped to date at Lake Erie ports together with anticipated dumpings the balance of the season will provide an ample supply of coal at upper lake ports to meet all requirements.

Movement of coal to New England shows a marked decrease compared with last year. This failure to accumulate coal in that territory in greater volume during the season, the report declares, undoubtedly will mean a heavy movement during the winter and possibly under unfavorable weather condi-



Louis W. Huber

Recently appointed instructor in the department of metallurgical and mining engineering at Carnegie Institute of Technology, Pittsburgh, Pa. Mr. Huber was graduated in mining engineering from Illinois University in 1921. After obtaining his degree he went with the La Salle Carbon County Coal Co., Carbon County, Ill., and later was associated with the B. F. Sturtevant Co., of Chicago.

tions. Between Jan. 1 and Nov. 1 bituminous coal moved all rail to New England totaled 112,675 carloads as compared with 169,175 carloads during the corresponding period of 1923, a decrease of 56,500 carloads.

During the period Jan. 1 to Oct. 1 tidewater shipments of bituminous coal to New England were 7,255,591 gross tons, a decrease of 2,084,712 gross tons when compared with the corresponding period of last year. Shipments of anthracite to New England during the ten months of 1924 ended Nov. 1 were 245,831 cars, as compared with 319,057 cars in the corresponding period of 1923, a decrease of 73,226 cars.

The report shows that during the first 44 weeks of 1924 coal loading amounted to 7,092,598 cars and coke loading to 432,019 cars as compared with 8,158,120 cars and 628,083 cars respectively in 1923. Coal cars put in service during the first nine months of this year totaled 36,526, whereas during the twelve months of 1923 they amounted to 83,296 cars. Coal cars on order on Oct. 1, 1924, totaled 12,793, as compared with 26,541 on the corresponding date of 1923.

Coal production in British Columbia in September was 124,169 tons, which is 7,115 tons less than in August. The Canadian Collieries (D), Ltd., produced 37,013 tons during September, as against 41,708 tons in the preceding month. The Western Fuel Corporation of Canada, Ltd., had a September output of 35,206 tons, as compared with 41,413 in August. Slight increases were made by the Granby Consolidated M. S. & P. Co., Ltd., Cassidy, the East Wellington Coal Co., and King & Foster. The Nanoose Wellington Collieries produced in September 8,075 tons and in August, 8,122 tons. In the Nicola-Princeton district there has been some increase.

\$30,000,000 Power Plant Planned on Lake Erie

A 400,000 hp. steam-electric generating station, to cost about \$30,000,000 and to serve as an important contribution to one of the Middle West's superpower systems, is to be constructed soon at Avon, Ohio, on Lake Erie, west of Cleveland, by the Cleveland Electric Illuminating Co., a subsidiary of the North American Co., F. L. Dame, president of the North American, announces.

"The new Avon station will tie in with the same company's Lake Shore station in Cleveland, which is the world's largest steam-electric plant under one roof," Mr. Dame said. "These two sister generating stations will, upon completion of the Avon project, have a combined power exceeding that now being taken from Niagara Falls."

This source of power is located at the northern end of superpower transmission lines running south to the Ohio River region, carrying energy into many iron and coal cities over the distribution systems of the Cleveland Electric Illuminating Co., the Northern Ohio Traction & Light Co., the Ohio Public Service Co. and the Ohio Power Co.

"In line with the practice of all the larger plants of the North American Co. subsidiaries," said Mr. Dame, "Avon station will be equipped to burn pulverized coal, an installation whereby fuel is ground into powder, mixed with warm air, and burned like gas at a temperature of 3,000 deg. By this method upward of 93 per cent of the heat energy in coal is being transformed into steam to turn the turbines as compared with 65 to 85 per cent in the old type crushed coal stokers."

Coal Road to Extend Line

Extensive improvements are reported to be under way on the Wellsburg, Bethany & Washington Ry., which operates between Wellsburg, W. Va., and Bethany, Pa., preparatory to extending the line to Washington, Pa., from Bethany. The road was recently taken over by the Buffalo Valley Collieries Co.

Appropriations have been made by this company for the improvement of the roadbed of the electric railway system and additional appropriations are expected before the end of the year.

Two coal towns to house miners and workers are contemplated, one three miles north of Bethany, the other about three miles south of the village. The traction line divested of many of its tortuous curves, will be used to convey coal from the fields to Wellsburg. The problem of moving it to the railway, seven miles distant from Bethany, has been the main factor in delaying the work in the past.

Upon the completion of the improvements now in progress fifteen minute service will be offered between Wellsburg and Bethany with high speed cars. The remainder of the trip to Washington will require about an hour, upon the completion of that roadbed within the next two years.

H. L. Doherty Urges Legislation to Curb Overproduction of Oil

Oil and Public Utility Operator Relies on State Action to Protect the Industry—Proposal Is Worthy of Study by Those Having Welfare of Coal at Heart

BY PAUL WOOTON
Washington Correspondent of Coal Age

The news from Cleveland last week contained a valuable suggestion for the coal industry. Henry L. Doherty, an oil and public utility operator who long has been known as a champion of the public welfare regardless of the immediate effect upon his own business, came out flat-footedly, in an address before the National Petroleum Marketers' Association, for a program of legislation that would make it possible to end profligate output of petroleum.

In his paper Mr. Doherty goes into detail as to his proposals for legislation, but for the purposes of this article all that it is necessary to know is that he places chief reliance on state action. Apparently he looks to the federal government to lend its moral influence to the proposal. In fact, it is known that thought now is being given to calling a conference in Washington of petroleum producers to discuss ways and means of conserving our oil resources by checking the waste incident to overproduction.

Reference already has been made in this correspondence to the striking parallel between coal and oil in the matter of overproduction. It ravishes each industry and takes an enormous toll from the public and from posterity. In oil it has meant wanton waste of a diminishing resource. In coal it has meant the abandonment of hundreds of mines when only partly worked out. It has meant starvation wages when calculated on an annual basis. It has meant crushing losses to thousands of investors.

All of this has been clear to the coal industry itself, but that industry has not visualized so clearly how much its uncomfortable situation is due to overproduction in oil.

The total production of soft coal in the United States in 1923 was 560,000,000 tons. This looks sizable, but, as we now know, it includes a very large quantity put in storage which is being liquidated this year. The average production over the two-year period probably will be 510,000,000 tons. The average would have been much higher had there been nothing to interfere with the normal growth of new business. For a long period that normal growth was 17,000,000 tons annually. It has been five years since the war. Five times 17,000,000 tons is 85,000,000 tons. The country had reached a normal output of 520,000,000 tons in 1917.

The normal expectation of the coal industry, based on former experience, therefore, would be 520,000,000 tons plus 85,000,000, or 605,000,000 tons, which probably would have been the 1924 production had there not been a powerful competitor in the field. That business has gone to oil—partly to fuel oil, mostly to gasoline. That the big loss has been to petroleum is quite evident to anyone who will reduce the supplies of the several fuels to their heating value and compare the result. Here it is:

Per Cent of Total Heating Value in Coal and by Petroleum

Year	Anthracite	Bituminous	Total Coal	Oil and Gas (A)	Total Mineral Fuels
1923	14	73	87	13	100
1918	13	78	85	15	100
1924 (B)...	12	61	73	28	100

(A) Includes imports.
(B) Based on preliminary estimates of production.

This shows where the coal market

has gone. Overproduction of oil has thrown on the fuel market ever increasing quantities of fuel oil and gasoline. It had to be sold at prices which would move each of them rapidly. Under present conditions there is no bottom to petroleum prices. Whatever may be said of the cost of production from pumping wells there is no bottom to cost of production from gushers. In 1923 California crude oil actually invaded Mexico. It went through the Panama Canal in great quantities for use on the Atlantic Coast, where it was sold under the noses of non-producers.

Mr. Doherty has raised a voice in the camp of the oil producers. The question now is, who will raise a voice among the coal producers?

Mr. Doherty's program for oil apparently is a good program for coal. None disputes that it is high time to limit the wasteful competition which sacrifices labor, standards of living and the coal resources at one and the same time. Mr. Doherty predicts that many oil operators will object to any such plan. It is certain also that many coal operators will object, but there is substantial opinion that it constitutes the chief prospect for their salvation. The oil industry is pleading for the right to prevent waste by co-operation. Its cause will be strengthened and success made more likely if the coal industry will join in the movement to procure the right to co-operate for the public good.

Northern Pacific Wants Coal

The Northern Pacific Ry. requests bids for its coal requirements from Dec. 1, 1924, to April 30, 1926, for the line extending from Jamestown, N. D., to Spokane, Wash. Not less than 500,000 nor more than 1,500,000 net tons will be required. The coal must be delivered f.o.b. cars on Northern Pacific Ry. tracks in as nearly equal monthly proportions as practicable in accordance with the company's requirements, commencing Dec. 1, 1924, and ending April 30, 1926.

Bids must be submitted to R. J. Elliott, purchasing agent, Railroad Building, 5th and Jackson Streets, St. Paul, Minn., by noon, Central Standard time, Dec. 1, 1924.

Output and Value of Coal from Missouri Mines in 1923

(Compiled by U. S. Geological Survey)

County	Loaded at mines for and used by shipment (net tons)	Sold to local trade employees (net tons)	Used at mines for steam and heat (net tons)	Made into coke at mines (net tons)	Total quantity (net tons)	Total value	Average value per ton	Number of employees				Average number of days worked
								Underground Miners, a	All others	Surface	Total	
Adair.....	238,846	5,883	7,054		251,783	\$744,000	\$2.96	369	116	49	534	160
Andrain.....	5,558	10,314	87		15,959	62,000	3.88	38	14	6	58	263
Barton.....	658,822	6,913	38,355		704,090	2,221,000	3.15	87	14	693	794	93
Bates.....	114,245	1,839	3,850		119,934	318,000	2.65	99	23	96	218	130
Boone and Chariton.....		12,150	50		12,200	38,000	3.11	32	8	6	46	223
Caldwell, Clay, Dade, and Platte.....	60,517	32,277	2,498		95,292	358,000	3.76	189	54	22	265	217
Callaway.....	6,800	19,602	200		26,602	110,000	4.13	46	14	7	67	202
Grundy, Harrison and Schuyler.....	3,284	8,426	500		12,210	66,000	5.41	51	12	5	68	133
Henry.....	107,600	5,669	1,825		115,094	318,000	2.76	19	3	95	117	170
Johnson.....	56,075	1,458	967		58,500	206,000	3.52	49	20	30	99	181
Lafayette.....	470,938	23,796	16,543		511,277	1,985,000	3.88	757	303	101	1,161	187
Linn.....	5,126	22,674	164		27,964	150,000	5.36	140	66	19	225	70
Macon.....	550,348	10,909	10,093		571,350	1,767,000	3.09	764	223	64	1,051	192
Putnam.....	12,869				12,869	48,000	3.71	85	24	11	120	363
Randolph.....	222,612	6,517	4,400		233,529	796,000	3.41	306	70	38	414	190
Ray.....	474,054	41,110	3,469		518,633	2,048,000	3.95	1,126	357	109	1,592	130
Vernon.....	7,478	212	134		7,824	21,000	2.68	35	8	9	52	41
Other counties b	17,164	1,698	240		19,102	52,000	2.72	25	6	40	71	13
Total, excluding wagon mines.....	3,012,336	211,447	90,429		3,314,212	11,308,000	3.41	4,217	1,335	1,400	6,952	15
Wagon mines served by rail.....	88,939				88,939	267,000	3.00					
Grand total.....	3,101,275	211,447	90,429		3,403,151	11,575,000	3.40					

a Includes also loaders and shotfirers. b Cass, Lincoln, Ralls and St. Clair.



Practical Pointers For Electrical And Mechanical Men



Automatic Cager Speeds Loading and Unloading at Shaft Bottom

New Device Installed in Auxiliary Shaft of Illinois Mine—
Hoisting Operation Made Continuous—No
Limit to Number of Redumps

OLD tramping methods have long ago been abandoned in mines where high production records are made at low cost. Aside from the fact that automatic caging has resulted in savings and made possible large output the ease and safety with which the cars are placed on the cage are important factors.

Nearly every coal mine has some conditions about its caging problem which are different from others, but essentially the problem is one of accurately caging the car and getting the empty one off as quickly as possible. Many devices have been made to cage the cars but the best results are obtained only when the supply of loaded cars is co-ordinated with the system of placing them on the cage.

At the Donk Bros. Coal & Coke Co.'s Thermal mine No. 4 near Edwardsville, Ill., William Palecek, mine manager, and Fred Braske, mechanic, have developed a caging device which helps materially in speeding up the caging and hoisting of mine cars. Occasionally it is necessary to raise the mine cars to the surface through the auxiliary shaft and it was here that this device was installed, but usually the coal is hoisted in a skip in the main shaft.

NEARLY 100 PER CENT AUTOMATIC

The automatic caging equipment thus developed is interesting in that it is almost 100-per cent automatic, and as a result the hoisting operation is continuous. Two loaded tracks run direct to the shaft which is of the double-compartment type. Empty cars leave the cages on one side of the shaft and the loads enter on the other. All hoisting is done in balance, the cage at the foot being loaded while the one at the top is unloaded.

Between rails of the loaded tracks is placed a heavy steel shaft as shown in Fig. 1. On each shaft two car stops are arranged so that when one is in the up position the other is down. The purpose of these stops is to catch the axle of a car and hold it in place until released. The shafts are interlocked so that the rear car stop on one track is up when the rear stop on the other is down. Owing to the location and

position of the other two stops the same relation applies, namely when one is up, the other is down. If the rear stop on one track is up and ready to stop a car only the forward stop on the other track is in the engaging position.

HEAVY SPRINGS ABSORB SHOCK

The interlocking arm between the two tracks keeps the two bars so related to each other that when the rear stop on one track is holding a car the forward stop on the other track also holds a car. Heavy springs take the shock of a car when it bumps a stopping block and this has greatly reduced the repair and maintenance of the device and the cars.

On the end of each bar and extending into the sump is a heavily constructed crank or arm. The two cranks are so arranged and related to each other that as the cage descends to the landing a block on the cage turns the crank.

When the caging device is in service a car on one track is held against the forward stop while another car is held against the rear stop on the other track. When the cage descends, it strikes the operating arm on the first-mentioned track, and the car on the front stop passes onto the cage. This same operation releases the car held by the rear stop on the other track, and it proceeds to the forward stop on its track. At the same time the rear stop on the first track has raised and it holds the next approaching car. When the opposite cage descends it turns the bars of the caging device so that a car is loaded from the track leading to that side of the shaft and the other cars progress toward the cage as already described.

In this manner a car is caged from each track alternately. An added fea-

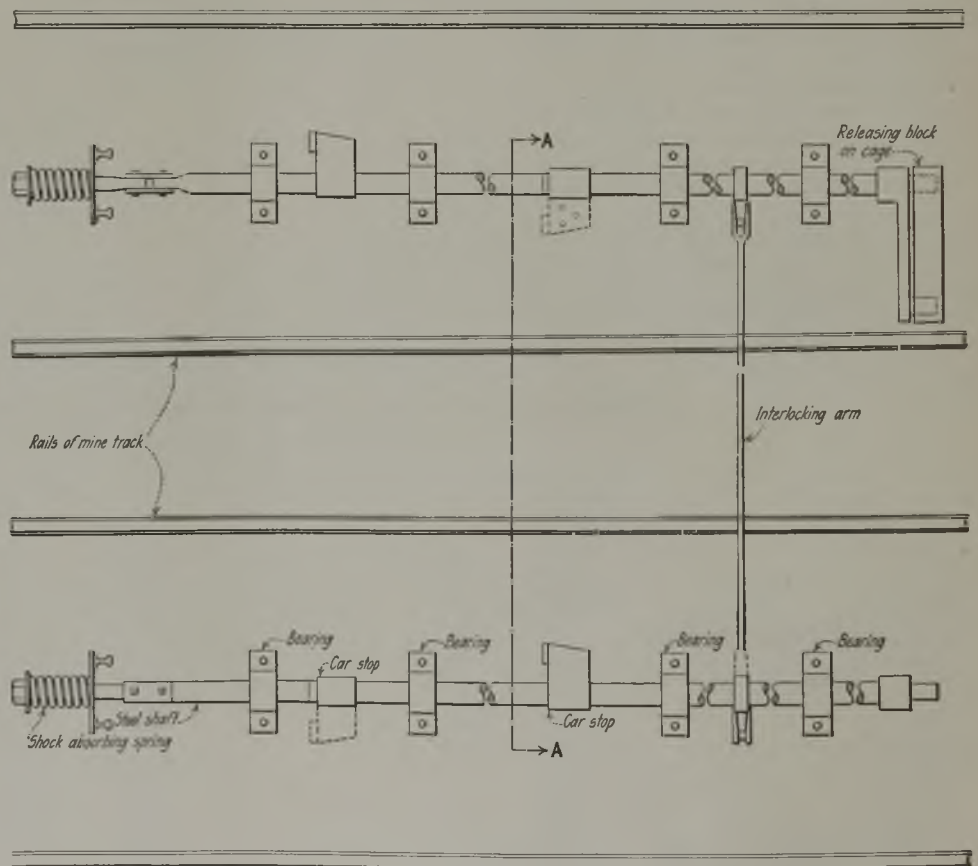


Fig. 1—Automatic Cager Permits Any Number of Redumps

The descending cage in one compartment releases a car which is caged immediately. At the same time a car on the opposite track is permitted to proceed toward the other compartment, but is held in position until the other cage comes down and releases it.

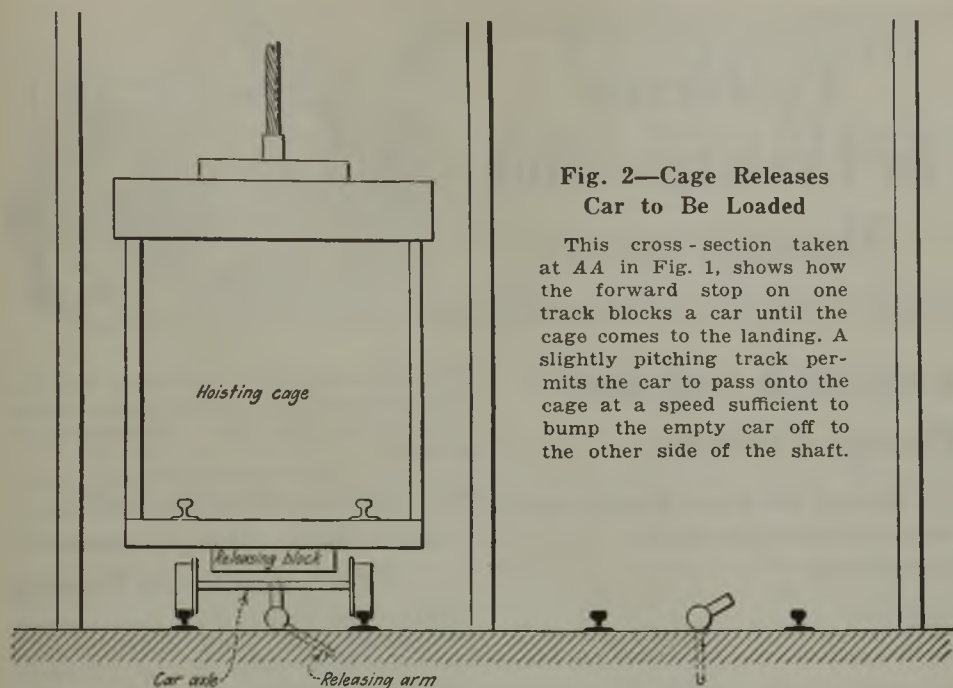


Fig. 2—Cage Releases Car to Be Loaded

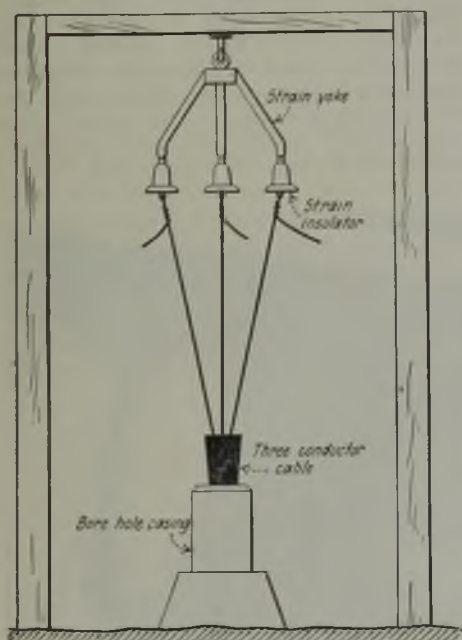
This cross-section taken at AA in Fig. 1, shows how the forward stop on one track blocks a car until the cage comes to the landing. A slightly pitching track permits the car to pass onto the cage at a speed sufficient to bump the empty car off to the other side of the shaft.

ture of the device is that as many redumps as necessary may be made at any time without interfering with the sequence of operations of the caging device.

The designers have patented the mechanism and to date have been successful in supplying instructions and prints for its installation at other mines.

Method of Equalizing Strain on Suspended Cables

With the use of alternating current for substations, hoists and pumps, within mines a suitable method for suspending three-conductor cables over bore-



Strain Yoke Distributes Load

Each conductor must take its share of the load because of the equalizing effect of the strain yoke. Porcelain insulators prevent current leakages much better than wooden rolls, around which the cable is commonly wrapped in other types of bore-hole mountings.

holes has become necessary. The suspension should be arranged so that the strain cannot be concentrated on a single wire. Frequently due to the

arrangement of the supporting structure and the manner in which the cable is suspended, one conductor is compelled to carry the entire weight of the cable. This is not only overloads that wire but also causes accidents. When the wire breaks or slips the cable receives a sudden jerk and frequently the conductors snap and the cable falls, piling up at the foot of the borehole.

PERFECT BALANCE OBTAINED

A novel method for equalizing the strains on the various conductors is shown in the illustration. The strain yoke is a heavy iron fitting built somewhat in the form of a tripod. An insulator is hung on each leg of the yoke, and each conductor is fastened to an insulator. The strain insulators prevent current leaks that otherwise would be caused by the insulation on the wire being broken where it is twisted and tied. A perfect balance between the three conductors is obtained because the strain yoke will tilt into a position so that each wire will carry its proportionate share of the load.

It will be noted that the borehole casing extends above the ground level. This is necessary to prevent water and especially snow from getting into the cable. It is always good practice to pour paraffin or wax on the outside of the cable, especially where the latter comes through the borehole casing. This seals the casing and conductor together so that moisture cannot work its way into the insulation.

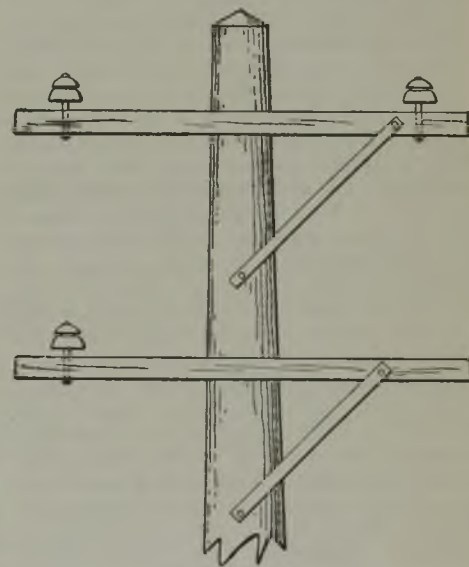
The breaking of any one of the conductors is not merely objectionable because of the danger of a total failure of the line or because of the need of repair, but also because the breakage of the wire results in a phase failure which may ruin a motor.

A Stunt Which Prevents Power Line Failures

Permanent line construction in these days necessitates the use of steel poles and crossarms. However, wood poles and wood crossarms are quite extensively used and thoroughly practicable. One of the greatest difficulties in the past has been due to the use of the same type and size insulators on steel crossarms and poles as were formerly used on wood poles and wood crossarms carrying the same voltage. It is quite obvious that short circuits and grounds are more likely to occur with steel poles which conduct electricity readily than with wooden ones which, when dry, do not.

ONE BRACE PREVENTS LEAKS


A three-phase line on a wood pole is sometimes no better than the same line when mounted on steel members. The reason for this is that it is common practice to use iron braces on the crossarms and attach them close to the insulator pins. When this is done it is obvious that there is a metallic circuit almost directly from the insulator pin to the crossarm braces then to the other insulator pin on the same crossarm. To prevent such a circuit being formed it may be found advantageous




Long Leakage Path Prevents Short Circuit

The left-hand crossarm brace on this pole was eliminated to prevent leakage of current from one of the top line wires to the crossarm braces and thence to the other top wire.

to use only one crossarm brace placing it on one side of the pole. This brace should be a heavy one. With this arrangement the current may leak along this crossarm brace to the pole but thereafter it would have to travel along a highly resistant path through the wood of the pole and the crossarm to reach either one of the other two line wires. By this method the liability to breakdowns on almost any wood-pole line can be greatly decreased at low cost. As the voltage on certain lines is raised to carry larger loads it is often inconvenient and expensive to change insulators. The plan suggested may obviate that necessity.



Problems In Underground Management



Explains Why Water of High Sulphur Content Causes Pump Failures

Coal-Mining Company's Experiments Indicate Six-Stage Pumps with Glycometal Impellers, Resist Acid—Centrifugal Action Separates Acid from Water

By J. S. O'FLAHERTY
Chief Engineer, Central Coal & Coke Co.,
Kansas City, Mo.

Some of the experiences of the company with which I am connected, in handling mine water heavily impregnated with sulphuric acid, may be of interest to other coal operators as well as to metal miners and pump manufacturers. In many operations the expense of handling sulphur water is one of the larger items entering into the cost of producing coal or other mineral.

In 1912 my company purchased two centrifugal pumps intended to perform certain specific work in a mine in Oklahoma. The water in this mine had a high sulphur content and the cost of pumping and of pump maintenance was excessive. One of these pumps was a three-stage machine while the other had four-stages. In both pumps the impellers were of bronze, and the casings were made of acid-resisting metal selected from samples submitted for test by some of the largest and most reliable pump builders in the country.

All tests of this metal were conducted in both standing and running water in the mine in which the pumps were to operate. When these machines were purchased it was the intention to operate them under different heads in different locations in the mine. Through a change in plan, however, they were installed side by side, pumping out of one drill hole, each pump working a 12-hr. shift. In the course of time the shell of the three-stage pump was destroyed by the action of the acid water. Having portions of the pump still in good order yet on hand, sufficient repairs were ordered to again put the machine in good condition. The shell of the four-stage pump was still in good shape when the second casing of the three-stage pump was practically gone.

For a while I was of the opinion that a better grade of acid-resisting metal had been used in the four-stage pump. The two machines, however, were operating at the point for which the three-stage unit had been specifically designed. In time it occurred to us that the number of stages in the pump might have something to do with its life. Further experimentation proved this to be the case.

We now use a six-stage pump under

the conditions where formerly we would have used a three-stage machine. Furthermore, by using impellers made of glyco metal we have imparted indefinite life to our pumps when handling the same water that formerly caused no end of trouble.

My explanation of this is as follows: Sulphuric acid is comparatively heavy, having a specific gravity of 1.849; consequently the impellers act as separators, concentrating the sulphuric acid against the shell or casing. As a result the slower the rotational speed the less the separation of water from the acid, and the greater the number of stages the less the velocity of the water.

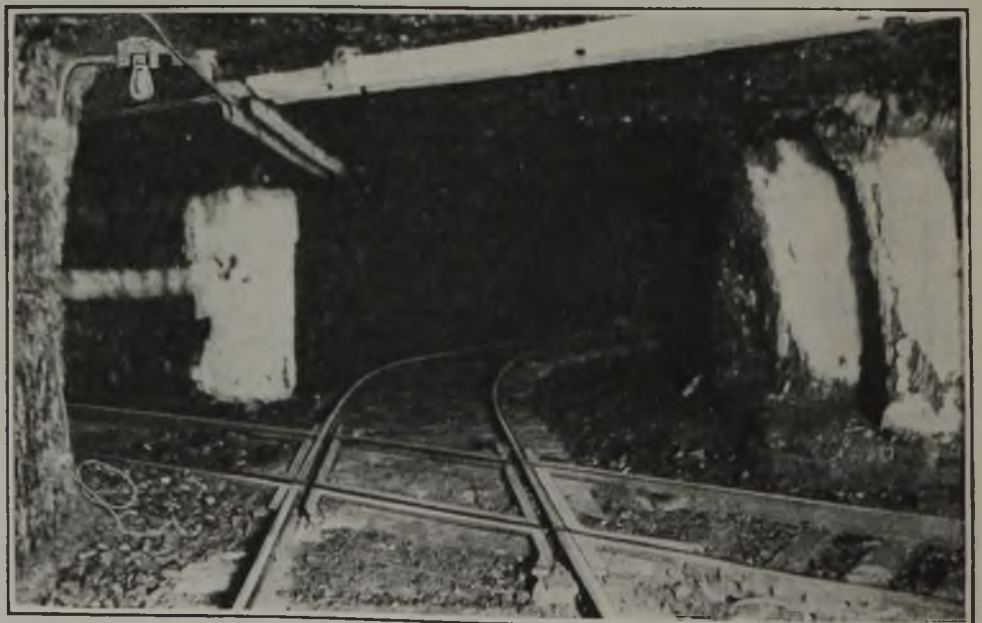
Chemists to whom the above was shown state that the affinity between sulphuric acid and water is so strong that the two liquids cannot be separated or the acid content appreciably concentrated by centrifugal action.

Perhaps some *Coal Age* reader has had experience similar to that above related and can explain this phenomenon.—
EDITOR.

At Crossover Double Rail Lifts False Flange Above Track Rail Being Crossed

Where the Fourth East entry crosses the Second Main South haulageway in the Springdale mine of the Allegheny Pittsburgh Coal Co., Logans Ferry, Pa., a substantial crossover has been laid which possesses at least one feature worthy of note. Beside the usual crossover rails, on which the wheels of rolling stock run, and guard rails to insure safety to a trip in passing the junction, an outer rail is matched with each of the track rails in the crossover as shown in the accompanying illustration. These outer rails are placed close to the track rails. The balls of both rails touch each other and lie in the same plane.

Each end of the outer rails is tapered in the vertical plane to form a slight incline which gently lifts false-flanged wheels of rolling stock up and over the track rails being crossed, thus eliminating violent impacts between the false flanges of the wheels and the rails being crossed. The outer rails form a track in the crossover on which the unworn parts of wheels run.



Stilling the Cry, "They're Off at the Crossover Again"

Wheel treads are made wide for safety. If they weren't wide cars would leave the track at any point where the distance between the rails greatly exceeded the gage. But that widening of the tread unfortunately gives it an unworn exterior area, and at this crossover an extra rail is placed so that this unworn area supports the wheel, lifting the worn area clear of the rails being crossed.



Production And the Market



Coal Business Has Fleeting Revival of Interest With Fall in Temperature

A partial sop to the justly disgruntled coal trade came along last week in the guise of a blast of rough weather, but—the usual insect in the salve—while it was unusually severe it didn't last long enough. Therefore, although there was a sudden revival of interest in coal it subsided almost as quickly as it appeared and conditions resumed the listless aspect that had been in evidence for several weeks. The paradoxical wish of the coal industry still is for more weather—the worse the better. And unless a stretch of seasonable temperature puts in an appearance soon the producer will be up against it harder than ever with the end of the lake season close at hand and heavy tonnage to be deflected into other channels.

Industrial Improvement Is Spotty

The era of prosperity expected to follow on the heels of the election has thus far fallen far short of prognostications. Though surveys of industrial conditions indicate an improvement, the pickup has not been sufficiently general—being quite spotty in fact—to give the impetus to business expansion that would pull the coal trade out of the rut. As New England industries have been conspicuously sluggish for some months more than ordinary interest attaches to the resumption of operations this week on full time by one of the large Fall River textile plants.

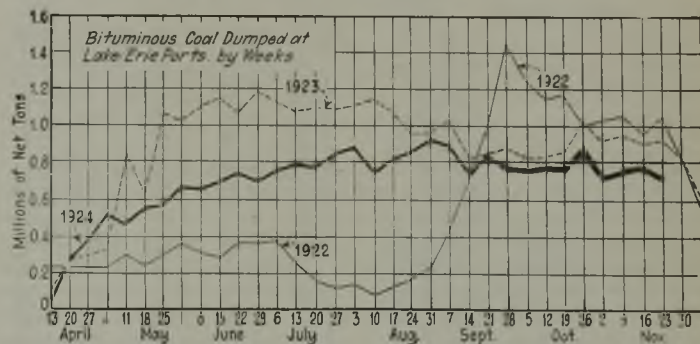
The anthracite trade felt the stimulus of more seasonable weather, especially the retail end—the producers scarcely needed it, as they have not entirely caught up on October orders. Stove is in greatest demand, except in Philadelphia, where chestnut has forged to the front. Egg and pea are listless and there is perhaps a slight improvement in the steam sizes. Independent prices show a firmer tendency with little material change in the range of quotations.

Coal Age Index of spot prices of bituminous coal at least is holding its own, standing on Nov. 24 at 170,

the corresponding price for which is \$2.06, the same as for the preceding two weeks.

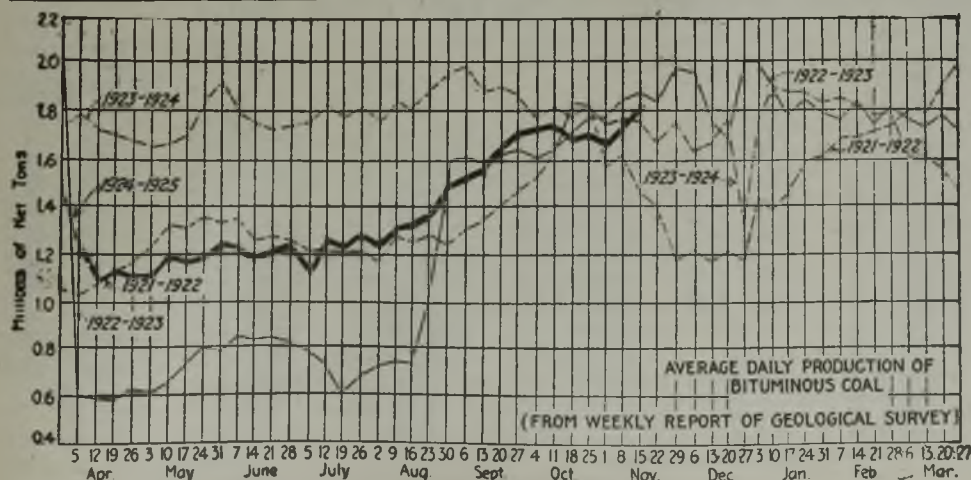
A further gain in activity was made at Hampton Roads last week, dumpings of coal for all accounts during the seven-day period ended Nov. 20 totaling 369,793 net tons, compared with 356,603 tons handled during the previous week.

Movement of coal across the lakes is unmistakably on the wane, dumpings at Lake Erie ports during the week ended Nov. 23, according to the Ore & Coal



Exchange, being as follows: For cargo, 704,930 net tons; for fuel, 28,698 tons, compared with 753,405 and 30,875 tons respectively during the preceding week.

Despite the celebration of Armistice Day, which cut operation about 40 per cent, the output of bituminous coal improved perceptibly in the second week of November, when, according to the Geological Survey, 10,122,000 net tons was produced. This was an increase of 791,000 tons over the preceding week, according to revised figures. Incidentally this is the first time since February that production has exceeded a corresponding week of 1923. Election Day tended to limit output of anthracite, but nevertheless 1,674,000 net tons was produced during the week ended Nov. 15, compared with 1,592,000 tons in the previous week and 1,669,000 tons in the corresponding week of 1923.



Midwest Feels Slight Pick-up

A little more business was available all along the line in Midwest markets during the week, though domestic coals have not started any climb worthy of cheers. Most producers are wary of overproduction and therefore the markets have not been flooded with anything. This firms up most coals. Steam sizes have stiffened a shade in and around Chicago and a further improvement is expected unless a cold snap of real iciness should induce a sudden heavy production of lump and egg. Smokeless domestics could not maintain their top of \$4.25 and sank to \$4, but there has been a steady mine-run trade even though the price never passes \$2. Anthracite is reasonably active throughout this territory despite keen oil competition.

Cool weather came along just in time to save the domestic prices in the southern Illinois field. All domestic sizes, with the exception of lump, were beginning to pile up and lump was slow at several mines, with the result that in one or two places lump prices were good but egg suffered and nut was a drug on the market. Railroad tonnage is light, cars are plentiful and the movement is good. Mines are getting from two to four days a week and all coal has been moving under pressure.

In the Duquoin field conditions are similar to the above except that prices are weaker. Weather has been favorable and prices are such that Duquoin coal will move. In the

Mt. Olive field conditions have been unusually bad but cold weather has put a little life into that region's domestic trade. There is some domestic coal moving northwest and steam is pretty well taken up on contract with no change in prices. In the Standard field up to the present there has been no movement and conditions have been unusually bad, most coal being sold at below cost.

A little cold weather has spurred the St. Louis market just a trifle on cheap grades. There is nothing doing in anthracite, smokeless and coke. Carterville is moving rather freely but the small orders which are most numerous are for the cheaper grades. Country domestic demand for Mt. Olive or better grades is fairly active. Local wagon-load steam is very good, while carload steam is soft and with little demand. Country steam is rather hard to find, with nothing moving out of the Chicago market.

Better Omens in Kentucky

Demand for Kentucky coal over the week has been fair, but offerings at Louisville have been heavier due to larger tonnage production in western Kentucky and slumping off of Lake movement from West Virginia and eastern Kentucky. Retailers haven't been moving much yard stock because of mild weather and are refusing to buy. The result has been that there is a good deal of prepared coal on track in western Kentucky awaiting billing. Eastern Ken-

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

Low-Volatile, Eastern		Market Quoted	Nov. 26 1923	Nov. 10 1924	Nov. 17 1924	Nov. 24 1924	Midwest		Market Quoted	Nov. 26 1923	Nov. 10 1924	Nov. 17 1924	Nov. 24 1924
Smokeless lump.....	Columbus....		\$4.10	\$4.35	\$4.10	\$4.00@ \$4.50	Franklin, Ill. lump.....	Chicago.....		\$4.10	\$3.35	\$3.35	\$3.25@ \$3.50
Smokeless mine run.....	Columbus....		2.10	2.05	2.00	1.75@ 2.25	Franklin, Ill. mine run....	Chicago.....		2.35	2.35	2.35	2.25@ 2.50
Smokeless screenings.....	Columbus....		1.30	1.35	1.25	1.20@ 1.35	Franklin, Ill. screenings...	Chicago.....		1.45	1.35	1.35	1.35@ 1.60
Smokeless lump.....	Chicago.....		4.50	4.60	4.10	3.75@ 4.00	Central, Ill. lump.....	Chicago.....		3.10	2.85	2.85	2.75@ 3.00
Smokeless mine run.....	Chicago.....		2.25	1.85	1.85	1.75@ 2.00	Central, Ill. mine run....	Chicago.....		2.10	2.20	2.20	2.15@ 2.25
Smokeless lump.....	Cincinnati..		4.25	3.85	3.75	3.75@ 4.25	Central, Ill. screenings...	Chicago.....		1.05	1.25	1.25	1.25@ 1.35
Smokeless mine run.....	Cincinnati..		2.10	1.90	1.85	1.75@ 2.00	Ind. 4th Vein lump.....	Chicago.....		3.35	3.10	3.10	3.00@ 3.25
Smokeless screenings.....	Cincinnati..		1.50	1.15	1.15	.75@ 1.15	Ind. 4th Vein mine run....	Chicago.....		2.60	2.35	2.35	2.25@ 2.40
*Smokeless mine run.....	Boston.....		4.65	4.30	4.30	4.20@ 4.35	Ind. 4th Vein screenings..	Chicago.....		1.35	1.45	1.45	1.50@ 1.60
Clearfield mine run.....	Boston.....		2.15	1.95	1.90	1.65@ 2.25	Ind. 5th Vein lump.....	Chicago.....		2.50	2.85	2.85	2.50@ 3.00
Cambria mine run.....	Boston.....		2.60	2.40	2.30	2.00@ 2.60	Ind. 5th Vein mine run....	Chicago.....		2.10	2.10	2.10	2.00@ 2.25
Somerset mine run.....	Boston.....		2.35	2.15	2.05	1.80@ 2.35	Ind. 5th Vein screenings..	Chicago.....		.95	1.10	1.10	1.10@ 1.35
Pool 1 (Navy Standard)...	New York....		3.00	2.75	2.75	2.65@ 3.00	Mt. Olive lump.....	St. Louis....		3.10	3.00	3.00	3.00
Pool 1 (Navy Standard)...	Philadelphia..		3.00	2.70	2.70	2.50@ 2.90	Mt. Olive mine run.....	St. Louis....		2.25	2.35	2.35	2.25@ 2.50
Pool 1 (Navy Standard)...	Baltimore....			2.30	2.30	2.10@ 2.50	Mt. Olive screenings....	St. Louis....		1.25	1.10	1.10	1.00@ 1.25
Pool 9 (Super. Low Vol.)...	New York....		2.35	2.10	2.10	2.00@ 2.25	Standard lump.....	St. Louis....		3.05	2.75	2.75	2.75
Pool 9 (Super. Low Vol.)...	Philadelphia..		2.30	2.15	2.15	1.95@ 2.35	Standard mine run.....	St. Louis....		2.05	1.95	1.95	1.90@ 2.00
Pool 9 (Super. Low Vol.)...	Baltimore....		2.05	1.70	1.70	1.65@ 1.80	Standard screenings....	St. Louis....		.55	.60	.65	.60@ .75
Pool 10 (H.Gr.Low Vol.)...	New York....		2.00	1.85	1.85	1.75@ 2.00	West Ky. lump.....	Louisville..		3.00	3.05	3.05	3.00
Pool 10 (H.Gr.Low Vol.)...	Philadelphia..		1.85	1.75	1.75	1.65@ 1.90	West Ky. mine run.....	Louisville..		1.75	1.60	1.60	1.50@ 1.75
Pool 10 (H.Gr.Low Vol.)...	Baltimore....		1.90	1.55	1.55	1.50@ 1.65	West Ky. screenings....	Louisville..		.65	.70	.80	.85@ 1.00
Pool 11 (Low Vol.).....	New York....		1.55	1.60	1.60	1.50@ 1.75	West Ky. lump.....	Chicago.....		2.85	2.75	2.75	2.50@ 3.00
Pool 11 (Low Vol.).....	Philadelphia..		1.70	1.45	1.45	1.35@ 1.60	West Ky. mine run.....	Chicago.....		1.75	1.65	1.55	1.40@ 1.70
Pool 11 (Low Vol.).....	Baltimore....		1.75	1.45	1.45	1.40@ 1.50							

High-Volatile, Eastern		Market Quoted	Nov. 26 1923	Nov. 10 1924	Nov. 17 1924	Nov. 24 1924	South and Southwest		Market Quoted	Nov. 26 1923	Nov. 10 1924	Nov. 17 1924	Nov. 24 1924
Pool 54-64 (Gas and St.)..	New York....		1.60	1.50	1.50	1.40@ 1.65	Big Seam lump.....	Birmingham..		3.85	3.10	3.10	2.75@ 3.50
Pool 54-64 (Gas and St.)..	Philadelphia..		1.65	1.50	1.50	1.40@ 1.60	Big Seam mine run.....	Birmingham..		1.95	1.70	1.70	1.50@ 1.90
Pool 54-64 (Gas and St.)..	Baltimore....		1.70	1.45	1.45	1.40@ 1.50	Big Seam (washed).....	Birmingham..		2.35	1.85	1.85	1.75@ 2.00
Pittsburgh ac'd gas.....	Pittsburgh...		2.55	2.40	2.40	2.30@ 2.50	S. E. Ky. lump.....	Chicago.....		3.25	2.85	2.75	2.50@ 3.00
Pittsburgh gas mine run...	Pittsburgh...		2.25	2.10	2.10	2.00@ 2.25	S. E. Ky. mine run.....	Chicago.....		1.85	1.60	1.60	1.50@ 1.75
Pittsburgh mine run (St.)..	Pittsburgh...		2.00	1.85	1.85	1.75@ 2.00	S. E. Ky. lump.....	Louisville..		3.50	3.25	3.25	2.75@ 3.25
Pittsburgh slack (Gas)...	Pittsburgh...		1.25	1.15	1.15	1.10@ 1.25	S. E. Ky. mine run.....	Louisville..		1.85	1.60	1.60	1.50@ 1.75
Kanawha lump.....	Columbus....		3.00	2.55	2.55	2.35@ 2.75	S. E. Ky. screenings....	Louisville..		.75	.90	.95	.85@ 1.00
Kanawha mine run.....	Columbus....		1.85	1.55	1.55	1.45@ 1.65	S. E. Ky. lump.....	Cincinnati..		2.60	2.60	2.75	2.50@ 3.00
Kanawha screenings.....	Columbus....		.80	1.00	.95	.80@ 1.00	S. E. Ky. mine run.....	Cincinnati..		1.50	1.45	1.45	1.25@ 1.65
W. Va. lump.....	Cincinnati..		3.15	2.60	2.65	2.25@ 3.00	S. E. Ky. screenings....	Cincinnati..		.85	1.00	.95	.75@ 1.15
W. Va. gas mine run.....	Cincinnati..		1.50	1.45	1.45	1.35@ 1.50	Kansas lump.....	Kansas City..		5.10	5.00	5.00	5.00
W. Va. steam mine run....	Cincinnati..		1.50	1.30	1.35	1.35@ 1.50	Kansas mine run.....	Kansas City..		3.25	3.35	3.35	3.25@ 3.50
W. Va. screenings.....	Cincinnati..		.85	.95	.95	.75@ 1.25	Kansas screenings....	Kansas City..		2.00	2.00	2.00	2.25@ 2.35
Hocking lump.....	Columbus....		2.95	2.55	2.55	2.35@ 2.75							
Hocking mine run.....	Columbus....		1.85	1.60	1.60	1.50@ 1.75							
Hocking screenings.....	Columbus....		.80	.75	.75	.75@ .90							
Pitts. No. 8 lump.....	Cleveland...		2.55	2.30	2.40	1.90@ 2.75							
Pitts. No. 8 mine run....	Cleveland...		1.95	1.75	1.85	1.80@ 1.90							
Pitts. No. 8 screenings...	Cleveland...		1.15	1.00	1.10	1.10@ 1.30							

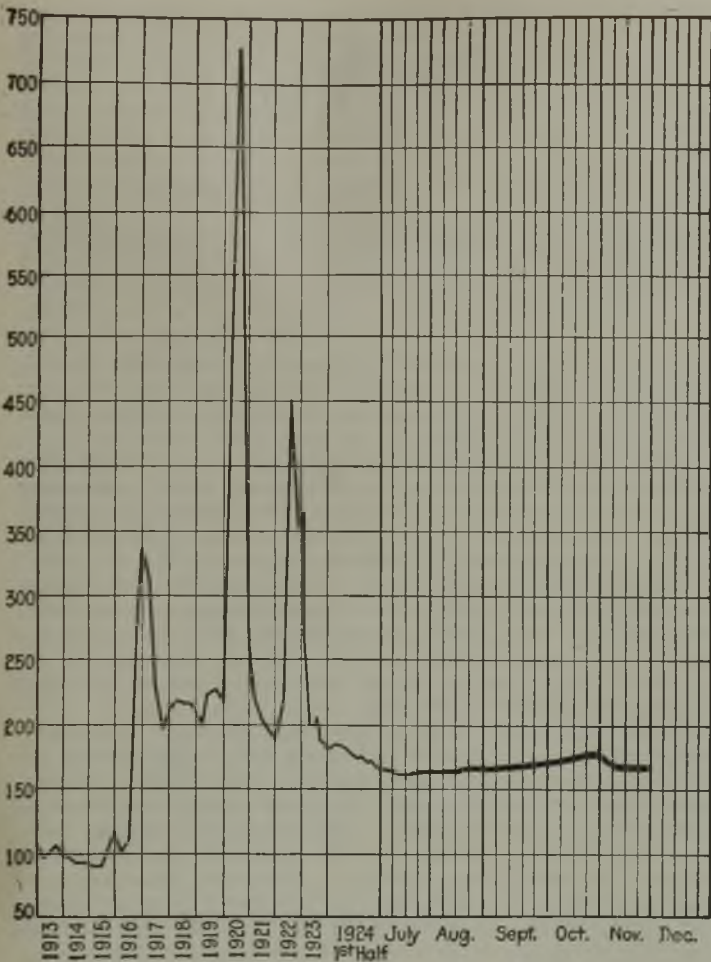
* Gross tons, f.o.b. vessel, Hampton Roads.

† 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	Nov. 26, 1923		Nov. 17, 1924		Nov. 24, 1924†	
			Independent	Company	Independent	Company	Independent	Company
Broken.....	New York....	\$2.34	\$8.50@10.00	\$8.00@ \$9.25				
Broken.....	Philadelphia..	2.39						
Egg.....	New York....	2.34	9.85@12.25	8.75@ 9.25	\$8.50@ \$8.75	8.75@ 9.25	\$8.75@ \$9.00	8.75@ 9.25
Egg.....	Philadelphia..	2.39	9.85@12.20	8.75@ 9.25	9.45@ 9.75	8.80@ 9.25	9.45@ 9.75	8.80@ 9.25
Egg.....	Chicago.....	5.06	9.60@12.50	8.00@ 9.35	8.17@ 8.25	8.14@ 8.20	8.17@ 8.25	8.14@ 8.20
Stove.....	New York....	2.34	9.85@12.25	8.75@ 9.25	10.00@10.50	8.75@ 9.50	10.00@10.50	8.75@ 9.50
Stove.....	Philadelphia..	2.39	9.85@12.20	8.90@ 9.25	10.10@10.75	9.15@ 9.50	10.10@10.75	9.15@ 9.50
Stove.....	Chicago.....	5.06	9.60@12.50	8.00@ 8.35	8.63@ 8.75	8.50@ 8.64	8.63@ 8.75	8.50@ 8.64
Chestnut.....	New York....	2.34	9.85@12.25	8.75@ 9.25	9.75@10.25	8.75@ 9.25	9.75@10.25	8.75@ 9.25
Chestnut.....	Philadelphia..	2.39	9.85@12.20	8.90@ 9.25	9.85@10.50	9.15@ 9.25	9.85@10.50	9.15@ 9.25
Chestnut.....	Chicago.....	5.06	9.60@12.50	8.00@ 8.35	8.26@ 8.40	8.44@ 8.60	8.26@ 8.40	8.44@ 8.60
Pea.....	New York....	2.22	6.40@ 7.75	6.15@ 6.65	5.00@ 5.50	5.50@ 6.00	5.00@ 5.50	5.50@ 6.00
Pea.....	Philadelphia..	2.14	6.75@ 9.00	6.35@ 6.60	5.75@ 6.00	6.00	5.75@ 6.00	6.00
Pea.....	Chicago.....	4.79	6.00@ 6.75	5.40@ 6.05	5.13@ 5.45	5.36@ 6.20	5.13@ 5.45	5.36@ 6.20
Buckwheat No. 1.....	New York....	2.22	1.75@ 3.50	3.50	2.00@ 2.50	3.00@ 3.15	2.00@ 2.50	3.00@ 3.15
Buckwheat No. 1.....	Philadelphia..	2.14	2.25@ 3.50	3.50	2.50@ 3.00	3.00	2.50@ 3.00	3.00
Rice.....	New York....	2.22	1.25@ 2.50	2.50	1.75@ 2.15	2.00@ 2.25	2.50@ 3.00	2.00@ 2.25
Rice.....	Philadelphia..	2.14	1.75@ 2.50	2.50	2.00@ 2.25	2.25	1.75@ 2.15	2.00@ 2.25
Barley.....	New York....	2.22	.90@ 1.50	1.50	1.25@ 1.50	1.50	2.00@ 2.25	2.25
Barley.....	Philadelphia..	2.14	1.00@ 1.50	1.50	1.50	1.50	1.25@ 1.50	1.50
Birdseye.....	New York....	2.22	1.25@ 1.45	1.60	1.50	1.50	1.50	1.50

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



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

	1924			1923
	Nov. 24	Nov. 17	Nov. 10	Nov. 26
Index	170	170	170	186
Weighted average price	\$2.06	\$2.06	\$2.06	\$2.25

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.

tucky also has unsold coal on track and has been active in an effort to move egg and 2-in. lump sizes.

Steam demand has been fair for screenings, but not much mine run is being taken, although total industrial movement has been good since election.

Of course there is a fair movement to retailers in the North, who are getting more cold weather. However, prices are a shade weaker on prepared. There is very little eastern Kentucky block quoted at over \$3.25, and not much sold at over \$3, while some good coal has been offered at \$2.75. Western Kentucky is still asking \$3 for block, but the price is being shaded.

Screenings are firmer as a result of lighter production of prepared. The western Kentucky field has advanced to 85c.@ \$1 a ton quoted, and supplies are said to be scarce at these prices. Some screenings in eastern Kentucky are quoted at 85c. but most houses are asking 95c.@ \$1.10.

Northwest Is Busy

Stocks of coal on docks at Nov. 1, according to figures just released, give an accurate picture of the condition at Head of the Lakes. This year the docks hold 4,751,352 tons of bituminous as against 5,369,529 last year at the same time, and 543,340 tons of anthracite as against 138,982 last year. Obviously the bituminous market will not be glutted this year and the anthracite now on hand will assure the Northwest that there will be no shortage.

Only one cargo of anthracite was received last week and at the same time 36 cargoes of bituminous came in. Twenty-three cargoes are reported en route and one of these is anthracite.

The feature of the Head-of-the-Lakes market still is Pocahontas. The demand is insistent and several docks have received additional cargoes to help out. The price took another jump in lump this week and now stands at \$9. With the jump, however, mine run remains at \$5.50 and screenings at \$4.50. Pocahontas lump was \$7 for October. Other prices, both in hard and soft coal, remain the same.

Docks are on the jump and are working overtime to get shipments out. Last month, it will be remembered, was the biggest so far this year, and this month bids fair to pass it. One dock is two weeks behind in its orders.

At Milwaukee a drop in temperature during the week, with snow as a reminder of conditions soon to be expected as a matter of course, caused a betterment in the inflow of orders for fuel for a day or two, but things snapped back with a rise of the mercury, and dealers report a quiet market. There has been some improvement in getting stock from the mines, which have been catching up because of slower demand. Pocahontas has been advanced in price 25c. to 50c. a ton, the latter advance on the nut size. The Milwaukee retail price is now \$11.25@ \$11.50.

Milwaukee receipts during November, including the 19th, were 23,500 tons of anthracite and 283,235 tons of bituminous coal, making the season's totals thus far 716,794 tons of anthracite and 2,346,609 tons of bituminous coal, or 3,063,403 tons in all. Receipts for the same period of 1923 were 862,324 tons of anthracite and 3,000,162 tons of bituminous coal—3,862,486 tons in all.

Western Domestic Is Slow

Kansas screenings, which have been selling several weeks at \$2, are quoted at \$2.25@ \$2.35 now. The surplus of this grade which accumulated during the early season period of heavy domestic demand has been moved and it is now the domestic sizes that are dragging, with mines working only about half time. Production in Arkansas and Oklahoma also is very light, the result of warm weather.

A slight stimulation in the production of domestic coals was noted in the Colorado market during last week, but not to such an extent as one familiar with previous seasons would expect for this time of the year. The remarkably warm weather prevailing throughout Colorado and the regions where Colorado coal is marketed is puzzling others than the weather man. However, Colorado mines worked on an average of 31 hours last week with only 18 per cent of the total working time lost on account of "no market." Prices are firm.

In Utah production is increasing as a result of colder weather. The best industrial customer is the metal mining industry. The sugar making campaign fell nearly 40 per cent short of normal and there may be some surplus coal left in sugar factory yards. Northwestern business is improving and the California trade is holding up well. Dealers, who have already moved a good deal of coal to householders' cellars, are not buying heavily at the moment.

Ohio Markets Lack Vim

Sales of coal in the Cincinnati market have fallen off materially during the last week, in spite of the active movement of lake coal in winding up the season. There has been a slight increase of steam and byproduct orders, but a large falling off of domestic orders. Most retail yards are full, but the colder weather of the last week served to relieve them a good deal. The off situation has been marked by the reappearance of distress coal, though not to an amount to prove demoralizing. Many mines have had to shorten production and available mine tracks are full of loaded cars. Mine-run both in low and high volatile continues to drag in the West, which is customarily its best market, but this condition, due to earlier overshipment, is only temporary. The tidewater demand for smokeless mine-run continues off and the price is below the profit-making point. West Virginia and Kentucky operators have had notice that final shipments on outstanding orders for lake coal must be made on or before Nov. 26.

While colder weather has stimulated retail trade at Columbus, no effect is noticed in production and distribution. Smokeless and splints are rather strong at former levels, but Hocking, Cambridge and Pomeroy coals are weak and featureless. Prices have not moved to any extent. Steam business is rather dull, reserves are fairly good and buying is mostly from the open market, as demurrage coal is still rather plentiful. General manufacturing has not increased to any extent. Screenings are slightly stronger as a result

of reduced output of prepared sizes. Production is not large in any section of the southern Ohio field.

At Cleveland there has been a marked stiffening in spot prices on slack and nut and slack of 10c.@15c. per ton, the result of diminishing supply of these grades due to the cessation of production for shipment in the Lake trade and the further fact that steam users did little stocking when slack was plentiful.

Demand Slightly Better at Pittsburgh

Demand has been improving slowly at Pittsburgh since the election, but not enough to make up for the previous lull without a corresponding decrease in production. Railroad consumption is good, but stocking is below normal. The steel mills are now running a trifle above their average in the past six years. Domestic coal demand has been poor for this time of year, due to mild weather, and prices have failed to stiffen. Nut is particularly hard to dispose of and slack is in unsatisfactory demand, but steam slack has avoided falling below \$1.

A slightly better tone pervades the central Pennsylvania coal market since the election. Orders are increasing slightly and although production has been slightly lower this is accounted for by four holidays during the month, when many miners were off duty. Output for the week ending Nov. 15 was 14,243 carloads, compared with 14,436 carloads the previous week.

Trade at Buffalo continues quiet with prices no higher. The steel trade has improved a little and business is in a healthy condition. The movement of coal is very free. Cars are not at all hard to get and they arrive at destination promptly. A sudden cold snap improved buying a little, but it lasted only two or three days. Quotations are as before, with a slight stiffening in slack.

New England Markets Listless

In New England buyers seem almost wholly without interest in the current market and prices are again somewhat depressed in consequence.

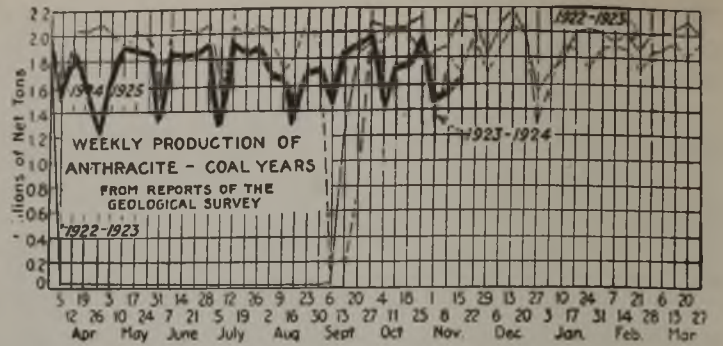
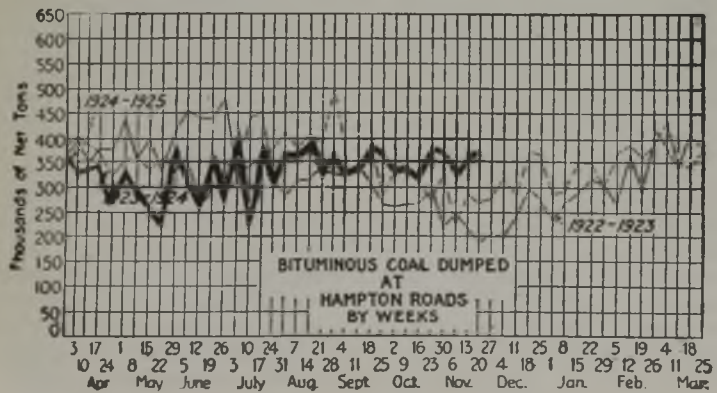
The Hampton Roads situation seems to have entirely lost the favorable tone that was noticed a few weeks ago. Prices f.o.b. vessel have again slipped to lower averages, \$4.20 having been mentioned in the past week for navy acceptable grades f.o.b. vessel. The recent sale of locomotive supply coal by the Island Creek interests to New England railroads in considerable volume, displaying a large tonnage of high volatile from other districts in West Virginia, and has occasioned much comment.

For inland delivery high grade Pocahontas and New River are an easy purchase at \$5.35@\$5.40 per gross ton on cars Boston, with Providence and Portland prices 15c.@35c. higher, depending upon the urgency of sale. This situation continues to exclude even the highest grades all-rail from central Pennsylvania.

Dumpings via the New York and Philadelphia piers are at a minimum. The tonnage is not only relatively small but is confined almost exclusively to gas-producing coals and other specialties that in the main are unaffected by competition of the smokeless coals from Southern ports.

Signs of Life Appear in Atlantic Markets

A little more activity has appeared in the New York market. Buyers are inclined to display a little more interest and coal movement is somewhat better than last week. Contract holders are more anxious about their full quota and there is not so much free coal available as a result. Not



much improvement is looked for, however, until after Jan. 1. Arrivals at tidewater continue to increase but shippers appear to be able to dispose of the surplus without much trouble. Quotations continue on last week's basis.

Colder weather has stirred up interest in the Philadelphia market, though buying has not increased much. Ordering on contracts is heavier and there is some storing for winter. Offering of slack has fallen off slightly but demand from retailers has increased. There is not much life at tide.

At Baltimore there has been no response by coal buyers thus far to the prosperity talk. Prices remain at points that bring little, if any, profit to producers, and offer little incentive for sales work by jobbers. On several days of the past week there was not more than one vessel at any time at the piers taking export coal.

Birmingham trade is devoid of much activity. Such seasonal industries as oil mills and steam electric plants are the principal buyers in the spot market, there being little increase in the tonnage taken by year-round industries as compared with recent weeks. Railroads are taking minimum deliveries on contracts and apparently no buyers on contract are increasing reserves. Domestic sales are confined to orders for a few cars for shipment here and there over the territory. Quotations are fairly steady and but little domestic or steam is produced in advance of disposition.

Spurt in Anthracite Market Short-Lived

There was a slight revival in the anthracite market at New York early in the week, but it did not last long. Lower temperatures caused a sudden spurt in demand on the retailers, which was reflected in the wholesale trade, but bins were soon refilled. Independent prices steadied with the increased demand, but the range doesn't show any material change. Stove leads in demand, but egg and pea move slowly. The situation of the steam sizes has not changed. Early in the week some shippers offered egg coal at tidewater on a basis of \$8.25 per ton at the mines, but this was soon cleaned up.

Unusually cold weather at Philadelphia has caused a strong retail demand, but producers hardly needed a stimulant of this kind, as they have not altogether caught up with orders. Stove and nut are most in demand, with the latter now in the ascendant. Egg is giving more trouble than pea. Retail prices have strengthened. Steam sizes are in much better demand.

Demand is only moderate at Baltimore although spurred into some action by a cold snap during the week. Much is hoped for as a result of the drive about to be started to educate the people to burn buckwheat coal. Yards are fairly well stocked to meet all demands.

At Buffalo the demand for anthracite has been helped materially by colder weather and retailers are really busy for the first time since last winter. Consumers are still seeking substitute fuel, however. The latest is a shipment of blue star semi-anthracite from southern West Virginia. The price is \$4 to \$5 below anthracite, but the coal carries considerable volatile, though it is claimed that it is much above regular anthracite in heat units and lower in sulphur and ash.

Car Loadings, Surplusages and Shortages

	Cars Loaded	
	All Cars	Coal Cars
Week ended Nov. 8, 1924.	994,504	171,985
Previous week	1,073,430	181,718
Week ended Nov. 10, 1923.	1,036,221	190,587
	Surplus Cars	
	All Cars	Coal Cars
Nov. 7, 1924.	116,448	60,097
Oct. 31, 1924	99,190	49,058
Nov. 7, 1923.	31,955	12,567
	7,099	1,120
Car Shortage		

Foreign Market
And Export News

Business in British Market Improving
But Still Below Normal

The improving tendency in the South Wales market is patchy, and the recent heavy gales have disorganized shipping, holding up consignments and causing more stoppages at the pits. The sale of 300,000 tons of best admiralty coal to prominent Italian exporters for 1925 delivery at 26s. f.o.b. is reported from Cardiff. On the whole, however, foreign demand is disappointing. Complaints of German competition are unabated, and it is reported that Germans are giving three to six months credit against the thirty days offered in the South Wales market. Several other collieries are reported on the verge of stopping.

Several contracts have been renewed, among them that with the Somerset and Dorset Joint Railway for 1,000 tons of coal per week for the next year. Several other smaller contracts have

been placed and others renewed, but in no case is the price revealed, which leads to the impression that prices now are below those of expiring contracts.

The Newcastle market has improved very slightly, though operators are finding difficulty in meeting German competition; British prices, though at their very lowest, are still about one dollar per ton above the German figures. None of the pits has reopened, and, according to the principal of one large group in north England, there is every prospect of further stoppages unless business improves.

A cable to *Coal Age* states that production at the British collieries increased in the week ended Nov. 8, when the output was 5,137,000 tons, according to the official reports. This compares with 5,043,000 tons in the week ended Nov. 1.

French Markets at Standstill;
Stocks Unimportant

The French coal market remains in a sort of privileged position in that while Belgian supplies of industrial coal are excessive, French stocks of corresponding grades are just normal and those of house fuels practically nil. Demand for industrial coal is limited and that for house fuel, active at the end of October, is at a momentary lull due to unusually mild weather.

Imports of Cardiff-Swansea and Newport coals fell away in October to 667,000 tons, compared with 1,008,000 tons in the corresponding month of 1923. This was due partly to the further appreciation of sterling, firmness of prices at the shipping docks and receipts of fuels from Germany.

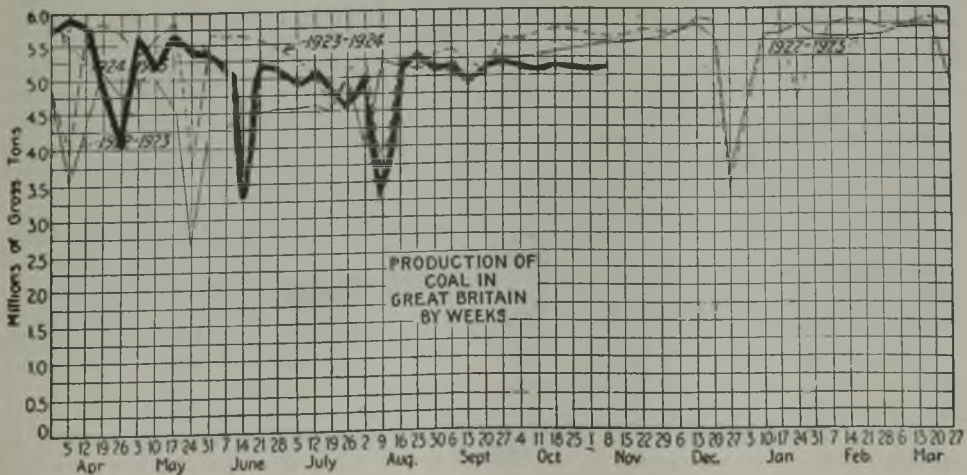
German reparation deliveries having virtually stopped since Oct. 28, when the M.I.C.U.M. retired from office, a meeting of French, Belgian and Italian representatives with delegates of the German mines and cokeries was held in Paris under the auspices of the Reparation Commission and an agreement was

quickly arrived at. The apportionment of reparation fuels to the Allies will be fixed by the Reparation Commission, France's share to be about 600,000-650,000 tons per month dating from November.

The supply of coke to the O.R.C.A. in October was 269,805 tons, of which 11,555 tons was received during the last two days of the month. From Nov. 1 to 12, 6,746 tons was received.

U. S. Domestic Fuel Exports
In October

	(In Gross Tons)	
	1923	1924
Anthracite, tons.....	400,599	362,118
Value.....	\$4,437,241	\$4,109,348
Bituminous coal, tons.....	1,488,887	1,534,459
Value.....	\$7,516,221	\$6,801,630
Coke, tons.....	77,737	55,759
Value.....	\$744,987	\$420,927
Ten Months Ended October		
Anthracite, tons.....	3,846,392	2,985,222
Value.....	\$41,736,118	\$33,220,615
Bituminous coal, tons.....	16,823,508	13,196,946
Value.....	\$92,825,649	\$61,230,545
Coke.....	1,010,456	475,171
Value.....	\$10,978,978	\$4,009,974



Trade Slow at Hampton Roads;
Price Tendency Firmer

Business at Hampton Roads is slow, although prices show a tendency to stiffen, due to the advent of winter weather. Inquiries have increased somewhat and prospects are brighter.

Coastwise business has improved and bunker movement is good, but practically no foreign business is being booked. Little prospect for increase in the latter trade is seen. Coastwise movement is expected to increase rapidly and the bunker trade has every indication of continuing upward.

The tone of the market is firm. Though few contracts are in the market, domestic business was improved on substantial lines. Supplies at tidewater have improved somewhat.


Export Clearances, Week Ended Nov. 22, 1924	
FROM HAMPTON ROADS	
For Brazil:	Tons
Nor. Str. Mathilda, for Rio de Janeiro	4,937
For Cuba:	
Br. Str. Onega, for Havana	4,139
For Italy:	
Ital. Str. Campania, for Porto Ferrajo	6,607
For Mexico:	
Amer. Schr. Rosa Ferita, for Manzanillo	916
For Porto Rico:	
Nor. Str. Cissy, for Guayabal	3,030
For West Indies:	
Br. Str. Portmore, for Fort de France	4,255
FROM PHILADELPHIA	
For Cuba:	
Am. Motorship Munmotor, for Havana	—
FROM BALTIMORE	
For Italy:	
Ital. Str. Hermada, for Genoa	6,452

Hampton Roads Pier Situation		
N. & W. Piers, Lamberts Pt.:	Nov. 13	Nov. 20
Cars on hand.....	949	1,229
Tons on hand.....	58,587	75,403
Tons dumped for week.....	117,017	95,985
Tonnage waiting.....	4,000	20,000
Virginian Piers, Sewalls Pt.:		
Cars on hand.....	1,706	1,984
Tons on hand.....	113,550	129,900
Tons dumped for week.....	109,911	94,492
Tonnage waiting.....	12,000	8,395
C. & O. Piers, Newport News:		
Cars on hand.....	2,220	1,554
Tons on hand.....	116,770	86,575
Tons dumped for week.....	91,468	135,696
Tonnage waiting.....	19,510	3,950


Pier and Bunker Prices, Gross Tons		
PIERS		
	Nov. 15	Nov. 22†
Pool 9, New York.....	\$4.75@ \$5.00	\$4.75@ \$5.00
Pool 10, New York.....	4.50@ 4.75	4.50@ 4.75
Pool 11, New York.....	4.40@ 4.55	4.40@ 4.55
Pool 9, Philadelphia.....	4.90@ 5.25	4.90@ 5.25
Pool 10, Philadelphia.....	4.45@ 4.70	4.45@ 4.70
Pool 11, Philadelphia.....	4.30@ 4.50	4.30@ 4.50
Pool 1, Hamp. Roads.....	4.20	4.25
Pool 2, Hamp. Roads.....	4.10	4.10
Pools 5-6-7 Hamp. Rds.....	4.00	4.00
BUNKERS		
Pool 9, New York.....	\$5.00@ \$5.25	\$5.00@ \$5.25
Pool 10, New York.....	4.75@ 5.00	4.75@ 5.00
Pool 11, New York.....	4.65@ 4.80	4.65@ 4.80
Pool 9, Philadelphia.....	4.90@ 5.25	4.90@ 5.25
Pool 10, Philadelphia.....	4.75@ 4.95	4.75@ 4.95
Pool 11, Philadelphia.....	4.50@ 4.70	4.50@ 4.70
Pool 1, Hamp. Roads.....	4.30	4.35
Pool 2, Hamp. Roads.....	4.20	4.20
Pools 5-6-7 Hamp. Rds.....	4.10	4.10

Current Quotations British Coal f.o.b. Port, Gross Tons		
Quotations by Cable to <i>Coal Age</i>		
Cardiff.....	Nov. 15	Nov. 22†
Admiralty, large.....	27s. @ 27s. 6d.	27s. @ 27s. 6d.
Steam smalls.....	16s. @ 17s.	16s. @ 17s.
Newcastle:		
Best steams.....	18s. 3d. @ 18s. 6d.	18s. 3d. @ 22s. 6d.
Best gas.....	20s. @ 21s.	21s.
Best bunkers.....	18s. 6d. @ 19s.	18s. 6d. @ 19s.

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



News Items From Field and Trade



ALABAMA

New coal washeries of medium capacity will be constructed by the Pratt Fuel Corporation at its drift mines at Dora and at its Jagger operation. The plants will cost about \$60,000 and \$20,000 respectively, according to announcement.

Frank Nelson, Jr., formerly president and principal owner of the Nelson Coal Corporation, and S. L. Yerkes, of the Grider Coal Sales Agency, who formerly operated the Burnwell Coal Mining Co., have been elected directors of the Pratt Fuel Corporation. The properties of the former two companies were absorbed by the latter a short while ago.

Walker County celebrated its 100th anniversary as a sub-division of the state recently at Jasper, Ala. A contest was held to determine what factor had contributed the most to the up-building and development of the county to its present position of wealth and influence and "Coal" was voted this distinction by the crowning of L. B. Musgrove, a pioneer developer in the Walker County field as "King."

The School of Mines at the State University, University, Ala., operated under the direction of the U. S. Bureau of Mines, is making an addition to its laboratory to accommodate new equipment recently acquired. A small coal washery has been donated to the school by the Montgomery Coal Washer & Mfg. Co., of Birmingham, and concentration tables and other equipment have been added to aid in the treatment and determination of coal samples.

The Joseph A. Holmes Safety Association, which has organized chapters throughout the Alabama coal fields, is conducting a campaign for the prevention of haulage accidents in the mines, it being stated that this class of accidents is responsible for about 16 per cent of the fatalities in the industry. Meetings are being held throughout the district, each being addressed on this subject by an official of the association or some representative of the Alabama mine inspection department or U. S. Bureau of Mines, which latter agencies are co-operating in all efforts being put forward for the prevention of accidents in mining operations.

COLORADO

The State of Colorado produced 123,892 tons less coal during the first nine months of the year than it did in the same period of 1923.

The Chandler mine of the Victor-American Fuel Co. broke all its previous

monthly production records when it averaged nearly its maximum of 850 tons a day during October. This mine is in the Canon City field.

D. E. Davis, superintendent at Oak Creek for the Victor-American Fuel Co. in Routt County, is in California for a long vacation.

Colorado was not the most dangerous coal mining state in the Union during September. National statistics on coal-mine accidents for the month show 186 deaths for 48,624,000 tons produced, or a national fatality rate of 3.83 deaths per million tons of coal. Colorado's rate was but 3.20 for the month.

F. O. Sandstrom, secretary and traffic manager of the Colorado & New Mexico Coal Operators Association, and Harry F. Nash, vice-president of the Oakdale Coal Co., were in Washington, D. C., during the week of Nov. 17, representing the Colorado operators in the Missouri River rate case, which is at present before the Interstate Commerce Commission for final hearing. This case was filed by the Colorado operators in September, 1923, in order that the commission might eliminate the discrimination in the rates between Colorado fields and other producing districts to the Missouri River.

ILLINOIS

The Peabody Coal Co. has reopened its mine No. 9, at Langley, which had been closed several months. It is expected that 500 men will be employed all winter.

Eighty men are on the payroll of the Rutland Coal mine, at Rutland, which was recently opened by Ottawa men. Rutland is now producing third vein coal.

The United Electric Mine Co., Danville, is negotiating for a large acreage north of Rushville, with a view to opening a big strip mine. Several options have been closed upon land and more are pending. The company is now operating a mine between Cuba and Lewistown on the Galesburg-Havana branch of the Burlington, where it began taking out coal last February. The output of that mine is now thirty cars per day. The coal on the farms near Rushville, which are now under lease, is under from 30 to 40 ft. of cover. It averages 5 ft. in thickness.

Crescent Mine No. 1, in Marsh Creek Hollow, near Peoria, has begun operation on a half capacity basis after having been idle since March 29. This operation will give employment to 250

men. With the opening of this mine about 40 per cent of the miners in the Peoria territory are now employed. This is an increase of 30 per cent over the total employed sixty days ago.

The Tiger mine at Cuba, has resumed work after having been closed down for the last four months.

INDIANA

Reports that the Vandalia Coal Co., operating some of the largest mines in Indiana, is experimenting with a "new process of mining," to which miners are taking exception, have been refuted by officials of District No. 11, United Mine Workers. "It is true the Vandalia Coal Co. is experimenting with the Joy loading machines, but the miners are not objecting to this," John Hessler, president of the miners, said.

MISSOURI

A. Burt Champion, former vice-president of the Matthew Addy Co., has opened an office in St. Louis, where he will sell pig iron, coal, coke, charcoal, fluorspar and alloys.

PENNSYLVANIA

The Shamokin Collieries Co., which is headed by Boyd C. Osler, formerly of Hazleton, is following the lines suggested by A. J. Jessup, general manager of the Jeddo-Highland Coal Co., and is going after the small sized coal trade.

To protect the new Fort Jenkins bridge at Pittston from damage by mine caves and settlement of the surface, the county commissioners have entered into an agreement with officials of the Pennsylvania Coal Co. for the purchase of the coal under the piers and abutments and for a certain radius beyond.

Consolidated Coal & Coke Co., of Butler, resumed operations Nov. 17 at its mines at Nicola, Armstrong County, after a shutdown since last April. Fifty men are employed. The company resumed operations at its Fennelton mines in Butler County three weeks ago.

Activity is increasing in the Connelville coke region. The Republic Iron & Steel Co. resumed operations last week at the Republic mine, which had been idle more than a year. No ovens are being fired but the mine will operate 100 per cent. The H. C. Frick Coke Co., however, fired 200 additional ovens at its Lamont plant. The Fayette Coal & Coke Co. has resumed

work at the Shamrock operation. The Linn plant of the American Coke Corporation, which was taken over at receivers' sale about a year ago by the Union Trust Co., resumed mining last week under the name of the American Coke & Fuel Co., of which George Batton, of Pittsburgh, is the head. The Snowden Coke Co. has fired 100 more ovens.

The Cosgrove-Meehan Coal Corporation, of Johnstown, has contracted with the Roberts & Schaefer Co. for the installation of a Marcus screen and R. & S. loading booms at its new tippie at Foustwell.

Announcement has been made that Concrete City, the model settlement of the Glen Alden Coal Co. in the lower end of Hanover Township, is to be razed soon after Jan. 1. The tenants of the houses, who work at the various collieries of the company in the section, have been notified to vacate the premises not later than Dec. 1. Company officials say that the settlement is to be abandoned due to the action of the State Health Department in demanding that sewers be installed in the section, which would entail an expense of \$200,000.

Mine inspectors of the state are not employees within the meaning of the state administrative code, according to a decision rendered by William A. Schnader, special Deputy Attorney General. The ruling has just been given to P. S. Stahlnecker, secretary to Governor Pinchot and secretary of the state executive board. They are departmental administrative officers of the state, it is held.

An unusual set of lessons for use by Pennsylvania coal miners attending evening classes has just been completed at Pennsylvania State College, under the direction of N. E. Hubbel, associate professor of industrial education. The aim of the lessons is to prepare ordinary miners to take state examinations for official positions in mine work. Separate sets are to be used in the bituminous and the anthracite districts. The course requires two years of weekly class attendance during the winter

months. The lessons have been approved by the State Department of Mines and the State Department of Public Instruction. One thousand six hundred miners were enrolled last year and this year the number will exceed 2,000. The lessons have been made available at cost to those who cannot attend school.

To accommodate the large volume of coal which is hoisted daily at No. 4 slope, Alaska colliery of the Philadelphia & Reading Coal & Iron Corporation at Mount Carmel, a new high-powered electric engine is being installed at the head of the incline. A concrete engine house has already been built. On account of the immense size of the new engine a floor several feet deep has been placed. Hitherto three cars a trip were drawn to the top of the incline in ten minutes. With the high-powered engine it is expected that at least four cars will be drawn on each trip and it will take only two minutes.

The board of directors of the McKeesport Coal & Coke Co. has called a special meeting of its stockholders, to be held at its office, 1406 First National Bank Building, Pittsburgh, Dec. 2, at 2 p.m., for the purpose of (1) voting for or against an increase of the capital stock from \$1,200,000, to \$1,600,000, and (2) approving or disapproving of the creation, out of such increase of capital stock, of 2,000 shares of preferred stock of the par value of \$100 per share, entitled to receive a fixed yearly cumulative dividend of 7 per cent but no more, before any dividends be paid on the common stock.

By a decision of the State Supreme Court, it is ruled that mine owners "have no right of any kind to drain their mine waters into streams, considering the public use made of their waters, and that their so doing constitutes a nuisance which must be restrained." In the anthracite region the outlet for mine water has always been the creeks and rivers which flow through the sections where mining operations are conducted. The opinion was handed down in the case of the Pennsylvania R.R., the Mountain View Water Co. and other water companies

against a group of Fayette mine owners. Justice William I. Schaffer wrote the opinion. It provides that a pure water supply is a public necessity paramount to any other consideration.

Thomas J. Kennedy, president of district No. 7, declared that the most important subject in connection with coal mining to be considered by the next legislature is the electrical hazard. Other union officials condemn the use of electricity in the mines as "needless and dangerous." A new law should be drafted to make impossible the danger from the general use of electricity, some of the miners urged.

The litigation over the \$400,000,000 assessment of coal lands in Schuylkill County, which was regarded as practically settled, was reopened during the week in court by a large number of attorneys representing the county, who told the presiding judge that they were unable to agree with the coal companies and owners on the settlement proposed. Hearings on the whole litigation were therefore asked on behalf of the county. Later an application was made to the court for a mandamus on County Treasurer Hensyl to compel him to proceed with the sale of lands on which the taxes have not been paid for the last two years. Attorneys for the coal companies view the procedure with indifference. They believe the decision of the Supreme Court in the Kemble case of Philadelphia settles all other pending cases. This estate, instead of getting an increase of assessment from \$250 to \$800 an acre, had its assessment lowered to about \$90 an acre on a decision of the Schuylkill County Court, which closely follows the opinion of the Supreme Court.

In connection with the winter meeting of the Coal Mining Institute of America in Pittsburgh, Pa., Dec. 3-5, the members will have the choice of two interesting inspection trips. One is to see the 35-car revolving dumps, the five-mile belt conveyor system in the Colonial mines of the H. C. Frick Coke Co., near Grindstone, Fayette County, Pa., and the river tippie on the Monongahela River near Fayette City, fed by the above mentioned conveyor system. The other is to observe the rock-dusting system of the Inland Collieries Co. at Indianola, in Allegheny County, in the double Freeport field. This is a very gaseous mine.

Of the 180 fatal accidents in Pennsylvania industrial establishments during October, 69 occurred in the mines, according to the State Bureau of Workmen's Compensation. Forty-seven of the fatalities were reported to the bureau from the transportation companies and 64 from other industrial concerns. Forty of the mine fatalities were in the anthracite district and 29 in the bituminous region. Lackawanna County reported the largest number of fatal accidents in the mines, 15, and Luzerne was second with 14. The deaths by other counties in the hard-coal section were: Carbon, 2; Dauphin, 1; Northumberland, 4, and Schuylkill, 4. The bituminous district fatal report showed: Allegheny, 2; Cambria, 3; Clarion, 2; Fayette, 6; Greene, 1; Indiana, 3; Lawrence, 1; Somerset, 3; Washington, 5, and Westmoreland, 3.



Courtesy Berth-Consumers Co.

Tippie at Rachel Mine

Rear view of top works at Berth-Consumers operation at Downs, W. Va., in the Fairmont gas-coal field. The mine has its own locomotive for efficient yard shifting.

Directors of the Lehigh & Wilkes-Barre Coal Co., on Nov. 19 declared the regular quarterly dividends of \$3 on the common and 1½ per cent preferred stock and an extra dividend of \$3 on the common stock. Early this year directors declared a stock dividend of 200 per cent payable one share of preferred and one share of common for each share held by stockholders of record March 26. After April 1 last holders of the old capital stock were to exchange their holdings for an equal amount of new common stock. After such conversion and distribution of the stock dividend, shareholders will have received two shares of common and one share of preferred.

C. A. Saunders is now the *Coal Age* circulation representative in the anthracite field. He succeeds Sage Coe, who has been transferred to the Philadelphia district. Mr. Saunders is not new to the coal mining industry, as he has been covering the Nova Scotia field for the last two years.

TENNESSEE

The Durham Coal & Iron Co., James Building, Chattanooga, has leased several thousand acres of coal land from the Waller interests and will develop the property.

The Glen Mary Coal Co., 227 James Building, Chattanooga, has acquired 1,200 acres of coal land near Glen Mary, and will equip the property for an output of 250 to 500 tons per day. The company probably will purchase a steam shovel mounted on caterpillars, as well as dump cars, rails, etc.

UTAH

Coal production in Utah for October was 441,789 tons, compared with 535,698 tons in October of last year.

VIRGINIA

H. M. Fadely, formerly manager at Norfolk for the local County Coal Corporation, is now sales manager for the Dudley Coal Co., with headquarters in Richmond. John W. Bunting, formerly with the C. & O. Coal & Coke Co., and one of the best known men in the trade, is now associated with Dichmann, Wright & Pugh, steamship agents at Norfolk.

WEST VIRGINIA

The Pond Creek By-Product Colliery, which really is the fuel department of the Norfolk & Western, has eliminated heavy haulage costs by installing an aerial tramway near Williamson which eliminated two bridges, a good deal of track and trestling.

A record for monthly coal production was made in September, 1924, along the Chesapeake & Ohio Ry., the total output being 4,162,665 tons. During the early part of October the movement was equally large, the Logan field contributing 38.5 per cent of the coal loaded in the several fields served by this road. During the first week of October the Logan field shattered all

previous records by loading 1,318 cars daily, a daily output of 65,000 tons. During the second week the average was nearly maintained. Average daily loadings during the first fourteen working days of October amounted to 1,292 cars of fifty tons capacity. In 1902 the C. & O. moved 4,164,260 tons during the entire year.

General Edward O'Toole of the United States Coal & Coke Co., operating in McDowell County, has announced that Gary No. 7 mine will resume at once, giving employment to about 400 men. The mine has been closed down since last June. Other coal operators in McDowell County are optimistic about conditions and expect that in less than 30 days practically all of the mines in the county will be working full time.

The Supreme Court of Appeals of West Virginia, in a decision dealing with the liability of coal companies for injury or death of boys under 16 employed in the mines in violation of the state mining laws has held that "A parent who consents to employment of his child under the age of 16 years in a coal mine is not precluded from recovery as the sole beneficiary if the accident causing the death of the child in the mine is the result of negligence of the employer for which recovery would be had if the employment had been legal." The decision also held that the parent cannot recover if the unlawful employment is the proximate cause of the death of the child.

WISCONSIN

The Consolidation Coal Co. is attempting to avoid what it considers double taxation on coal stored on the Milwaukee docks of the Great Lakes Coal & Dock Co. It has applied for a writ of certiorari to stay proceedings by the State Tax Commissioner. The company is to pay an occupational tax of \$7,313 under the Wisconsin law and therefore objects to paying \$375,000 of personal property tax on the same coal.

CANADA

K. A. Blatchford, Mayor of Edmonton, Alta., says that coal from Alberta soon will be making a strong bid for the Pacific Coast bunker trade and that it may be expected to cut into the domestic business of the coast. He asserts that Alberta steam coals compare with the finest on the American continent and that lignites from Edmonton and Drumheller have "run American anthracite out of Alberta and Saskatchewan altogether and have cut the anthracite business of Manitoba to a fraction of what it was." He says that better freight rates, for which Alberta is fighting, is all that is necessary to put the coal of that province in the markets of both the extreme East and West of Canada.

The Dominion Advisory Fuel Committee has issued a further warning on the "continued apathy" of the anthracite-using public in the matter of winter supplies. Imports of hard coal from the United States between Jan. 1 and Sept. 30 were 833,421 tons less than

for the same period last year, and importations from Great Britain are 20,324 tons less. The chief anthracite-consuming provinces are Ontario and Quebec, and in these two provinces alone imports have declined more than 800,000 tons. It is pointed out that the principal mines producing Alberta domestic coal have been shut down since April 1 and are only now resuming production, and even if railway rates were such as to permit any considerable movement of Alberta coal to the East, the needs of the Prairie Provinces would first require to be supplied.

At the District Convention of District No. 26 of the United Mine Workers at Sydney, N. S., on Nov. 17 a motion was introduced to admit delegates from the One Big Union miners of Thorburn and Stellarton, the locals of which recently seceded from the U. M. W. President J. W. McLeod ruled the motion out of order on the ground that the O. B. U. was a dual organization seeking to oust the U. M. W. from control of the district. His ruling was sustained by a vote of 65 to 10.

The Coal Creek Mine, at Fernie, B. C., owned by the Crows Nest Pass Coal Co. which recently resumed operations, is closing down indefinitely. An official statement has been issued giving as a reason "failure to retrieve sufficient business" and advising miners to seek employment elsewhere.

Association Activities

The West Kentucky Coal Bureau, a traffic organization supported by over 90 per cent of the mines of the western Kentucky field, had a good attendance at a meeting on Nov. 11, at which time two new members were added, and announcement made that a third would come in shortly.

Transportation and traffic matters absorbed the attention of the Smokeless Coal Operators Association of West Virginia at the November meeting in New York. The members were informed that the new all-rail rate of \$2.84 per gross ton from the Pocahontas field to Washington would be come effective on Dec. 8. A special committee was appointed to investigate the possibility of effecting uniform conditions in connection with the demurrage tariff situation at Hampton Roads on the Norfolk & Western, the Chesapeake & Ohio and the Virginian railroads. It has been tentatively agreed to hold the next meeting at Washington on the second Thursday in December. Among those in attendance at the November meeting were R. H. Gross and S. A. Scott, of the New River Coal Co., the former being the president of the association; T. E. Farrell of the Pocahontas Fuel Co.; E. E. White, of the E. E. White Coal Co.; W. D. Ord, of the Empire Coal & Coke Co., and T. S. Crockett, of the Leckie Coal Co.

New Companies

The Lincoln Coal Co. has been incorporated in Covington, Ky., with a capital stock of \$15,000, by Irvin Davis. H. M. McLain and August Helm.

The Erbest Coal Mining Co., with a capital stock of \$200,000, has been formed at Marion, Ill., by C. I. Hayden, William H. Warder and R. B. Mitchell.

The Line Creek Coal & Land Co., capital stock \$10,000, has been formed at Nelsonville, Ohio, by C. C. Sharp, C. B. Sharp, Fern Parry and others.

The Hill Valley Coal Co. has just been organized, with a view to operating at Julian, in Boone County, W. Va. This company is capitalized at \$25,000 and was incorporated by M. A. Fore and associates.

Traffic

Proposed Rate Changes on C. & O. Cancelled by I. C. C.

The Interstate Commerce Commission declined on Nov. 20 to sanction proposed increases and reduction in rates on coal from points on the Gauley branch of the Chesapeake & Ohio, in West Virginia, to various destinations east and west thereof. The schedules have been under suspension since Aug. 25, but according to an order issued by the commission are now cancelled and the entire proceedings dismissed.

Increase in Rates Suspended

Proposed new schedules increasing the freight rates on bituminous coal from Evansville, Ind., and related points to points on the Chicago & Eastern Illinois Ry. were ordered suspended Nov. 14 by the Interstate Commerce Commission from Nov. 20 until March 20, 1925. The commission will investigate the reasonableness of the proposed new rates.

Lower Coal Rate for Port Huron

Coal rates affecting Port Huron, Mich., and the river district will be reduced 35c. a ton, effective Dec. 1.

Under the new rates the Pere Marquette will no longer carry coal from Ohio north to Saginaw and then south to Port Huron, as has been done in the past. The new routing will take the cars across the river at Detroit, bring them up through Canada to Sarnia and ferry them across to Port Huron. This means a direct saving in miles carried as well as in rate. The new rate applies to coal billed for Marysville, St. Clair, Marine City, Armada, Washington, Chesterfield, New Haven, Richmond and Smith Creek.

Roads carrying directly to Port Huron which will operate under the new rate are the Grand Trunk, Pere Marquette and Detroit-Toledo Shore Line.

It was estimated by officials of the Pere Marquette that \$175,000 would be saved local industries during the first year of the rate reduction.

Not to Reopen Western Rate Case

The Interstate Commerce Commission declined on Nov. 10 to reopen for further argument the case involving new Western coal rates. Petitions for a re-argument of the case were filed by the Public Service Commission of Wyoming, the Rock Springs-Kemmerer operators and others. The I. C. C. held that the rates it had fixed on coal from Colorado producing fields to points in northeastern Colorado are just and not discriminatory.

Industrial Notes

Alfred G. Norris has been appointed manager of the New England office of the Strom Ball Bearing Mfg. Co., with offices at 75 Pearl St., Hartford, Conn. He has been identified with the ball-bearing industry for a number of years and is well known among industrial engineers and manufacturers in the New England States.

A. W. Wiese, sales engineer, has been transferred from the Philadelphia office to the Hartford office.

The Tri-State Engineering & Construction Co. has just taken over the contracting business of C. I. Keck, of Morgantown, W. Va., after having been organized as a result of the consolidation of the T. R. Marshall Engineering Co.; Baritell Brothers, engineers, of Morgantown; McCutcheon Engineering Co.; R. A. McCall Construction Co., and J. E. Falter, construction engineer. The new company, of which T. R. Marshall is president, is capitalized at \$50,000. It will project its work into all sections of the West Virginia, Ohio and Pennsylvania fields. Mr. Marshall's company has been specializing in mining- and coke-plant construction.

Conveyors Corporation of America, Chicago, Ill., announces the appointment of Frederick E. Bausch, 1105 Chemical Building, St. Louis, Mo., as district representative of eastern Missouri and southern Illinois.

The stockholders of Joseph T. Ryerson & Son, Inc., Chicago, have purchased a substantial interest in the Reed-Smith Co., Milwaukee. The Reed-Smith Co. is an independent steel warehousing company serving the industry in that section of the country. Under the new plan the officers of the Reed-Smith Co. are D. M. Ryerson, president; George W. Smith, vice-president and general manager; E. L. Hartig, treasurer, and Carl Gallauer, secretary. Joseph T. Ryerson & Son is the largest independent steel warehousing organization in the country, operating plants at Chicago, St. Louis, Cincinnati, Detroit, Buffalo and New York. A complete range of steel products, including bars, shapes, plates, sheets, tubes, rivets, bolts, nuts, etc., is maintained at all six plants.

Obituary

George W. McNeil, president of the Grand Junction Mining & Fuel Co., general manager of the McNeil Coal Co., and secretary of the Cameo Mercantile Co., died Nov. 4th at St. Joseph's hospital in Denver following an operation. He was buried the following Saturday. In his death Colorado loses one of its most progressive mining men.

James Wood, well known in the coal industry of central Pennsylvania, died at his home in Punxsutawney, Pa., on Nov. 17, aged 82. He had been connected with the Berwind-White company over 40 years. He had been a miner in England and came from there in 1868. He leaves a daughter and four sons.

George S. Blewitt, aged 50 years, purchasing agent for the Vinton Colliery Company for the past 31 years and one of the most prominent residents of Vintondale, Cambria County, Pa., died suddenly at his home on Tuesday morning, Nov. 18. He is survived by his widow and two sons. He was prominent in Masonic circles and was Justice of the Peace in Vintondale.

Coming Meetings

National Exposition of Power and Mechanical Engineering. Annual exposition, Dec. 1-6, Grand Central Palace, New York City. C. F. Roth, Grand Central Palace, New York City.

American Society of Mechanical Engineers. Annual meeting, Dec. 1-4, Engineering Societies Building, 29 West 39th St., New York City. Secretary, Calvin W. Rice, 29 West 39th St., New York City.

West Virginia Coal Mining Institute. Annual meeting, Dec. 2-3, Welch, W. Va. Secretary, R. E. Sherwood, Charleston, W. Va.

Coal Mining Institute of America. Annual meeting, Dec. 3-5, Chamber of Commerce Bldg., Pittsburgh, Pa. Secretary, H. D. Mason, Jr., Box 604, Ebensburg, Pa.

West Virginia-Kentucky Association of Mine, Mechanical and Electrical Engineers. Fourth annual convention, Dec. 12 and 13, Huntington, W. Va. Secretary-Treasurer, Herbert Smith, Huntington, W. Va.

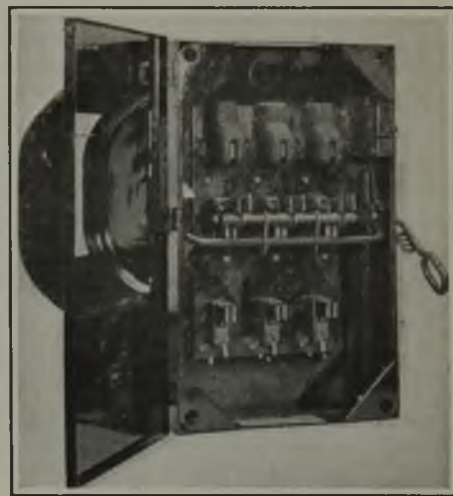
American Institute of Mining and Metallurgical Engineers. Annual meeting, Feb. 16-19, 1925, 29 West 39th St., New York City. Secretary, F. F. Sharpless, 29 West 39th St., New York City.

American Institute of Electrical Engineers. Midwinter convention, Feb. 9-13, 1925, 29 West 39th St., New York City. Secretary, F. L. Hutchinson, 29 West 39th St., New York City.

New Equipment

Switch With Each Part Set On Separate Base

Most electrical men who have had maintenance experience around plants where the common type of knife switch is used are familiar with the necessity of having to remove the entire switch when perhaps just one of the blade or fuse contacts is burned and needs replacing. The Square D Co., of Detroit, Mich., has developed a line of indus-



Switch Without Slate Base

The individual insulating bases are mounted on a metallic back. The copper connectors, carrying clips and lugs, are easily renewed. The switch pictured has protectors on the line contacts.

trial safety switches on which contact renewals can be made in a short time and at small cost.

Instead of the switch being mounted on the customary slate base, it is mounted on metal and each part insulated from the metal by a small piece of molded insulating material.

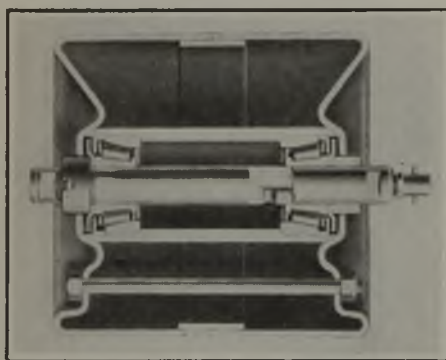
This individual base construction makes it possible to remove any part from the front of the switch in a few minutes without disturbing the wiring. It is unnecessary to remove the base from the switch box. The copper connector has fastened to it a jaw at one end and a solder lug at the other. Both are held by means of bolts with the heads in a downward position. The bolts are kept from turning by fitting the heads into grooves in the separate bases. The connector is fastened to the individual base by a screw which threads into a brass socket molded in the insulation. The removal of this single screw permits quick replacement of the switch jaw, connector or solder lug.

It is claimed that the molded insulating material of the individual bases is tough and will not break or crack, also that there are other advantages in not using slate. The switch weight is reduced about 25 per cent and the possibility of short-circuits in the metallic streaks, which sometimes occur in slate, is eliminated.

Another interesting feature is the provision of porcelain protective covers for the line contacts where the operating conditions warrant this precaution. When a switch is in the "off" position the only live parts are the line contacts. By having these protected it is only through intentional effort that a person, who may open the switch box, can make contact with live parts. The individual porcelain covers can be easily attached or removed without disturbing the rest of the switch.

Idlers with Anti-Friction Bearings Save Power

The Stearns Conveyor Co., of Cleveland, has put into service their new special belt conveyor idler, equipped with Timken roller bearings. The device is being used with their complete installations of material handling equipment,

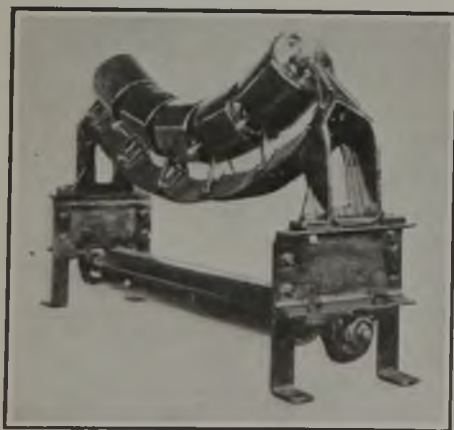


Dirt and Dust Cannot Get Into Bearings

Grease under high pressure is introduced to the bearings. Old grease is forced out and it acts as a seal against dirt or dust.

but they are also designed to make possible their use to replace any type of carrier now installed.

The pulley shells, made of No. 10 gage pressed steel, drawn together with rod bolts, are practically indestructible. The through pulley shafts are fitted with roller bearings, of the same size as used on the front axles of Ford automobiles. The generous size of this bearing allows a large factor of safety but when wear does begin, it easily can be compensated by means of the adjusting nut at one end of the shaft without



If Idlers Run Freely Small Motor May Be Used

The rollers run so freely that the conveyor requires but little power to drive it. Inclined conveyors are much cheaper than old types because of the reduced investment in the driving motor.

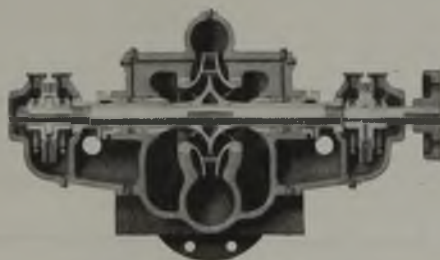
removing the pulley from the carrier.

The bearings are carried in heavy steel tubes inside the pulley shell. These tubes also serve as a reservoir for grease. One of the outstanding features of the carriers is the method of applying high-pressure lubrication. Grease applied to the high-pressure fitting on the end of the shaft enters the grease reservoir near the center of the pulley, forcing the worn-out grease from the bearing out through the labyrinth washers. The grease seal thus formed prevents any dust or grit from entering the bearing. These pulleys require greasing not more than once or twice a year, and to do so, it is not necessary to remove the pulley from the carrier.

Small Centrifugal Pump as Efficient as Large Ones

A new low-head pump has recently been developed by the Allis-Chalmers Manufacturing Co. This new pumping unit is similar to the present type S design which has long been one of the standard types manufactured by the company. The new pump will be built in small sizes, and most of the details will be similar to those of larger units, except that a number of mechanical improvements will be incorporated. The efficiency of the pump has been raised by several important changes which reduce the hydraulic losses.

The cross-sectional view of the pump shows a few of the new features. The bronze companion wearing rings are L shaped to reduce disturbances in suction passages and thus increase the efficiency. Split bronze inclosed glands are provided with drains to prevent water from being thrown off revolving

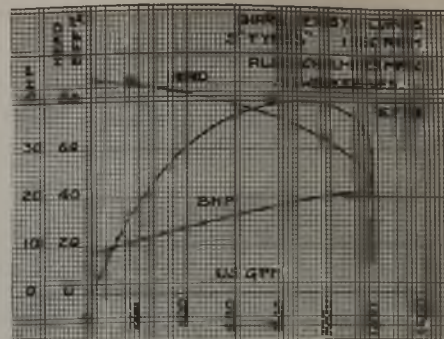


Small But Efficient Pump

This new unit has all the features that go to make up a high-efficiency, large-size centrifugal pump.

parts and entering the oil-lubricated bearings. The stuffing box throat is provided with bronze bushings which can easily be removed and replaced. The shaft is made of annealed steel and is provided with removable cast-bronze sleeves which extend from the runner hub to the inside of the bearing housing.

The outboard bearing is the double-acting type. It is firmly fixed and locked in position so that it cannot become loose. Thrust is taken in either direction, and a center collar is provided. The oil bearings are split and provided with two oil rings. Oil is led to the center of the bearing and it is thus completely lubricated over its entire length. All oil-hole covers are self-closing, thus keeping out dirt. Oil-level indicator cups are supplied with each bearing. The water seal passages are



Operating Characteristics Prove Important Facts

The curves of this 5-in. centrifugal pump show that it can deliver 900 gal. per minute against a 68 ft. head at an efficiency of 80 per cent.

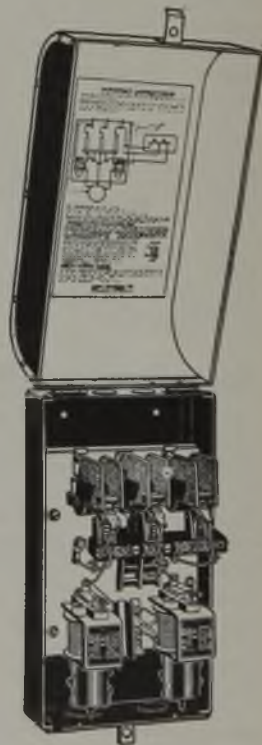
integral with the upper half of the casing and can be arranged for outside seal whenever necessary.

The shaft nuts are unusual in that they are designed to act as oil throwers to prevent oil from creeping along the shaft, and also to prevent any water from entering the bearings. The characteristic curves of the pump show its performance under various conditions.

An Across-the-Line Starter

A push button starter for squirrel-cage motors up to 25 hp., 220 volts or 35 hp., 440 to 550 volts and self-starting polyphase motors up to 50 hp., has recently been developed by the Allen-Bradley Co., Milwaukee. It is equipped with inverse time limit overload relays, no-voltage release, push button station and copper-to-copper rolling contacts. It is also inclosed in a steel cabinet and operated entirely from a push button station with a start and stop button.

Relatively small induction motors on large power lines do not create serious line surges because the initial inrush current is only a small percentage of the capacity of the line. It is not generally recognized that the induction motor has inherent characteristics which prevent it from drawing more than a limited amount of current under the most severe starting conditions. The transformer action between the two windings of the motor exerts a demagnetizing action when the current has reached a certain value.



Protective Starter

Small motors do not ordinarily cause serious line surges yet some kind of switching device is always necessary to protect the equipment.