

# COALAGE

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

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## When the Wrench Fell

A STORY has gone the rounds to the effect that an employee of Henry Ford was seeking a job and, being asked why he left his previous place, said he had been "fired." "You see," said he, "I had to perform operation No. 4,560 on every car as it passed. My stunt was to screw a nut on a bolt in the few seconds available. One morning my wrench slipped. I stooped down to pick it up and by the time I had reached it three hundred cars had passed. I had tied up the whole plant, and the foreman fired me."

With all its exaggeration, this story is illustrative of a division of labor such as makes every man dependent on his co-worker in an extremely intimate manner. Not all division of labor works in just that way. The prop cutter, for instance, cuts his timber in the winter and delivers the props for use in the summer. He hauls his load when the snow affords good sledding. He cuts and sleds his product when he has nothing else to do. If he takes a week's holiday the mine is not delayed. It may take six months to realize the effect of the delay and perhaps no inconvenience will be experienced even then.

Similarly, the roadman may be off a few days, without direct effect on the mine operation. But most of the men are so immediately dependent on other men's labors that an idle man is a source of inefficiency throughout the plant. If the machine cutter fails to cut, several loaders are idle, the motorman gets fewer cars to haul, the dumper less cars to dump, the picking-table man less coal to clean, the trimmer less railroad coal to load and trim, and efficiency is destroyed. In consequence, the company may find the cost of coal greatly increased.

Some adjustments may be made, but they are effected on the spur of the moment, and any arrangement made thus speedily usually is both unsatisfactory in operation and slow in execution. Storage of coal may help, but only in a degree, and in most cases no storage is provided. Uncertainty, discouragement and inefficiency destroy all morale. A man who does a poor day's work becomes indifferent and sets his gait to suit the lower output and becomes a relatively unproductive unit even when conditions favor maximum output.

This argument might be used to advocate the steady reporting for duty of every man employed whose health and home conditions permit, and undoubtedly much depends on the reliability of the workman. Present conditions favor such responsibility. But to emphasize that consideration is not the purpose of this editorial.

Equally important is it that the cutting machine shall cut its anticipated quota of coal, that the shot shall be successful and bring down the appropriate tonnage, that the roof shall not be allowed to fall and close a room, that the locomotive shall pull all the coal as soon as loaded, and that the tipples shall always be ready for effective operation, to mention only a few of the links in the chain of production.

Reliability in machines is one of the keys to steady and profitable operation and no mine can succeed that has any uncertainty in the operation of its equipment. Much mine disability never finds its way to reports of the U. S. Geological Survey but does find place, not yearly or weekly but daily and hourly, in cost sheets.

Consequently, machines should be kept in perfect order, if anything in the world can be labeled perfect. To assure this, mere repair will not serve. The repairman should be set to work at inspection. He must know that the mechanical equipment is always in good condition so that slow work and shutdowns may be avoided and every man may do what is expected of him. That is why inspection is displacing repair and the trouble finder is being superseded by the man who forestalls trouble by prompt inspection and early adjustment.

Graham Bright, at the Cincinnati convention, said that steel and electric railway men spent twice as much on inspection as on repair, for in that way the most important item in economical operation is assured. J. F. MacWilliams states that inspection has lightened the work of the repairman and the machine shop. His repairmen were being detailed to inspection duties. No one safely can neglect this moral. Most men are busy correcting what greater wisdom and intelligence would have foreseen and forestalled.

## Is It Absurd?

DOWN in Louisiana, or rather extending from Louisiana into Texas, the Magnolia Gas Co., is building a 16-in. steel pipe line to transmit natural gas from Shreveport to Beaumont. When completed this line will be 210 miles long and will carry gas at high pressure. Autogenously welded joints between pipe lengths will assure that the line will be absolutely tight.

Aside from all interest in this undertaking engendered by the difficulties encountered and the means taken to surmount them, this pipe line may quite possibly hold a valuable suggestion for the coal industry. It has long been considered commercially feasible to coke coal in byproduct ovens only at or near centers of population or in the immediate proximity of industrial plants that furnish a ready market for the gas evolved.

May not large high-pressure transmission lines solve the difficulties, heretofore considered at least formidable if not even insurmountable, and permit coal to be coked in byproduct ovens at the mine mouth, the gas to be sold in some distant center of population, coke to be marketed as a high-grade domestic fuel, while the other byproducts which run a long gamut of usefulness be sold at prices which will largely defray the cost of the mining and coking processes?

Take the coal fields of southern Illinois as an example. These lie within about 100 miles of St. Louis and less than 300 miles as the crow flies from Chicago. Burned raw the coals of this region, except when fired in furnaces that are specially constructed, are unusually smoky. Although the smokeless combustion of these



coals is entirely possible, the furnaces employed are practicable only to the industrial user. The domestic consumer, on the other hand, who must content himself with the ordinary stove or house furnace cannot obviate the emission of smoke when burning these high-volatile fuels.

In view of the construction of such pipe lines as that now being built in the Southland, is it any violent stretch of the imagination, any absurd flight of fancy, to picture Chicago within a comparatively short time as a smokeless city, even though it has long been famed as the smokiest locality in the country with the possible exception of Pittsburgh.

The advantages of byproduct coke as a domestic fuel have only recently become known to the average user. Already, however, coke has become a somewhat formidable rival for anthracite and other so-called smokeless domestic fuels. Gas, on the other hand, has long been considered as a most convenient fuel for stationary heating appliances. Manufacturing both of these products from a natural material at best but ill adapted to perfect combustion, and simultaneously releasing a vast variety of useful byproducts ranging all the way from drugs to fertilizers and motor fuel, may at no remote date react not only to the financial advantage of the coal producer, but to the general benefit and convenience of the entire country.

### Guiding the Public's Choice

**I**F YOU find you cannot readily meet a specification, try to have it changed. If you can meet it but don't find it profitable to do so use the same recipe. Of course, it is sometimes well to give the public that for which it clamors, but when the public is not justified in its clamor a little propaganda is excusable.

The anthracite operators found that the public wanted too much large coal. So much indeed that the companies could not sell their fine sizes. The operators tried with some success to give the public what it wanted. They eliminated much needless degradation. They put in chutes that could be kept continuously full. They introduced conveyors and spiral troughs. They arranged in transporting coal to bed lumps on finer coal so as to reduce breakage. They removed the preferable sizes and fine sizes when crushing the larger so that no coal of salable dimensions should be passed through the rolls.

Unfortunately, they still had too much fine coal, and then there were the mountains of undersize coal that had accumulated in the earlier years when no one could burn anything but coarse sizes.

Consequently, do what they would, they could not sell the fine sizes in sufficient volume. Did they fill the valleys with their fruitless lamentations? For a while, it must be confessed that is just what they did. At last, finding that their regrets were vain, they decided none too soon to educate the public to use fine coal. Realizing that those using anthracite for steam purposes were headed uncompromisingly, and with some show of justification, toward bituminous coal and oil, they sought to convert the domestic consumer.

They combined their efforts and started economy shows. Little may have been done to cause people to dispense with equipment already in use, but this, at least, has been accomplished: When new houses are built, or when new furnaces are installed in place of old and worn out equipment, many persons successfully have been induced to put in arrangements for burning

finer sizes. Just how much has been accomplished remains to be seen, but evidence points to the attempt being successful.

Let the Illinois operators take the hint. They may succeed in advancing the day when steam plants and locomotives, even domestic furnaces, will be equipped for burning small sizes and one of their difficulties will be at an end. Why do they not combine to speed that happy day? Why leave it to salesmen who see only the easier way and sell what the consumer is ready to buy, leaving the operator's problems unsolved? Meanwhile every effort should be made to reduce degradation from the face to the railroad car.

### Closing Down Mines

**W**HEN for any reason it is necessary to close down a mine it is likely to prove profitable to do it thoroughly, suspending pumping and ventilation as well as operation. That will mean lifting track and removing wire wherever rising water may reach the one or the other. Pump rooms and underground substations may have to be vacated. Such a complete abandonment will not be safe if rising water might work havoc on neighboring mines.

It seems sometimes that operators are disposed to believe that a mine thus shut down will be greatly injured. But it is well to remember that the mine will never contain more than a certain quantity of water. By ceasing to pump, a back pressure will be placed on the water which will probably reach a certain height and then cease to rise. The water pressure will attain a balance, after which no more water will come in. Consequently the operator who pumps during a shutdown may pump more than the operator who leaves his pumping till resumption.

As for the mine itself it will be preserved rather than destroyed by flooding. It is remarkable how mines, flooded thirty or forty years ago, retain the condition in which they were left. Falls are few partly because the timber is preserved and partly because the water keeps the condition of the roof, as to moisture, constant; it does not become alternately wet and dry. The pressure of the water helps to sustain the drawslate. The mine is watersealed and deterioration ceases.

The only disadvantages are that reopening is slow, that the copper will be restrung with difficulty and may be injured in withdrawing, and there is an expense in withdrawing rail, copper and other equipment. A company which thus proclaims itself out of the market for an extended period may make its creditors nervous. It may be at a disadvantage in defending some action in court, for the creditors may be able to impress some judge or jury that such an action is prejudicial to their interests. But on the whole the total abandonment of a mine is not so harmful as it is generally feared and not as costly as a steady run of pumping and ventilating.

Care must be taken in reopening as gas may collect under pressure, and if it cannot escape by the return as the waters are lowered, it may spread into the intake with unfortunate results. The air in these pockets may be so mixed with carbon dioxide and nitrogen as to be unflammable but if it escapes into the air of the ventilated portion the carbon dioxide and nitrogen may become so diluted by good air that the firedamp will become flammable and an explosion result from an open lamp or an electric spark. However, precautions can be taken against such an untoward event.



# Early Coal Stripping Full of Heartbreak—I

The Art Was "Born" at Danville, Ill., Where Hand Work Began in 1866 Followed by the "Land Dredge," Dragline, Shovel-Conveyor and Other Strange and Wondrous Things

BY GRANT HOLMES  
Danville, Ill.

IT IS a far cry from today's 300-ton giant electric shovel stripping 60 ft. of cover from a coal seam, back to the primitive hand stripping of 1866 in Danville, Ill. But it is interesting to look back through those years, for modern practice in coal stripping was "born" in Danville, so to speak, and most of the developments that have led from the hand shovel to the 300-tonner have taken place right in Danville territory.

If your mind has any pictorial tendencies you can see the first coal stripping of history—a man shoveling a little rotten coal from an exposed and weathered bed into a wagon. As the coal seam was followed back into the hillside the job of removing the earth from it grew too heavy for the man. So he made a horse do the work with a slip scraper. Then came the wheeled scraper for heavier operations.

At about this stage, coal stripping started in the Danville region in 1866. Kirkland, Blankeney & Graves opened a little pit on Grape Creek. Then followed a few years of slow expansion in the business. Michael Kelley, in 1875 was the next outstanding stripper. He began in Hungry Hollow and in the next decade was the principal operator of the region, with both strip pits and underground operations.

When a man opened a team-and-scraper stripping, he expected to lose money in the summertime and make it back in the winter, as the surface could be stripped only when the ground was not frozen. The truth of the matter is, many lost money and few got it back.

The usual method of exposing the coal was in long pits; first an oblong section along one edge of the field was plowed up, and then the scrapers took off the loose dirt. The piece was plowed again. Thus by alternate plowing and scraping, the bed finally was reached; the overburden being piled in a long mound overlooking the pit. Teams and wagons hauled out the coal during the winter, and the next summer a new block parallel to that just taken out, was stripped, the waste being dumped into the abandoned cut.

Considering the enormous quantity of material to be removed from an acre of coal under 10 to 15 ft. of overburden, small wonder was it that men came to the conclusion that team-and-scraper stripping had no commercial value. Nevertheless, it is of interest that this method is still in use, though only for local coal.

Another firm engaged in this primitive method of stripping was that of J. N. Hodges and A. J. Armil,

who in 1876 and 1877 loaded a lot of coal near Pittsburg, Kansas. Mr. Hodges had been engaged in railroad-track laying and ballasting in Ohio, during the two years previous, and had used a steam shovel in this track work for loading gravel. After a short experience in coal-stripping with teams and scrapers Mr. Hodges and his partner decided that the steam shovel could do the work far better.

In 1877, an Ohio contracting company rented these two men an Otis steam shovel. Unfortunately there are no pictures or description of this machine available—the first machine on record at least in the bituminous-coal stripping business. However, we know that Mr. Otis invented the steam shovel in 1839, and was killed in trying to operate the first one made.

Concerning the work of this pioneer machine, Mr. Hodges says—"We oper-

ated this shovel for about one year very successfully when I sold my interest to engage in other business, but the shovel was operated for about three years when it was returned to the owners. We had land with from 8 ft. to 12 ft. overburden.

"This, with good management, could be handled profitably, but coal at this depth was limited and the boom of this shovel was too short to do deeper work and waste the overburden far enough away to uncover a pit of coal of sufficient width to be handled economically." He also says that this experience proved to him that a larger shovel would be successful, but the manufacturers told him that it was not practical to build such a shovel.

The second stripping outfit which has come to my notice was merely a furtherance of Mr. Hodges' idea. The Consolidated Coal Co. of St. Louis, Mo., extensive land owners, had a strip-coal area which lay in a river bottom, known as Missionfield, near Danville, Ill. Here, the overburden ran up to 35 ft., but in many places, was only 10 ft. to 15 ft. deep. The bed of coal was 6 ft. thick. Contrast this with the lightly buried seam stripped in Kansas by Hodges and Armil! However, the seam they stripped was only 3 ft. thick.

The first requirement to produce coal in the Missionfield was to find some one with sufficient nerve to attempt stripping by contract. Wright & Wallace of LaFayette, Ind., drainage contractors and dredgers, were induced to accept an "ironclad" agreement to uncover a given quantity of coal daily for the Consoli-

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## THIS IS AN EYE-WITNESS HISTORY

SINCE 1875 Grant Holmes, of Danville, has had his hand and mind on coal stripping. Half a century of it successively as mechanic, boss, operator, advisor to and rescuer of failing strip companies, and finally as an investor and director in many stripping companies in Illinois, Indiana, Kentucky, Ohio and Pennsylvania have given him a background in stripping such as few men have. Probably no one is as well qualified as he to tell the story of coal stripping from its beginnings. So this is his story, although he credits his old-time friend and fellow-stripper, the late Alec Swanberg, with much of the inspiration for it.

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dated Co., under the supervision of J. L. Swanberg and their mining engineer, Louis Stockett.

As Hodges and Armil had found, steam shovels had not been developed to a size suitable for stripping economically, for there had been no call for shovels larger than those for railroad excavations, but because dipper dredges were called upon to dig in deep water, they had been developed for longer digging ranges. Being experienced dredgemen, Wright & Wallace relied on the size of the dredge to carry out this contract for stripping, and in 1885 they purchased from the Marion Steam Shovel Co. of Marion, Ohio, a dredge minus the hull.

#### PUT DREDGE ON WHEELS AND STRIP WITH IT

The owners erected this machine on a wood frame supported by wheels, and a dry-land dredge or stripping machine was the result. Wood was the construction material used throughout in this excavator, even on the boom which was 50 ft. long. A single-cylinder, vertical steam engine furnished power to hoist the  $\frac{3}{4}$ -yd. dipper and to swing the boom. Speed and power as measured today were not virtues with this machine, as one small engine took care of all operations.

Four hundred cubic yards of overburden moved in a day was a great record. One should remember in connection with this "astounding" feat, that those were the good old days when mine labor worked ten hours for \$1.50. There was no means of propelling this dredge except by block and tackle; hence, moving the outfit was a slow process, especially on curves, as all wheels were fastened rigidly to the frame.

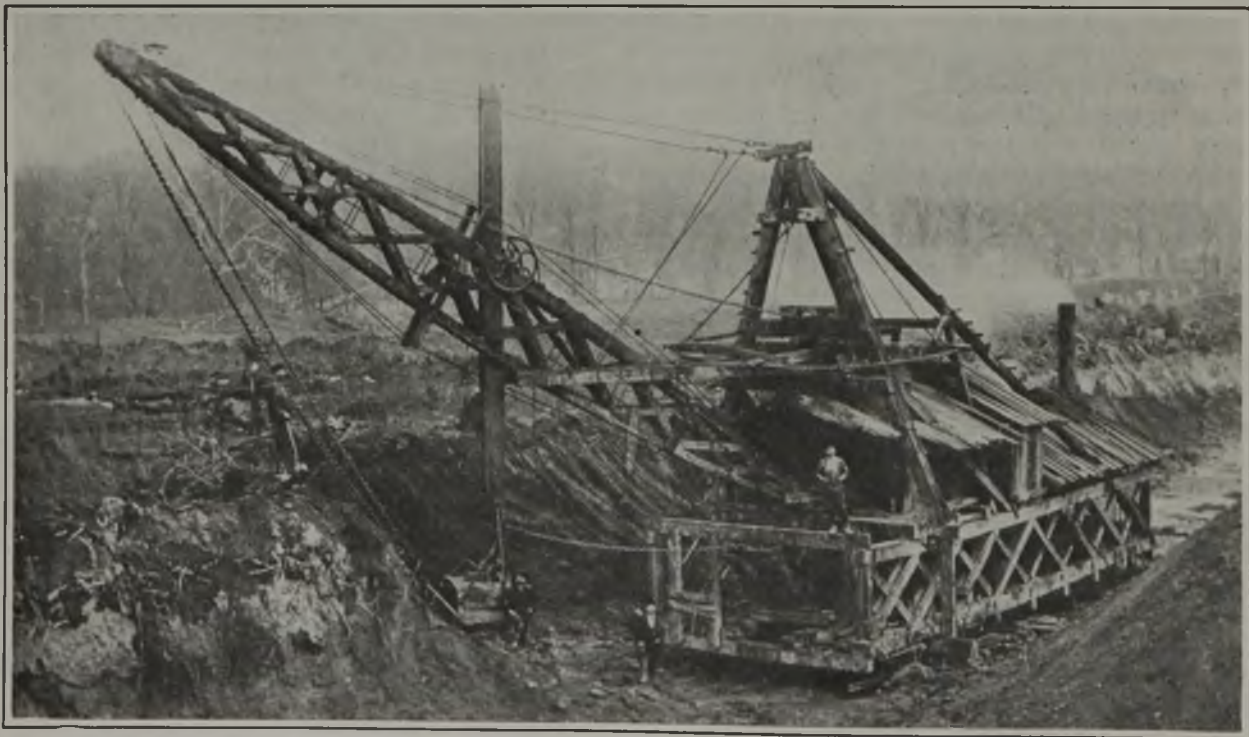
Because their shovel could dig forward only, a circular path of operation was adopted by Wright & Wallace, as the only means of keeping the machine constantly at work. The whole plan of operation resembled

a flat coil spring—each cut decreased the diameter of the island of unstripped coal around which the machine worked. At one point in each revolution of the field, the shovel left, as best it could, a gap in the waste banks for the haulage way.

The initial circle, or thorough-cut, surrounded about thirty acres, which was one-third of the entire field. Many months were occupied in making this and each succeeding circle, for, although the circumference grew smaller, the curves became sharper, and proportionately hard to turn. When the circles became small, jacks were used to skid the land dredge around the sharp corners.

The widest cut the shovel was able to make in this overburden was only about 20 ft. Limited dumping range prevented placing the wastebanks far enough away to keep the dirt from covering up the face of the coal, and because of this burial of the face, entry cutting was necessary before the miners could load out the coal, all of which was removed from each cut as fast as the strippers uncovered it. One can readily see that if a long time was occupied by the dredge shovel in completing each circle, the face of the coal around the "island" would be exposed to the weather the same length of time, resulting in a heavy percentage of rusty, rotten coal in the output.

The slowness of this shovel, the narrowness of the cut, and the annual flooding of the field by the neighboring river, induced the stripping contractors to place a second shovel in the mine in order to keep their agreement with the Consolidated Coal Co. A general enlargement of the first design, including a  $1\frac{1}{4}$ -yd. dipper, characterized this second machine. Naturally, its plan of operation was the same. A short time later, a third stripping machine was purchased, having a  $1\frac{1}{2}$  yd. dipper, a 65-ft. boom and two vertical steam



**The Great Dry-Land Dredge, the Precursor but Hardly the Progenitor of the Modern Stripping Shovel**

Though this machine was the second put into operation by Wright & Wallace, contractors, in the Missionfield at Danville, it was the same type as the first which started work in 1885. It had a 50-ft. boom and a  $1\frac{1}{4}$ -yd. dipper both operated by a single-cylinder, vertical steam engine. The great, cumbersome machine rode on wheels fastened rigidly to the underframe. It was moved by block and tackle and could cut only in a wide circular path which determined the method of stripping. It took months to make one cut around a 30-acre tract.



### Butler Bros.' 1890 Dragline

Machines of this type, originally developed for trenching in Kansas, worked in pairs from the edge of the cut. One uncovered the coal and the other loaded it into railroad cars run directly into the pit. This latter was the first mechanical contrivance for loading stripped coal. The stripping draglines made parallel cuts about 20-ft. wide in the coal and of any length.



engines. Both the stripping and coal ends of the business had now assumed quite respectable proportions with the three dredges operating.

In about three years, however, a snag was struck which seemed to lead on to the many failures that occurred in after years. The coal miners struck in 1888, shutting down the producing part of the operations.

No arrangements had been made in the contract between the strippers and the coal company to take care of such a contingency, therefore, Wright & Wallace continued to operate their machines during the strike. The mine owners were powerless to stop them, and in time, affairs reached such a stage that each shovel had made a complete circle in its respective working. Starting on the next cut, the machines began to cover up the coal stripped on the preceding round. To stop the ruinous work, the coal company had to buy the dredges and the contract from the strippers.

The strikers and the coal men at last settled their difficulties, and work was again resumed. For two years the new owners operated the three machines, but at the end of that time they were greatly discouraged as no money had been made owing to heavy expense and the slow rate of stripping. Hard work had almost worn out the machines, which were not made to stand such strenuous digging, and about 1890, after many fruitless efforts at repairing, the dredges were abandoned.

#### BUTLER BROS. INSTALL DRAGLINE EXCAVATOR

In Kansas and Missouri, where gravel is scarce, but gumbo, a kind of stiff clay is plentiful, a process called ballast burning had developed. A trench about 8 ft. deep, 100 ft. wide and a quarter of a mile long, was dug in the mud bed. In this, alternate vertical layers of coal and clay were built and the coal was burned, thus baking the clay. Butler Bros., Englishmen, had draglines for doing the ditching in this process. They burned ballast for the Rock Island R.R.

The Consolidated Coal Co., having heard of these dragline machines and their excellent work, started an investigation to determine the adaptability of the drag-

line to stripping. This inquiry ended by Butler Bros. accepting the contract to complete the job of stripping the Consolidated property at Missionfield.

The year 1890 marked a new era in the stripping industry. Butler Bros.—Henry A. and William—started work in Missionfield with three draglines. Each machine was of different bucket capacity,  $\frac{3}{4}$  yd.,  $\frac{2}{3}$  yd. and 1 yd. respectively.

#### HORIZONTAL BOOM WAS ABOUT 80 FT. LONG

These drag or scraper buckets were simply steel boxes with an open end which had teeth on the bottom edge. A cable, traveling through a sheave wheel on the top of the drag, was an adjustable trolley which not only raised or lowered the bucket, but also provided a guide for its travel. Ropes fastened to each end governed the forward and reverse motions. A fourth cable was a means to trip a latch which let the drag swing, open and down, to dump its load. These various cables were strung through a horizontal boom, some 80 ft. long.

Wire ropes suspended from a vertical frame or gantry held the lower boom in position. Two upright boilers supplied power for a two-cylinder engine geared to three drums. Clutches controlled the starting, stopping and speed of these drums, each of which governed a bucket cable. Gearing from the engine to the truck axles gave the machine self-propulsion in either direction.

Instead of being down in the pit, the drag line worked on top of a bank from one edge, the horizontal boom extending over the cut. When the engineer wished to dig, he either let the bucket run out half the length of the boom, on the incline formed by hoisting the trolley rope high in the air, or he pulled it out by means of the reversing cable. Releasing the trolley, he then "dropped" the bucket into the pit.

The bucket was dragged up the side of the bank on which the machine stood, until full of material. Picking up the load with the trolley, and letting it travel to the end of the boom, the engineer tripped the latch. This allowed the bucket to be dumped. Now, with the exception of pulling the drag half way back, the operation was ready to be repeated. The accuracy and speed





### Loading Strip-Pit Coal

The Butler Bros. dragline was the first mechanical contrivance for loading stripped coal. All the draglines, whether for coal or overburden, operated buckets like the one in the illustration on cables from 80-ft. booms. The scraper buckets for removing overburden or loading coal were simply steel boxes with an open end which had teeth on the lower edge. The capacities of these boxes varied from  $\frac{3}{4}$  yd. to 1 yd. By their aid skilled operators would load coal into cars at the rate of three buckets per minute.

attained by an experienced engineer was truly remarkable—three complete operations a minute was not unusual.

As the boom did not swing, the whole machine had to be moved frequently to keep the "scraper" supplied with digging material. This required much track laying of an expensive nature, because the soft ground let the machine sink down unless ties were laid as closely together as possible.

Dragline operations laid the coal open in rectangular cuts about 20 ft. wide and a quarter of a mile long. The length of the boom enabled the waste bank to be built far enough away from the coal face to prevent its burial. Entry driving was therefore unnecessary, the miners loading the coal from the "open face." When the end of the cut was reached, the machine was shifted back about 20 ft. from the edge of the bank. It then dug back to the opposite end of the pit, laying open a new strip of coal and depositing the spoil in the cut from which the coal had just been quarried. "Drag-lining" transformed the field into a series of parallel ridges.

The Butlers' machines were first placed at work in the upper bottom of Missionfield, where Wright & Wallace had also operated. The stripping was shallow in the center of this "bottom," and the overburden contained no hard material such as shale or soapstone, consequently the dragline operated with such ease and speed that the Consolidated Coal Co. soon was enjoying an output of over 1,000 tons of coal a day.

The available stripping in this section of the field did not last long, as a large part of the coal had been mined while Wright & Wallace were at work. Increased depth of overburden, the unlooked-for appearance of hard, blue shale above the coal, and a bad flood, forced Butler Bros. to move two of their excavators into what is known as lower Missionfield. The third machine was abandoned.

The overburden in the eastern end of this field was light, therefore, the dragline fairly made the dirt fly from about 40 acres of coal. Here, the machines were

operated in tandem—one stripping, the other loading coal into the railroad gondola cars which ran directly into the pit. This was the first machine coal mining.

However, in the center of the field, shale, soapstone and increased depth of overburden were encountered, retarding the progress of the machine greatly, and it became necessary to drill and blast the hard material so that the bucket could dig it. The profits decreased correspondingly, as Butler Bros.' contract with the coal company was to deliver the coal on board cars, at a certain price per ton. The mine workers became dissatisfied, and struck for an eight hour day and heavy increase in wages. These troubles stopped business, and brought about the abandonment of the first draglines.

### Cement Gun Used for Rock Dusting Mines

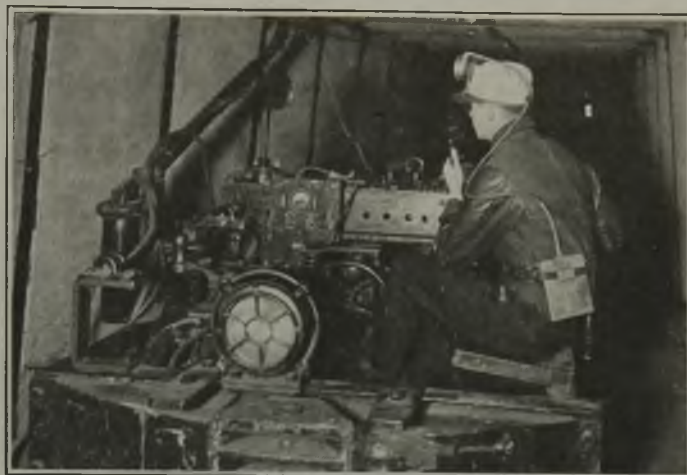
RECENT experiments, says Dan Harrington, formerly of the Bureau of Mines, have been made in a New Mexico colliery with a cement gun stationed at the intake end of the main entry. It ejects a stream of dry shale dust into a strong ventilating current. The tests indicate that the shale dust was discharged at the rate of 1 ton per hour. The velocity of the air current in one test was 800 to 1,000 lin.ft. per minute at the intake and about 400 lin.ft. at a point 6,000 ft. distant. The dust cloud at this point was dense 25 minutes after the cement gun was started, and definite evidence of dust settlement was found as far as 9,000 ft. from the gun.

When the air current that passes through the entry being dusted is uniform, the quantity of deposited dust is necessarily greatest near the point where the dust is ejected. To obtain even distribution of dust through an entry, it would be necessary to shift the dusting machine from time to time. In an entry such as that described, of 98 sq.ft. cross section and 6,000 ft. long, to obtain a deposit of, say, 4 lb. per linear foot, at the rate of 1 ton (of 2,000 lb.) an hour, the mechanical distributor would have to operate for 12 hours.—Bulletin 225, Bureau of Mines.



## Further Progress Made with Voice Transmission From Underground Workings to Surface

Are Wireless Tests Valuable When They Are Made Between the Mine and High-Powered Stations on the Surface?



*Receiving and Sending from Locomotive*

Propagation Affected by Earth Strata and Sheet Water—Experiments carried on from Mine Locomotive Successful

BY J. J. JAKOSKY  
U. S. Bureau of Mines

**R**ELATIVELY successful underground tests in wireless communication have been conducted in Illinois, Pennsylvania, Arizona, Utah, Idaho, Colorado, Michigan, Wyoming, Kentucky, New York, Connecticut, and in England, Germany, Italy and France. As a result, occasional press notices and illustrations have appeared in many papers. This may lead to the impression that radio communication in mines and tunnels is an established fact and that the method is comparatively simple. As a matter of fact, this is not so.

In practically all these tests the general procedure has been to take underground a receiving set of varying degrees of sensitivity and listen to broadcast music or speeches from high-power broadcasting stations. The results of these experiments are of real value and much interesting information is being obtained. Receiving stations have been placed on trains and communications received while they were passing through tunnels, tubes under rivers or subways. Other tests have been conducted in the Grand Canyon of the Colorado, in submerged submarines, in water wells and caissons, in the new tubes under the Hudson River, etc. Tests have been made in every conceivable part of a mining plant, from the carpeted offices of the officials to the mule barns underground.

### TESTS DETERMINE TRANSMISSION FACTORS

These tests are of much interest and are useful when interpreted with reference to the conditions under which they are made, as for instance, in relation to the surface and sheet waters, the geology, mineralogy, and topography of the measures, the presence of metallic conductors, such as electric power and lighting circuits, compressed air and water piping, trolley wires, telephone lines, hoisting cables, headframes, etc.

Practically all these tests, however, have three com-

NOTE—Headpiece shows set connected to harp on trolley pole. Line-radio communication may be carried on while the locomotive is in operation. Very little interference resulted from sparking of the trolley wheel. All tube sockets were mounted on special cushions to minimize vibration.

mon factors. First, reception is from broadcasting stations of a power very much greater than practical for underground sending sets. However, even one-way communication, that is, from the high-powered station on the surface to a receiving set in the mine, would be of value if the entombed miners who survive could be equipped with reliable receiving apparatus to allow them to tune in to some nearby station. The entombed men could be informed of the progress of the rescue parties and that information, though it afforded no physical aid, might prove to be a favorable psychological factor. In some cases even entombed men might be directed to parts of the mine where they could be reached by rescue parties.

### NO SUCCESSFUL MINE-TO-SURFACE TESTS

Second, in most of the tests coming to the attention of the U. S. Bureau of Mines, there is no mention of successful transmission from within the mine to the surface. This transmission is of the greatest importance. If a reliable means of voice transference can be placed at the disposal of entombed men, they could inform rescue parties of their exact location, the number of men entombed and living, their names and designation number, and the condition of the air supply. Such information would greatly facilitate rescue operations.

Thirdly, in practically all tests conducted either by the Bureau of Mines or outside experimenters, the data obtained indicates that metallic conductors such as trolley wires, power and lighting circuits, car rails, compressed-air and water piping, hoisting cables, steel frame work, etc., are the controlling factors in underground communication. An early publication of the Bureau called attention to the influence of such conductors upon radio transmission, and later work has greatly emphasized the importance of this feature. Most experimenters have neglected to consider the effects of such metallic conductors or "carriers" for the high-frequency currents. In some tests, however, the apparatus, when moved to other locations within the



mine where such conductors did not exist, gave entirely different results.

In practically every deep underground mine test it has been noted that reception is much better in one place than in another. When the apparatus is moved from one part of a room, into an adjacent working or to another entry on the same level, better signals may be received. In other cases after the change no radio communication can be received.

If the radio waves actually penetrated the earth for any appreciable distance, it does not seem probable that moving the apparatus a few feet would make such a great difference in the result. The effects of line-

present, its sheet distribution, and, to a somewhat less extent, on the type of ore or mineral.

Some formations, such as coal, shale, etc., are insulators when dry. The metals recovered from ores may be excellent conductors but such ores as they exist in the earth are not necessarily so. This is due to the fact that the metallic particles, if existing as such, are separated by the matrix which as a rule is a non-conductor. In most ores the metals do not exist as such but as chemical compounds, which must later be extracted by hydrometallurgical or pyrometallurgical processes.

Coal, which often contains as much as 95 per cent



#### Portable Mine Apparatus

This receiving set was connected to two short sections of mine rail and picked up signals from a line-radio transmitting set connected to the rails in another section of the mine. Oftentimes, good results can be obtained by connecting the receiving set to the rail and driving a peg in the ground.

radio or so-called "wired wireless" should be considered by experimenters when conducting such tests.

I do not intend to convey the impression that pure radio is the only system of communication. On the contrary, any reliable portable system of voice communication will be satisfactory. The point to be emphasized, however, in connection with such tests is that if line-radio played an important part in carrying the signals in or out of the mine when tests are conducted and while the mine is in good working order—and all trolley wires, power and lighting circuits, etc., are insulated from the ground and with no breaks in such metallic conductors—can the same system of communication be relied upon in cases of disaster? Fire, falls of rock and roof, explosions, mine flooding, etc., will not only ground the electrical circuits but also break the conductors in many places, causing changes in the electrical characteristics of the metallic carriers, which must all be taken into account.

So far, practically all data obtained from tests conducted by the Bureau indicate that the absorption of radio waves in penetrating the earth depends mainly upon the relative conductivity of the strata through which the waves are propagated. The conductivity of the earth depends largely upon the quantity of water

of carbon, is usually an excellent insulator. Practically none of the carbon in coal is existent in the green state but is present as a complex bituminous or pitch-like material, which acts as an insulator. Most of the eastern coals are of such close structure as to contain little free water or moisture. The "combined" water does not add to the electrical conductivity. Many seams, both horizontal and vertical, contain sheet waters and seepages between strata which prevent transmission of signals for any considerable distance. Other minerals such as hematite and certain sulphide ores are conductors even when dry.

In all cases, however, the conductivity of beds of ores and minerals is greatly increased by the presence of water. Mine waters containing relatively large quantities of dissolved salts are good electrolytes. Radio waves are greatly attenuated in penetrating such waters, and in horizontal, uniform strata with numerous sheet waters, only a short penetration of the radio waves may be expected. The thickness and number of such sheet-water formations limit the penetrating power of the radio signals.

Similar effects have been noted in numerous government tests conducted on submarine signalling. It has been found that even the comparatively high-powered



transmitting stations aboard battleships can not be relied upon for continuous communication with submarines when they have submerged to a depth approaching that of the average shallow coal mine in this country.

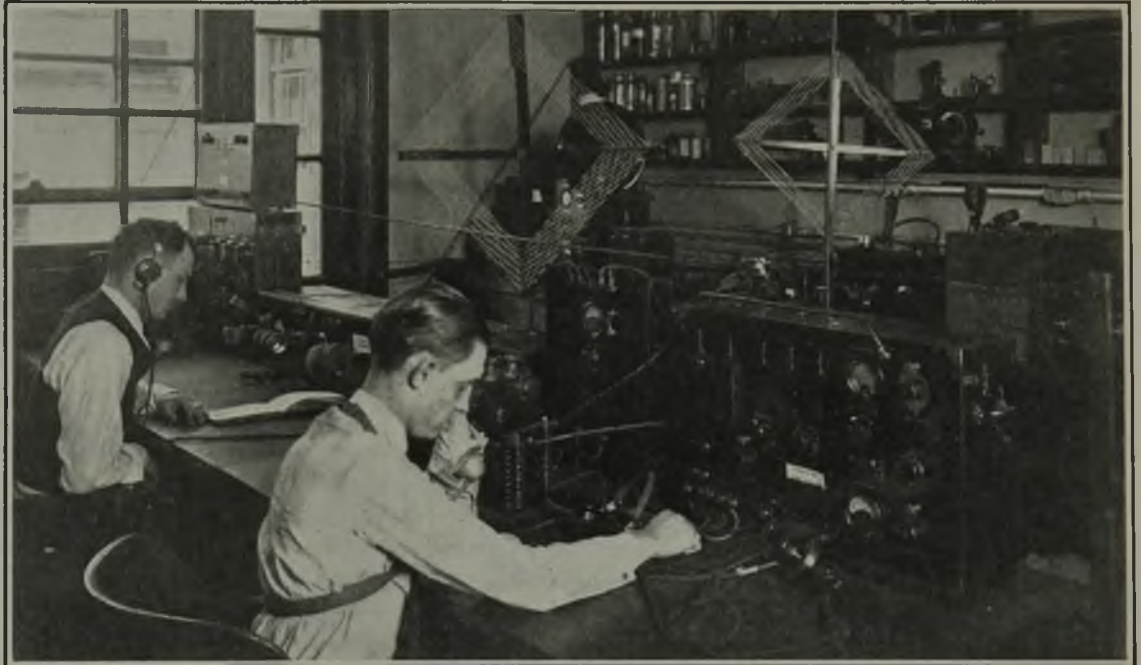
In mine tests conducted when receiving from surface stations, it has been found that the signal strength is not greatly affected at a short distance underground, but drops off rapidly as soon as a depth is reached approximating that of seepages and the sheet-water formations. This holds true, of course, when there are no metallic conductors present to act as carriers. In mines having electric light and power circuits, such conductors

tained indicated that the range is dependent almost entirely upon the type of conductors present, their electrical constants, etc. The transmitting range of this set in the average coal mine is only a few hundred feet when there are no conductors present, but may be several thousand feet when operating in the vicinity of power and lighting circuits, telephone lines or other metallic carriers.

In another series of tests similar effects were noted when using a loop aerial for transmission. It is not necessary that the metallic conductor be tuned or have a natural period the same as that of the wave. The

#### Bureau's Experimental Laboratory

This station has been licensed to use any wave length and power. From here the experimenters were kept in touch with all the portable field stations as they were moved about in the mine. Both code and voice transmitting equipment was used.



will carry the signals down from the surface—and often with but slight diminution in intensity.

The extent to which such conductors act as carriers for the high-frequency waves depends upon their electrical characteristics and the wave frequency. If the electrical circuits offer high resistances to the high-frequency currents, there will, of course, be a great loss in signal strength. However, the capacities of machine windings, parallel wiring, etc., are often of sufficient magnitude to offer a relatively low reactance bypass or shunt for the high frequencies.

In a series of recent tests a 10-watt telephone transmitting set was mounted upon an electric locomotive, and the outfit connected to the harp of the locomotive trolley pole. A portable receiving set, consisting of a detector and two steps of audio-frequency, was used on the surface and connected to a 50-ft. single-wire antenna. The mine was operated by a shaft about 400 ft. deep. There was no difficulty in picking up signals from the underground moving locomotive station as long as the receiving antenna was placed in the vicinity of any electrical conductor extending into the mine. The signals were picked up readily when the receiving antenna was near the trolley wires, power and lighting circuits, telephone lines, and hoisting cables, the relative magnitude of the signals from the different carriers being in the order named.

In a series of tests conducted to determine the transmission range underground, a portable 10-watt transmitter was mounted on a storage-battery locomotive. A short three-wire antenna mounted on the top of the locomotive was used for transmitting. The data ob-

wave is propagated or guided by such conductors which function "aperiodically."

The effects of line-radio are particularly noticeable when using a loop antenna for reception. In almost every case where the receiver is placed at a sufficient distance underground to be shielded, it has been found that the loop antenna, when near metallic carriers, functions best when placed in more than one direction regardless of the true direction of the transmitting station. Moving the set to another location in the vicinity often results in the loop pointing in a different direction. A study of near-by conductors shows the reasons for such changes in the directional properties of the loop. When using a capacity-type antenna, such as a wire stretched along the mine entry, this loss of directional properties as a rule cannot be noticed.

The variation in electrical characteristics of underground mine-power distributing systems indicates that certain optimum frequencies exist for each mine. The higher the frequency used the more efficient the radiation and the less loss in signal strength, when carrying across gaps due to metallic breaks, etc., in the conductors. On the other hand, the attenuation of the high frequencies when traveling along metallic conductors or directly through the earth is much greater than for the longer wave-lengths. The optimum frequency to be used in each case will depend upon the electrical constants of the underground metallic conductors, distances to be covered and type of communication desired.

It would, of course, be admirable if adequate provision could be made for the placing of mine communication rescue sets underground and have them ready for





### Testing with Loop Aerial

Practically all metallic conductors have a tendency to warp the signals and destroy the directional properties of the loop. This portable set was used in many places in the mine to study the effects of water, pipes, rails and mine cars.

use in cases of emergency. However, the capital invested in idle equipment while waiting for something to happen offers a serious obstacle—especially as the real usefulness of the apparatus for rescue operations has not yet been determined.

A direct service for the apparatus must be found in the everyday operation of a mine. Because radio can operate effectively and efficiently when the radiated energy can be guided by metallic conductors, it may be possible to use a simple low-power portable line-radio set. The installation of a line-radio telephone set is simple, it being necessary only to lay a wire 25 to 50 ft. long on the ground or stretch it along the wall or roof and in a direction approximately parallel to carriers, or to couple the set directly to such conductors by the use of suitable capacities or inductances. As far as actual installation of apparatus is concerned, the line-radio is simpler and can be installed in shorter time than the present underground mine telephone with its connecting wires.

The line-radio apparatus itself, however, is more complicated than the present simple mine telephone. After the line-radio apparatus has been developed to the point where its use for mine communication can be safely recommended, its final adoption will depend upon the operating conditions prevailing in each mine. The line-radio apparatus alone will necessarily have a higher upkeep and maintenance expense, but to offset this will be, not only the almost total elimination of telephone line and wire maintenance, but also one less wire to be given space in the mine haulageways and entries. This holds true of course when the line-radio utilizes power or lighting circuits already in place.

It has been found that practically any conductor insulated sufficiently for the economic transmission of power or lighting current will act efficiently as a carrier for the high frequency current. The conductor acts in a double capacity, the high-frequency current being superimposed upon the low-frequency or direct-current power without any interference to the power supply and with only slight interference to the carrier-current communication if proper coupling and filtering systems are used. No interference to telephone circuits is noted

by superimposing the high-frequency carrier on the telephone line. Much recent experimental and commercial work on line-radio and carrier-current communications has established its feasibility.

If the apparatus can be made sufficiently practicable to be used as a mine communication apparatus, it will prove advantageous for the following reasons:

(1) Men would soon become acquainted with the operation and care of the apparatus. In case of a disaster such knowledge would be of far more value than any short course or training which might be given men for the operation of other rescue apparatus.

(2) Maintenance and inspection service will be justified for other reasons besides the purely humanitarian viewpoint of safety.

(3) Purchase of sets, maintenance and apparatus costs can be charged to operating rather than to safety—and there is always more money available for the former.

(4) Breaks in the metallic conductors do not completely stop communication, as with a break in the lines connecting the present mine telephones. Short breaks in the carriers such as opening of switches, etc., are not as a rule directly noticeable in operation. Severe disasters which might cause one or more breaks will not completely destroy the conductors, and communication could probably be established despite them.

A LITTLE VOLUME ON MINE VENTILATION.—To Thomas Bryson, a mining engineer and certificated colliery manager of the Mining College of Wigan, England, the industry is indebted for a book entitled "Theory and Practice of Mine Ventilation." It is a thoroughly practical publication and is especially strong on the subject of mine fans. The public is accustomed to books which lay emphasis on distribution of air; this book lays the right stress on the ventilator. It treats of main fans and boosters but does not fail to deal with the basic principles of air distribution and measurement. The book measures 4½x7½ in., has 255 pp. and is distributed in the United States by Longmans, Green & Co., 55 Fifth Ave., New York City, the price being \$3.



# Using Rock Dust in Shotholes to Lessen Violence And Increase Lump Coal

Explosive Is Laid Loose in Shothole and Above It Cartridges of Rock Dust Are Placed—The Dust Is Compressed, Reducing the Violence of the Blast—Flame of the Shot Is Extinguished by Shower of Dust

BY J. H. HORLICK, JR.

A FEW expert blasters have long used "cushioned" blasting and its advantages have been rather widely recognized, if not practiced, by shotfirers. Dr. Alfred Stettbacher, of Zurich, Switzerland, has described\* a special method of rock-dust stemming introduced into the coal mines of the Ruhr district of Germany since the war by which it is claimed that the percentage of lump coal has been increased as much as 50 per cent with a reduction in explosives' consumption of from 20 to 40 per cent.

The use of rock-dust stemming has been demonstrated by the experiments of the Hercules Powder Co. to increase the convenience and safety to such an extent that there seems to be no reason why this method, or some modification of it, should not be adopted generally.

Former methods of obtaining the cushioned effect by air-spacing have involved refinements in tamping the charge which are difficult to perform in actual practice. With rock dust as stemming, the maximum cushioned effect is obtained, and the tamping operation is even simpler than in present practice. The procedure, in brief, consists in placing one or more cartridges of finely-ground rock dust in the hole after the reduced explosives charge has been loaded. The explosives cartridges should not be slit or tamped, and the long cartridges of rock-dust stemming are merely shoved into the hole without tamping.

## DUST STEMMING QUENCHES FLAME

It was found in the Ruhr mines that the explosion compresses the rock dust and wedges it tightly in the mouth of the hole so that none of the gases can escape until they have done their work in bringing down the coal. If, by any chance, a blownout shot occurs, the rock-dust stemming helps to quench the flame. It is, therefore, a safety precaution, whereas coal dust frequently used for stemming is a real danger, and clay, though not a menace, has no flame-quenching properties. The compression of the rock-dust stemming by forming a long pressure chamber provides a greater area against which the gases can expand. In the following tests slight modifications were made in the method described by Stettbacher.

On the test in an Illinois coal mine, the explosive used was black powder. Here the coal is undercut 6 ft. and the bottom holes drilled just above a blue band which occurs in the coal seam about 3 ft. from the bottom. Usually a high percentage of screenings is produced by shooting these bottom or "snubbing" holes. In the method generally followed, an average of 30 in. of "F" blasting powder is used and tamped solidly. On our test shots with the cushioned method the charge

was reduced to 20 in. of "C" blasting powder in cartridges of equal diameter to those used by the miners. After placing the 20 in. of powder in the hole without tamping it, cartridges of limestone dust about  $\frac{1}{4}$  or  $\frac{1}{2}$  in. less in diameter than the borehole were inserted. This gave an air space above the entire length of the stemming. There was also an air space of 2 in. left between the powder charge and the first cartridge of rock dust. The end of the last cartridge of stemming was mashed so that it fitted snugly in the collar of the hole. The shots made by this method with about one-third of the usual powder charge brought down the coal satisfactorily with appreciably less screenings than generally obtained.

## LESS SMOKE AND WELL-SPREAD ROCK DUST

On other tests in the Pittsburgh, Pa., district, more complete records were kept. In Mine No. 1, the coal is approximately 5 ft. high with about 10 in. of slate above it. All of the coal is undercut and is blasted by two rib holes; shooting the tight rib first with  $2\frac{1}{2}$  to 3 cartridges of a permissible explosive  $1\frac{1}{2} \times 8$  in. in diameter. The other butt shot is fired after the coal broken by the first one is removed. Ordinarily 2 to  $2\frac{1}{2}$  cartridges are used for the butt shots. The holes are  $1\frac{1}{2}$  in. diameter and 6 ft. deep; the portion not occupied by the charge is tamped with moist clay stemming. In the tests tabulated below the finely ground limestone stemming was placed in the hole in two cartridges.

Clark Patent Tubing,  $1\frac{1}{2}$  in. diameter, was used as a container for the dust and was cut to bring the end of the stemming 6 in. from the collar of the hole. The remainder of the hole was then firmly tamped with moist clay. After blasting with this method there was much less smoke than usual, and limestone dust was found distributed in the rooms, 50 ft. and more from the face.

At Mine No. 2 lump coal is not the principal consideration but it is important that all slate and other impurities occurring in a band of "bone" in the middle of the seam be separated from the coal. Any method

Table I—Test at Mine No. 1, Near Pittsburgh, Pa.\*

Kind of Shot	No. of Cartridges Ordinarily Used	No. of Cartridges Used on Test	Remarks
Tight	$2\frac{1}{2}$	$2\frac{1}{2}$	Broken down in excellent lump coal
Butt	2	$1\frac{1}{2}$	Good shot and good lump coal
Butt	$2\frac{1}{2}$	$1\frac{1}{2}$	Good shot and good lump coal
Butt	2	$1\frac{1}{2}$	Seemed to be shot rather heavy, but it appeared to produce practically no slack
Tight	$2\frac{1}{2}$	$2\frac{1}{2}$	Excellent shot in all respects
Tight	$2\frac{1}{2}$	$2\frac{1}{2}$	Broke coal half way across room. All coal in large size with practically no slack
Tight	$2\frac{1}{2}$	2	Hole was rather low. Some top coal hung and remainder appeared overshot

NOTE—Article entitled "Increasing Lump Coal Production by Cushioned Blasting" read before American Mining Congress. \*The Explosives Engineer, September, 1923.

\*NOTE—A slow permissible explosive was used. The "spreading" effect, typical of black powder, was readily apparent.



that produces less pulverization of this slate helps materially in attaining good separation. Shotholes are 1½ in. in diameter. The usual practice here is to drill one cut-hole in the center and near the top of the seam (which is 6½ to 7 ft. high) and to load it with four cartridges of a 1½x8 in. permissible explosive. After removing the coal produced by this shot, a rib hole is fired with a charge of 2½ to 3 cartridges, and then a second rib hole containing 2½ cartridges. The total charge for a complete cut, therefore, usually is 9 to 9½ cartridges.

With the cushioned method, using rock-dust stemming the charges were reduced from 20 to 30 per cent and it was quite apparent to the mine officials that the slate was brought down in larger pieces. The explosives charge was placed in the back of the hole and cartridges of shale dust were placed in the hole to within 6 to 10 in. of the collar. Neither the charge nor the rock-dust stemming was tamped. The small space at the collar of the hole was firmly tamped with moist clay. The results of each shot are shown in Table II.

A slow permissible explosive was used. In shots Nos. 1, 2, 3, and 4, in which the charges ordinarily used were

Table II—Test in Mine No. 2, Near Pittsburgh, Pa.

Number	Location of Hole	Distance from Rib in Inches	Distance from Roof in Inches	Depth of Hole in Inches	No. of Cartridges ordinarily Used.	No. of Cartridges Used in This Test	Inches Rock-Dust Stemming	Includes clay Stemming	Remarks
1	R Rib 1	13	12	70	2½	2½	44	6	Coal badly shattered.
2	L Rib 2	20	18	65	2½	2½	40	8	Coal badly shattered.
3	Center	69	37	69	3½	3½	30	6	Coal badly shattered.
4	L Rib	65	65	71	2	2	40	9	Coal badly shattered.
5	Cut	68	30	71	4	3½	40	6	Shot was very good.
6	L Rib 2	11	11	66	2	1½	42	2	All lump coal produced. Some hung up.
7	Cut	72	29	72	4	3	42	10	Bone brought down in large pieces. Unusually good lump.
8	L Rib 1	13	12	72	3	2	..	..	Excellent lump coal produced; left about 1 ft. back tight.
9	R Rib 2	22	12	68	2½	2½	42	8	Curly coal and tight—hard to shoot. Used 2½ cartridges. Good lump produced. Some hung up a little.
10	R Rib 1	12	18	72	2½	2	48	..	Excellent lump coal produced. Good shot.
11	Cut	84	26	69	4	3	40	10	Results excellent. Shotfirer stated better than with 4 cartridges ordinarily.
12	L Rib 1	16	12	70	3	2½	40	10	Results very good. Some fines but good lump.
13	Center	67	20	68	4	3	3½	6	Appeared to be overshot.
14	R Rib 1	18	12	72	2½	2	48 in.	6	Fair lump but appeared slightly over loaded.
15	Center	11	18	72	4	3	48	4	An exceptionally good shot.
16	Center	..	22	72	4	3	48	4	Good lump. Bone came out large and easy to remove.
17	L Rib	20	18	72	2½	2	..	10	Burden was heavy. Results good and good lump.
18	L Rib 2	12	16	72	2	1½	..	6	Very good lump. Later reported that back was tight.
19	Center	..	..	72	4	3	..	4	Pulled coal well and produced good lump.
20	Center	..	..	72	4	3	..	6	Excellent results.
21	R Rib 1	18	18	72	2½	2	..	6	Results good.
22	Center	..	15	72	4	3	..	6	Broke clear to ribs in some places. Good lump coal.
23	R Rib 1	..	..	72	2	1½	..	6	Seemed to be a very tight shot. Results good.
24	L Rib 2	..	..	..	2	1½	..	..	Fairly tight. Broke well with good lump coal. Began using larger tamping shells.
25	Center	..	..	72	4	3	..	6	Results very good.
26	L Rib 1	..	..	72	2	1½	..	24	Pulled very well.
27	R Rib 2	..	..	72	2	1½	..	4	Pulled very well.
28	Centre	..	..	72	4	4	..	42	Material smashed too fine. Considerable fine bone was produced which will be extremely difficult to eliminate.
29	L Rib 1	..	..	72	2½	2	..	8	Pulled well and good lump produced.
30	Center	..	..	72	4	3	..	6	Seemed to be shot hard. Coal broken, but not too fine.
31	R Rib 1	..	..	..	2½	2	..	6	Appeared to be somewhat overshot.
32	R Rib 2	..	..	..	3	2	..	4	Very heavy burden. Results good and good lump coal.
33	L Rib 1	..	..	..	3½	2½	..	..	Very heavy burden. Results as good as could be expected.

tamped by the cushioned rock-dust method, the coal was badly shattered, showing the necessity for a reduced charge when using this method. On most of the shots a "spreading" effect similar to that produced by black powder was quite apparent. Each shot dispersed some shale dust in the room, a safety precaution in itself, and there was much less smoke at the face than usually remains after blasting. On the last ten shots, 1½ in. tubing was used to contain the rock-dust stemming; on the other shots the diameter of the tubing was 1¼ in.

The difficulty of comparing results obtained in one mine with those in another, because of the many variables which occur in Nature, is well known. But even though the tests described have not been on large tonnages and have not extended over long enough periods to make them absolutely conclusive, the better results obtained by the cushioned rock-dust method were obvious in each instance.

You may feel that the increased percentage of lump coal obtained on the tests I have described is the result of the reduced explosives charges and is to be expected no matter what the method of tamping. However, it was apparent to all the experienced men who witnessed the demonstrations that the improved results could not have been accomplished merely by using less powder; for when the quantity of explosives usually necessary to pull down the coal without any overloading, was tamped by the cushioned rock-dust method, the condition of the blasted coal clearly indicated an overload. The explosives' charges used in our tests were less than could be relied upon to pull the coal with non-compressible tamping.

It was also observed that with the cushioned rock-dust method, the desirable "spreading" effect heretofore considerable attainable only with black powder was obtained with permissible explosives; and black powder when cushioned with rock-dust gave better results than larger charges tamped in the usual manner.

## Laws of Britain Regulate Handling of Lamp

British regulations dated July 10, 1913, require among other things that no person shall place a safety lamp on its bottom unless it is necessary to do so for the safe performance of any particular work or unless authorized by the manager. In all cases when the person is at work it shall be placed at least 2 ft. from the swing of the pick, hammer or other tool. Should any person find himself in the presence of inflammable gas he shall not throw away his lamp or attempt to blow it out, but shall shelter it, hold the lamp near the floor, avoid jerking it, and take it steadily into fresh air. If the gas fires in the lamp where he cannot take it into fresh air, he shall smother out the light or extinguish it in water. No person shall when trying or examining for the presence of gas with a safety lamp raise the lamp higher than may be necessary to allow the presence of gas to be detected.

Every person using a safety lamp shall examine the same externally and assure himself that it is locked and in good order before entering the mine, and shall from time to time while in the mine examine the lamp to see that it is in safe working order; and he shall, when he has completed his shift, return the lamp to the lamproom. If the lamp is injured while in his possession he shall at once carefully extinguish the light.



# Mine Inspectors' Institute Advocates Legislation Requiring Closed Lights and Permissibles

Miners to Be Searched for Liquors, Matches, Etc.—Benwood Explosion Exhibits Danger of So-Called Non-Gaseous Mine—Electric Lights Declared Efficient—Inspectors Favor Air Chambers in Shotholes

BY ALPHONSE F. BROSKY  
Assistant Editor, *Coal Age*  
Pittsburgh, Pa.

THAT the time has arrived for a general and uniform amendment and addition to the mining laws of the United States was the unanimous conclusion of the Mine Inspectors' Institute at its meeting, May 14, 15 and 16. These sessions were held while the National Coal Association and the American Mining Congress busied themselves with their alternate sessions. The members met in the Hotel Sinton, in Cincinnati, Ohio. Chief among the resolutions of the institute was one advocating legislation prohibiting the use of open lights in all bituminous coal mines large enough to ship coal by rail or water and in all other mines which, in the judgment of the district state inspectors, should be equipped with electric cap lamps. In order that dangerous gases may be discovered when they accumulate, the resolution contained a recommendation that approved flame safety lamps, bearing the approval plate of the U. S. Bureau of Mines, be used, where necessary in conjunction with electric cap lamps.

The resolution also provides that the operator search or cause to be searched any person entering or about to enter any mine in order to prevent such person from taking or carrying therein any intoxicating liquors, matches, pipes, cigars, cigarettes, or any device for making lights or fire not authorized or approved.

The adoption of the clauses set forth in the above resolution met at first with some opposition. Inspector Flynn, Alabama, believes that open lights are safe in mines not classed as gaseous, providing certain other safety measures are taken, but his statement did not remain undisputed for long; Robert M. Lambie, chief of the Department of Mines of West Virginia, briefly recounted the causes which he and others believe caused the Benwood explosion. It was another case where a small accumulation of gas ignited by an open light caused the death of many men. Coal dust, of course, played an important part.

"The approved electric cap lamps must go into every mine of the country," said Frank Hillman, of Alabama, who was backed by Inspector Cunningham, of Somerset

County, Pennsylvania, and others in his contention; and after an extended argument in which all joined, it was agreed that the Institute should not be satisfied with a compromise.

Later in the week, on Thursday morning to be exact, Dr. J. J. Rutledge, chief of the Maryland Department of Mines, read a paper on "Closed Lights in All Coal Mines." He said that the new and improved electric cap lamps give as much light as a carbide lamp and a much better light than the flame safety lamp. Where the electric cap lamps are being introduced no difficulty is being experienced. No one can say when a mine is gaseous or non-gaseous, which is reason enough that all mines should be considered gaseous. Gas may accumulate unexpectedly by the opening of a clay slip, breaking through to old workings, or by allowing a door to remain open that should be shut.

The efficiency of a miner is greatly increased by the use of an electric cap lamp. One operator in a southwestern state reports that this equipment actually increases the efficiency of a worker by an amount equivalent to 50 minutes in an eight-hour shift.

A resolution was passed requiring the use of none other than permissible explosives for blasting coal in any bituminous mine and limiting the quantity allowed in any one hole to the specifications approved by the U. S. Bureau of Mines. Certified shotfirers shall be required to inspect, charge, tamp and electrically fire all shots, first having tested the place to be shot for gas by means of an approved flame safety lamp. It is the opinion of the Institute as expressed in a resolution that detonators should be handled by none other than shotfirers. Clay or other incombustible material should be required by law in the tamping of shot holes.

And here is a surprising announcement made by the Institute: "It is the consensus of opinion of this committee (standardization committee) that the use of air chambers in drill holes results in an improved grade of coal and in the more efficient use of explosives." No further reference is made to this method of shooting by which excellent results have been obtained, notably

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### MINE INSPECTORS DEMAND:

- Electric cap lamps in all mines
  - Flame safety lamps where necessary
  - Searching of all miners for liquors, pipes, cigars, cigarettes, etc.
  - Exclusive use of permissible explosives
  - Shotfirers to fire all shots electrically
  - Detonators to be handled exclusively by shotfirers
  - Depth of no solid shot shall exceed 4 ft.
  - Haulageways and aircourses shall be rockdusted unless moisture content is raised to 30 per cent.
  - Rock-dust barriers shall be installed at mouths of aircourses and entries
  - Cutter bars must be sprayed
  - Superintendents must be held equally responsible with foremen for any accidents that may occur.
-



in the experiments made in the Naomi mine of the Hillman Coal & Coke Co. and conducted by Research Fellow Nelson of the U. S. Bureau of Mines and the Carnegie Institute of Technology. The Institute concedes the greater efficiency of this method but does not openly and directly approve of it. It is my opinion that the time is near at hand when this method of shooting will be permitted by law in many states.

A resolution was passed relative to solid shooting. It reads: "Coal that is mined or sheared is not classed as solid shooting. No coal shall be shot off the solid where other methods are adaptable; no hole shall be drilled deeper than the shearing or mining, and where coal cannot be mined or sheared, the maximum depth of the shot shall not exceed 4 ft."

Mine inspectors all over the country are behind the movement to establish rock dusting as a standard practice in all bituminous mines. They feel that only by the adoption of this measure, not neglecting others equally important, will the number of deaths due to explosion be reduced to the lowest possible level. Though a few of the inspectors are not yet convinced that coal dust is an important agent in explosions sweeping every part of a mine, and some are not yet assured of the effectiveness of rock dust to check coal dust explosions, the majority voice their opinion as follows:

#### SHOULD ROCK DUST ROADWAYS UP TO ROOM NECKS

"All haulageways, aircourses and productive entries shall be rock-dusted from the mine opening to the room necks. Rock-dust barriers shall be installed at the mouths of all aircourses and productive entries. In addition to rock dusting on all entries and aircourses, water lines of sufficient size shall furnish water at sufficient pressure for wetting down coal dust that may rise and accumulate in and about the working faces. Whenever, by analysis, the dust on a roadway or aircourse shows a content of incombustible material lower than that determined as necessary to render the coal dust inert, the section in question shall be fenced off, or the mine closed, until sufficient inert material has been added to allow of safe operation.

"Those mines, in which rock dusting is not done in the manner described in the preceding paragraph shall be equipped with efficient sprinkling apparatus by means of which the moisture content of floor material shall be made 30 per cent of the volume, the consistency being made such that a handful of dust will compress in a closed hand to a compact mass. The prescribed degree of wetting applies to all parts of a mine."

The resolution relative to wetting, as outlined in the above paragraph, destroys the value of the resolution on rock dusting. Active exponents of rock dusting are not in sympathy with any such weakling and contradictory resolutions. The recommendation covering sprinkling was adopted only to satisfy those who are not sure as to the effectiveness of rock dust. No other meaning can be placed on this action.

Another resolution involving sprinkling—however, in this case a good one—requires that: "Coal-cutting and loading machines shall not be operated in bituminous mines unless water is applied in such manner as to prevent the raising of a cloud of fine dust while the machine is in operation. All motors used in such machines shall bear the approval plate of the U. S. Bureau of Mines."

Section 7 of the resolutions provides that "accumulated gas shall not be permitted to exist after discovery in any mine longer than may be necessary to remove the accumulation," and that the latter "shall not be removed in such a manner as to endanger the lives of the men in the mines."

Section 8 provides that "In order to insure an uninterrupted circulation of air throughout the mine workings, it is recommended that all aircourses be securely and amply timbered and kept free of obstructions. Non-flammable material shall be used in the construction of all permanent stoppings, overcasts and undercasts."

The committee borrowed from the English laws in formulating its ninth resolution which reads: "Superintendents shall be held equally responsible with mine foremen for the enforcement of safety in and about mines. All mine officials shall be required to pass an examination and possess a certificate of competency issued by the various state departments of mines."

Section 10 contains resolutions involving qualifications and tenure of office of state mine inspectors. It reads: "Since state mine inspectors are charged with the general protection of life and property in mining, it is recommended that they be men who possess experience, technical knowledge and character, and that they shall hold office free from political influence. Their competency shall be judged by a merit system. It is further recommended that such mine inspectors shall be at least thirty years of age and shall have had at least ten years of practical experience in coal mines."

The newly elected officers of the institute are James Dalrymple, chief, Department of Mines, Denver, Colo., president; Frank Hillman, safety engineer, Woodward Iron Co., Mulga, Ala., first vice-president; E. J. Hoey, state mine inspector, Christopher, Ill. second vice-president; William Boncer, mine inspector, department of labor and industry, Richmond, Va., third vice-president; G. B. Butterfield, general manager, the Associated Companies, Hartford, Conn., secretary; J. H. Griftner, chief inspector, the Associated Companies, Champaign, Ill., assistant secretary; J. J. Rutledge, chief mine engineer, Bureau of Mines, State of Maryland, Baltimore, Md., treasurer.

### Right Kind of Rock Dust Is Harmless

Rock dust properly used in coal mines to prevent coal dust explosions is not a hazard to the health of the miners, according to Dr. R. R. Sayers, Chief Surgeon of the U. S. Bureau of Mines. It is true that dust produced in metal-mining operations is often the cause of minor's consumption, but this is because of the peculiar character of that kind of dust, according to Dr. Sayers. In drilling operations a dust is often produced that is very irritating to the lungs, and the continual breathing of this dusty air produces a bad effect. In coal mines, the rock dust used for limiting explosions does not remain in the air to be breathed, but settles on the sides and bottom of the workings. In addition, dust that is not irritating is used for this purpose. Limestone dust made from limestone that is free from silica is best for this purpose, but shale dust, clay dust, and other dust can be used. Dr. Sayers suggests that a mining company about to introduce rock dusting into its mine should submit a sample of the dust to the Bureau of Mines to be analyzed.



# Problem of Fitting Loading Machine to Physical Conditions of Mine and Coal Seam

Discussion at Cincinnati Meeting—Selection of Machine to Meet Physical Conditions—What to Do When Rock Lamina-tions Are Encountered—Does the Machine Break Up the Coal?

## Selecting a Machine to Suit A Particular Mine

PROMISCUOUS choice of a loading machine without regard to the conditions under which it must be operated was unsparingly condemned by R. A. Walter, consulting engineer, New York City, in a short address before the session on "Correlation of Mechanical Loading with Haulage and Mining Systems" at the Cincinnati conference of the American Mining Congress.

At present several hundred coal loading machines are in daily use, more than half of which are operating successfully. Of the remainder, many could be made to operate more satisfactorily were suitable mining methods employed. Loss through purchase of those entirely unsuited to local conditions, could have been avoided if careful preliminary analysis had been made of the conditions.

No machine loader can be universally applied nor does any mine present conditions permitting the successful operation of all the loading devices of proved merit. Given a suitable mine environment these devices will function efficiently, and practically every mine presents conditions permitting the successful operation of at least one of them. The right machine in a mine will undoubtedly cut costs, but purchase of unsuitable equipment is a sheer waste of money.

### WHERE FACTORS FAVOR SURVIVAL

There are certain factors at each mine which affect machine loader operation. Each loader in a varying degree possesses qualities which enable it to operate where one or several of these factors persist. Analysis of mine conditions and careful co-ordination with equipment will therefore eliminate much of the guesswork heretofore incidental to mechanical loading.

A study of the following list of some of the more common influencing factors will quickly indicate the reason for many mechanical loading failures and may show how they might have been avoided:

Old or New Mine	Haulage
Available capital	Drainage
Floor	Ventilation
Roof	Power
Coal:	Machinery
Pitch of Seam	Labor:
Height	Attitude
Structure	Supply
Preparation	Type
Mining:	Housing
System	Local Management
Laws	
Surface Protection	

These are only the most obvious fac-

tors. There are many more—some vitally important. All have a bearing upon successful operation. None may be ignored without lowering efficiency. To ignore some of them will cause absolute failure. Mechanical coal loading can of course be installed more economically and with less inconvenience at a new than at a going mine.

Some types of loading appliances can be adapted to a going mine at a cost well within the limits justified by the

working room between face and props, others but little. Some machines will load only up to some specified width of working face, and others will load any width but consume so large a proportion of time in moving as to impair their efficiency unless the face is at least a certain minimum number of feet wide.

There are almost as many different roof conditions as there are mines. Each requires different treatment with which the loading machine must co-



A Gathering and Loading Machine in Operation

Adoption of mechanical loading has been beset with many obstacles one of the chief of which was the ponderous size and large cost of the machines used. An expensive machine must be kept busy a large percentage of the time or the overhead eats up the profit. Most of the difficulties in the path of machine loading have now disappeared.

possible saving in operating costs. Others cannot be economically applied. Generally production can be increased far more economically by installing suitable mechanical loading than by increasing the hand-loading capacity.

A factor too frequently overlooked by those experimenting with loading equipment, is the floor or pavement. Examination of loading equipment quickly indicates that some machines cannot operate successfully on a soft bottom. A shelly floor presents an entirely different problem from one that is smooth and hard. Rolly or irregular bottom eliminates other machines.

The roof receives more attention but is seldom studied with sufficient care. Certain machines by their action make bad roof worse. Others practically make a bad roof almost good. Some machines advance more rapidly than others. Some require much space for

ordinate. Compulsory timbering to within a few feet of the face restricts selection but need not necessarily make machine loading impossible. A good roof permitting wide untimbered working face widens the possible choice but does not by itself indicate that every machine within this range will function satisfactorily.

Contrary to the general impression there are mechanical appliances which can be effectively applied to pitching seams. Manifestly these will change as the pitch of the seam varies. On some pitches within certain limitations of thickness none now developed will promote efficiency but in the majority of cases investigation will show that some one or various machines can be advantageously employed.

Floor and roof conditions may indicate equipment which is barred by the height of the seam. As the coal de-



creases in thickness the selection of suitable loading equipment becomes more limited but coal only 19 in. thick is being mined with mechanical aids.

Seam structure and coal preparation are closely interallied insofar as they effect mechanical loading. Presence of bands of impurities in the seam either restricts the choice of loading devices, lowers their efficiency, or calls for auxiliary cleaning equipment. Ordinarily the miner picks out these free impurities and throws them into the gob. Theoretically he loads only clean coal into the mine car. Perfection of separation so attained in practice is an important factor in machine selection.

Operating sufficiently rapidly to attain normal efficiency, some loading devices will not permit any but the most casual separation of impurities inside the mine. Others permit a better separation than is obtained with hand loading. In some instances coal and impurities can be loaded together with an appropriate machine loader the cleaning being accomplished at the tippie by suitable equipment. In others the cost of this cleaning will either offset the economies effected by mechanical loading, or the cleaning will be unsatisfactory and the coal prove unmarketable.

#### IMPORTANCE OF COAL FRACTURE

Another important factor to be considered is coal fracture. Coal breaks into lumps of various size. Some are slabs, others blocks, or the lumps may lack regular shape altogether. Each fracture presents its own loading problem and a machine which establishes a big tonnage record in one coal may fail entirely in another.

Market sizes and classifications, and the use for which the coal is intended all have a bearing on the machine to be used. In some instances there is no objection to shooting the coal into slack. In others it is important that the coal be blocky and slack be held at the minimum. Many machine failures can be traced to ignorance of their inability to load coal of a certain size. Much coal is shot only sufficiently heavily to crack it, after which in hand loading it is dug down with a pick and then loaded. Designers of mechanical loaders have spared neither thought nor effort to construct a machine which will first dig and then load such coal. Some attain creditable results, others are as yet in an experimental stage.

With some loading equipment efficient operation can be attained only if all the coal is removed, which brings into our problem a new factor—surface protection. Where it is necessary to hold the surface this frequently determines the mining system. In other instances the mining laws are the determining factor.

It is evident that both must be taken into consideration in planning a mining system. Then follows a further compromise between the system so evolved and that under which the loaders suited to seam conditions will best operate.

In a new mine the selection of suitable loading equipment and a mining system which will not conflict with laws, or interfere with surface protection is comparatively simple. In a going mine it is more difficult. In many

instances the mining system used eliminates from efficient operation all but a few loading machines. In others some machines will load coal rapidly and well, though the efficiency attained through rapid loading is more than counterbalanced through losses inherent to the system but which do not effect hand loading.

Though machine loading simplifies and contracts the haulage system a continuous car supply to the loading machine is a prerequisite for efficient and rapid loading. It is quite easy to supply cars to some loading appliances and difficult to supply them to others. Gage of track and height and size of mine car must not be overlooked for they influence machine design, clearances and speed of operation. Inability to supply mine cars to the machine loader indicates an inexcusable haulage condition and is not a legitimate reason for postponing a trial of mechanical loading.

Like haulage, drainage and ventilation are greatly simplified. The concentration of work attained with mechanical loading permits a reduction in volume of water and air handled per ton of coal mined. The reduction is enormous as machine loading requires only from one-third to one-sixth the working territory required by hand loading for equivalent tonnage. In some mines presenting particularly difficult drainage and ventilation these factors may be the determining influence in the matter of machine selection.

As loading machines replace human effort with mechanical energy it is only natural to think that additional power must be supplied. In practice this need not be done. Places are loaded out so rapidly and regularly that cutting machines operate far more continuously than with hand loading, making the flow of coal more regular. There is no such prolonged afternoon drag on power as is found in hand-loading mines where for several hours each day each cutting machine and locomotive is continually on the line with controller wide open. Peak loads are not so high. Power need not be distributed over so wide an area. Less copper is needed and the more regular power consumption will show a saving over hand loading.

#### PRESENT POWER PLANT ADEQUATE

In many mines where the power plant is the factor limiting production, certain loading devices will permit a decided tonnage increase without additional power plant. Before selecting loading equipment careful analysis should be made of its effect upon the power consumption of haulage and cutting auxiliaries for the power consumed by the loaders is but a comparatively insignificant part of the total power used.

At going mines auxiliary machinery may have properties which will go well with one type of loader, but be entirely inappropriate to others. This should be borne in mind and a careful analysis made to ascertain whether it is advisable to install loaders permitting its use, or to purchase other loaders and replace present auxiliary equipment with that more suitable to the type of loader selected.

Whether labor is receptive or antagonistic to machine loading has an important bearing. A shortage of labor indicates the desirability of mechanical loading. The type of labor available will limit, and may determine, the matter of machine loading and the selection of equipment.

At mines presenting conditions favorable to machine loading, where operators must furnish houses for their employees, properly selected loading equipment will obviate erection of houses for the labor which the machinery displaces. At a going mine it permits increased production without any increase in houses or in labor personnel.

One of the most important factors in determining the possibilities of mechanical loading is the attitude of the local management. Given reasonably good mine conditions and the sincere co-operation of the operating officials, mechanical loading is almost uniformly successful. Lacking this co-operation and with the best mining conditions failure is quite possible.

#### RAISES MINE TO FACTORY LEVEL

Mechanical coal loading places coal mines on a more efficient plane somewhat approximating that of factory operation. Through heretofore unprecedented concentration of labor it promotes safety and supervision and makes possible large reductions in operating costs. In return for these advantages it demands a higher grade of labor, better supervision and more thorough engineering.

Before installing any particular loader or loading device every influencing mine factor should be ascertained and analyzed. Next the characteristics of each available coal-loading device should be determined. A process of comparison and elimination will show which equipment may be expected to operate satisfactorily after which a mining method, suitable to equipment and coal seam, must be planned. Such a preliminary investigation may consume much time but only in this way lies any reasonable assurance of success.

#### What Shall We Do With the Refuse in the Coal

**M**ANY mines are perched on hill-sides and the tipples are located in narrow valleys occupied by streams, railroads and houses. Serious problems will be confronted, said Thomas F. Downing, Jr., general manager of the Logan County Coal Corporation, at the Cincinnati Conference, May 14, if the laminated impurities in the coal are loaded by loading machines and brought to the tippie to be removed at the picking table. Remembering that mines thus located on hillsides dump their coal quite frequently near the level of the seam and lower the coal to the tippie by rope-and-button conveyor, Mr. Downing, suggested that it would be possible and convenient to clean the coal before sending it down the hill. Then the coal could be dumped on the hillside where more space or at least more height is available.

Mr. Downing said also that if the small sizes of coal had to be washed because of indiscriminate loading by



machinery it might be necessary to spend 10c. to 30c. a ton to remove what had been mixed in with the coal by the loader. Again referring to the disposal of the waste after segregation Mr. Downing said that he knew of one mine where \$70,000 had been expended merely in the erection of a plant merely for the transference of slate.

He also referred to the difficulty of operating loading machines where posts must be set near the face in order to keep dirt out of the coal. In selecting a machine, one that will need the least room will in many cases be preferable. He added that he believed the mechanical loader was coming and even the oldest of those present would see the loader firmly established. We shall be willing before long, said he, to invest money in coal as liberally as is customary in France. He said he had seen one tippie in that country six times as large as he had ever seen in the United States.

In the discussion, D. J. Carroll, chief engineer of the Chicago, Wilmington & Franklin Coal Co., said that the loading machines of his company were working in new mines where mine run was the only coal shipped so he could say nothing as to sizes. The men at the picking tables are well able to take care of all the refuse in the coal that passes before them. The only lamination in the coal is 1½ in. of rock about 2 ft. above the floor. He believes, without having any figures to substantiate his statement, that the breakage was greater than with hand loading.

#### BREAKAGE NOT DUE TO LOADING

Mr. Downing said that in a case he had noted the breakage was not due to the loading itself but to the heavy blasting that was necessary to prepare the coal for loading. In one case the prepared sizes were reduced 30 per cent and the machine had to be taken out. David Ingle, president of the Ayrshire Coal Co., declared that he believed the machines did not break the coal up as much as the hand loaders. In a mine thus operated, he had no control over the shooting; in the mine that he had equipped with mechanical loaders he had such control. He said he did not have much impurity in his coal and that what there was gave him no more trouble than when the coal was loaded by hand.

J. F. Joy, of the Joy Machine Co., said that in some mines the percentage of slack was increased owing to heavier shooting. In other cases that percentage had decreased, particularly in the Indiana coal fields, which he thought might be favorably circumstanced for the use of mechanical loaders. One manufacturer is placing twenty-five loading machines a month in that state. Any one who had a mine that would not permit him to use a loader had better exchange it for one that would. Operators that are satisfied with loading machines are keeping quiet and those that were not, were quite willing to air their views. He had said that 200 machines had been installed. There were actually more than that number, for there were cases where they had been purchased inadvisedly. This was not always due to the conditions but sometimes to lack of co-operation, failure to study the problem and antago-

nism from the men operating the machine and delivering cars to it. Often the hand loaders got cars that should go to the machine. At other times judgment is not used in keeping out impurities. However, there are enough mines in the United States that can use machines for loading with advantage. The man who wishes to be a coal operator should get one of these mines.

Mr. Whaley, of the Myers-Whaley Co., said his loader had a smooth action and picked up the coal with a slow motion and with about the same drop as when loading by hand. The breakage, therefore, was no greater than in hand loading. The coal, moreover, need not be shot any more heavily than in hand work, for the shots should be no heavier than would roll out the coal. The machine could handle lumps larger than two men could lift.

It is necessary to shake the entire face and loosen it so that the machine can pull down the rest of the face without loss of time. Mr. Whaley did not believe that machine loading would drive any operators out of the mines, but he felt assured that the efficiency of the whole industry would be greatly increased.

A. P. Cameron said he had tried a modified type of the Whaley loader and some Joy machines which are doing excellent work. There are, however, conditions that no loading machine can meet. There are some fields that do not want small coal. The Westmoreland Coal Co. pays the miner only for lump coal. It has 300 men loading this lump. The small coal is kept down to 30 per cent. No loading machine could produce coal with such a small percentage of screenings. Time studies made of the work show that the miners at the mine load only one-third of the time they are in their places. The other two-thirds is consumed in doing work other than loading. Much as the Westmoreland Coal Co. is interested in loading machines it has not found any machine applicable to its conditions.

#### Machines That Will Drive One-Hundred Feet Daily

Carl Scholz discussed mechanical loaders for rapid entry driving. He said that operators were trying to outdo each other, each striving to get the largest mine in the world. Aside from this operators are seeking large tonnages so as to meet the interest on the large investment they are obliged to make. The higher the wage paid and the greater the interest to be met, the more important it is to develop the mine rapidly. Taxes never stop and the more coal produced the more output over which to distribute these taxes.

With this in mind and with a purpose of increasing safety Mr. Scholz began a study of entry driving. He found that every loading machine assisted in speeding the driving of entries. He had averaged 1,600 ft. per entry per month with two machines working in parallel headings. Conditions must be studied, for the conditions are not similar in any two mines. Mr. Scholz said he had good results with the Jeffrey heading machine. By working three shifts he had actually driven 100 ft. in 24 hours.

There are two types of entry drivers, and the McKinlay machine makes a third. The disadvantage of the Jeffrey machine is in its size. To use it the roof must be good, for it is not possible to timber closer to the face than 40 ft. The coal loaded must be clean and with the Jeffrey machine this can be attained. As it uses no explosives the coal is obtained in large sizes, being five times that obtained with hand loading, an advantage that cannot be overestimated. The elimination of explosives also assists in keeping a sound roof. Unfortunately in one of the mines where the large machine was used the roof was not sound. In consequence the machine had to be withdrawn.

Another big item with the Jeffrey machine is its cost. A machine can be purchased for \$25,000. It takes several months to build. In the Glen Rogers mine the machines had to be withdrawn because of the presence of gas. No machines now are being operated except Joy loaders and they are giving satisfactory results. This machine gives better coal with undercut faces than with overcut. Mr. Scholz added that the mine had no drawslate. In answer to an inquiry he said that longwall could not be successfully operated in this country. With coal selling at \$1.50 a ton the operator could not afford to pay 75c. for backfilling.

W. M. Drake read his paper on "How to Obtain Maximum Tonnage with Loading Machines" which appeared in the issue of May 8, pp. 689-694.

#### Ingle Describes Mine in Which He Loads by Machine

At the session of May 15 David Ingle, president of the Ayrshire Coal Co., addressed the meeting on "Room-and-Pillar Mining with Mechanical Loaders." Other details regarding his system of operation and conditions of working have appeared in the issue of *Coal Age*, Jan. 31, pp. 163-166. He said his loading-machine mine was in the No. 5 seam of southern Indiana which is 5 ft. thick. This seam has a rectangular cleavage and is quite open. Sometimes in shooting the coal, the gases from the powder will blow out at the back of the cut and at other times the coal falls in a mass after being undercut, thus making loading difficult.

The seam is clean, running 1 per cent sulphur and 6 per cent ash. Most of the impurities come from the roof, which is a grey shale and rather tender. In places 6 in. of this rock falls down with the coal when it is shot and this material has to be cleaned before loading. The mine has a cover of between 30 and 70 ft. It makes much water and this with a soft fire-clay bottom presents a condition of much difficulty.

The mine had been operated for some time and then closed. The room-and-pillar method had been used in this prior operation, and it was continued when the mine was reopened. The cars as loaded by the loading machine hold 3,200 lb. The machines were started in rooms already turned. They are driven on 30-ft. centers and only about 4 ft. to 8 ft. of pillar is left between rooms.





# News Of the Industry



## Unusual Situation in Coal Trade Brought About by Hoover's "Buy Now" Scheme

Commerce Secretary's Advice Not in Accord with Those Hoping for Runaway Market Prices—Shrinking Stockpiles Near Lowest Safe Point—Baffling Prospect Looms

BY PAUL WOOTON  
Washington Correspondent of *Coal Age*

An unusual situation in the coal trade is revealed by the reaction to Secretary Hoover's advice to buy now. Many of the producers of coal are not at all enthusiastic about Mr. Hoover's message and wish that he had kept his mouth shut. The operators who hold this opinion believe they will be better off at the end of next winter if the consumers are allowed to go ahead, just as they are doing, and use up their stocks. This will mean that they will come rushing into the market next autumn, with the probability that the operators who can afford to wait will profit much more than if buying had been spread evenly over the summer.

A few consumers already have recognized that the hand they can play to greatest advantage is not to draw on stocks now but to continue buying their current requirements in the existing easy market and then use their stocks when prices go up in the autumn or winter. Much interest is being manifested in the result of Secretary Hoover's letter. The more generally held view is that most consumers will not be able to resist the temptation of coasting on their stocks. Some think, however, that the consumers have been convinced that storage is greatly in their interest and that buying will begin as soon as stocks have been reduced to forty or fifty million tons. The only figures on storage which are available at the moment are those covering railroad fuel. It is significant that between March 15 and April 15 nearly 1,000,000 tons was taken out of railroad storage.

### Stockpiles Diminish Steadily

On April 1 the aggregate coal in storage was 65,000,000 tons. Consumption is thought to be running around 9,000,000 tons a week. Judging from the probable consumption in excess of production, stocks now are around the 50,000,000-ton mark, the figure usually regarded as supplying a safe margin of storage. Some insist that a reserve of 40,000,000 tons is ample. With 2,000,000 tons a week coming out of storage, only a few weeks more need elapse until the country's stockpiles will have reached that low figure.

While there can be little question that Secretary Hoover's advice is in the interest of the consumer and the transportation agencies, if followed it will have the effect of keeping alive many of the high-cost mines—an incidental result which Mr. Hoover must regret. On the other hand, if the country continues to go to the stockpile for its fuel, and the paralysis of April and May be extended for four months more, the credit of all but the stronger companies will have been broken.

The consumer who holds on to a reasonable reserve apparently has no chance to lose. Coal is almost certain to increase in price next autumn. The difference between that increased price and the current price is almost certain to be more than the carrying cost on the coal in storage. If the coal in storage has cost, including transportation, \$6 per ton, the interest charges for six months would be 18c. a ton, an amount certain to be exceeded if there be even a slight car shortage.

To anyone passing around among the coal specialists and others who are watching the market it is apparent that they sense something puzzling and baffling in the present situation. Somehow coal has entered on new times. The situation is more difficult of analysis than in the past.

No one ventures to predict what the ultimate results of the three-year wage agreement will be. No one will even hazard a guess as to how much of the market usually considered as belonging to the union fields will have passed into the control of the non-union producers. No one will attempt to answer what is to become of the mines that are being shut down. Are they to be allowed to cave in and be abandoned? What is to become of constantly growing surplus of union labor? All the union operators now have attached their signatures to the three-year agreement. Competition grows in intensity with each passing week. Major forces are at work on the far-flung coal industry, but even those possessed of unusual vision are frank in the admission of their inability to answer the questions which are on many lips.

### No Cut While Contract Runs, Says Lewis

John L. Lewis, Interantional president of the United Mine Workers, declared May 20, at the biennial convention of the Illinois district union, at Peoria, that coal operators who were predicting the necessity of modifying the miners' three-year wage contract, were mistaken. "There will be no modification of that scale now or at any time until the term expires," he said.

"Lower wages would not bring more work," President Lewis said, "and there is no hope for immediate relief. Depression in the industry will continue until the enormous reserves piled up against a possible strike are exhausted. Those reserves approximated 75,000,000 tons.

"They are burning up that reserve now, and no difference what rate we have as long as the reserve continues, people will not burn more coal than they require. If we had taken a \$5 rate (a reduction from \$7.50) at Jacksonville, non-union rates would have gone still lower, and present conditions continued."

### Shipping Board Opens More Bids at New York

Bids were opened last week by the U. S. Shipping Board at New York for furnishing and delivering alongside vessels operated by the Board from New York harbor two separate lots of bituminous coal with a minimum 14,500 B.t.u.

The first batch of bids, opened on May 19, called for 1,500 gross tons of coal. The bidders and prices were: Seiler Coal Co., \$5.48; H. B. W. Haff, \$5.31; Imperial Coal Corporation, \$5.42; Willard, Sutherland & Co., \$5.68; E. Russell Norton, \$5.49; W. A. Marshall & Co., \$5.85, and Steamship Fuel Co., \$5.09.

On May 23 the following bids were received for furnishing and delivering 5,000 gross tons of coal. Steamship Fuel Co., \$5.19; Seiler Coal Co., \$5.13; H. B. W. Haff, \$5.41; Coleman & Co., \$5.51; E. Russell Norton, \$5.61, and W. A. Marshall & Co., \$5.90.

Announcement has been made that the bids received on May 12 for furnishing the board with a maximum of 18,000 gross tons monthly for one year have been rejected and new proposals will be received on June 2.



## Keen Competition Marks Bidding for Supplying Navy with Coal

Bids opened by the Navy Department May 22 for supplying 768,600 gross tons of coal for the use of ships and shore stations during the fiscal year beginning July 1, next, showed unusually keen competition, nearly one hundred companies submitting quotations. The department probably will award contracts this week.

Tenders were asked on 330,000 tons of steaming coal for ships and 538,600 tons of bituminous or semi-bituminous run of mine for navy yards and shore stations, practically every item being competed for by a number of firms. Following are the bids submitted on the more important items.

Three hundred thousand tons steaming coal, for delivery at Hampton Roads—W. C. Atwater & Co., \$4.76; Castner, Curran & Bullitt, \$4.72; Consolidation Coal Co., \$4.75; Crozier Pocahontas Coal Co., \$4.76, delivered over twelve months' period; \$4.48 over six months' period; Smokeless Fuel Co., \$4.74; Sugar Creek Coal Sales Co., \$2.50; Fayette Smokeless Fuel Co., \$4.984; Haster & Co., \$4.83 over six-month period; \$5.01 over twelve-month period; Leckie Coal Co., Inc., \$4.65 over six-month period; \$4.73 over twelve-month period; C. H. Mead Coal Co., \$5.04; Pocahontas Fuel Co., Inc., \$4.58.

Thirty thousand tons run of mine for delivery at Boston—W. C. Atwater & Co., \$5.89, F. A. S. contractor's barges; Brinker Coal Co., \$5.94; Castner, Curran & Bullitt, \$5.89; Dexter & Carpenter, \$6.56 for delivery over six months, \$6.62 over twelve months; Eastern Fuel Co., \$7.02; Steamship Fuel Corporation, \$6.85; David E. Williams & Co., \$6.56 over six months, \$6.70 over twelve months. Fidelity Coal Mining Co., \$6.72; W. A. Marshall & Co., \$7.30; Metropolitan Coal Co., Boston, \$6.73; New England Coal & Coke Co., \$6.55 to \$6.70; Pittsburgh & Shawmut Coal Co., \$6.70; Pocahontas Fuel Co., Inc., \$6.13; Quemahoning Coal Co., \$7.55; Maritime Coaling Co., \$6.20; Seiler Coal Co., \$6.26.

### Bids Plentiful at New York

Fifty-four thousand five hundred tons run of mine, for delivery at New York—W. H. Bradford Co., \$5.07 to \$5.27; Davis Coal & Coke Co., \$5.28 to \$5.45; Dexter & Carpenter, \$5.20 to \$5.44; Eastern Fuel Co., \$4.86 to \$5.81; Emmons Coal Mining Co., \$4.84 to \$5.09; S. Smith Coal Co., \$5.72 to \$5.99; Steamship Fuel Corporation, \$4.70 to \$5.05; Titan Fuel Corporation, \$4.79 to \$4.99; West Virginia Co., \$5.01 to \$5.39; Fidelity Coal Mining Co., \$5.01 to \$5.42; H. B. W. Haff, \$5.89; Hillman Coal & Coke Co., \$5.62 to \$5.83; W. C. Huber & Co., \$4.86 to \$5.17; Johnstown Coal & Coke Co., \$4.97; W. A. Marshall & Co., \$5.47 to \$5.67; Maryland Coal & Coke Co., \$5.09 to \$5.27 at Navy Yard; Quemahoning Coal Co., \$5.27 to \$5.40; Seiler Coal Co., \$4.89 to \$5.18.

Thirty thousand tons run of mine, for delivery at Philadelphia Navy Yard—W. H. Bradford Co., \$5.09 to \$5.37; Campbell Coal & Coke Co., \$4.80 to \$5;

Campbell, Peacock & Kimball, \$5.12 to \$5.27; Cosgrove & Co., \$5 to \$5.03; Davis Coal & Coke Co., \$5.03 to \$5.17; Dexter & Carpenter, \$4.98; Eastern Furnace Co., \$5.39 to \$5.59; Emmons Coal Mining Co., \$4.83 to \$4.98; Southport Coal Mining Co., \$5 to \$5.17; Steamship Fuel Corporation, \$5.01 to \$5.45; J. Tatnall, Lee & Co., \$4.94; Walcore Coal Co., \$4.87 to \$5.05; Weston, Dodson & Co., Inc., \$5.39; West Virginia Coal & Coke Co., \$4.53. David E. Williams & Co., \$4.96; Fidelity Coal Mining Co., \$4.97 to \$5.09; Hillman Coal & Coke Co., \$5.22 to \$5.37; W. M. Hollenbach, \$4.39 to \$4.53; W. C. Huber & Co., \$4.64 to \$4.84; Logan Coal Co., \$5.29 to \$5.48; W. A. Marshall & Co., \$5.25 to \$6.10; Maryland Coal & Coke Co., \$4.53 to \$4.65; Morrisdale Coal Co., \$4.54 to \$4.69; Quemahoning Coal Co., \$4.70 to \$4.88; Seiler Coal Co., \$4.69; Seaboard Fuel Corp., \$4.72 to \$4.87.

Thirty-five thousand one hundred tons run of mine, for delivery at Annapolis—Cumberland Coal Co., \$5.52 to \$5.72; Davis Coal & Coke Co., \$5.39 to \$5.558; Dexter & Carpenter, \$5.88 to \$6.11; Eastern Fuel Co., \$5.93; Steamship Fuel Corp., \$5.47 to \$6.94; West Virginia Coal & Coke Co., \$5.20 in cars; Fidelity Coal Mining Co., \$5.31 to \$5.61; Hall Bros. & Co., \$5.14 to \$5.44; Hillman Coal & Coke Co., \$6 to \$6.15; W. C. Huber & Co., \$5 to \$5.19; Johnstown Coal & Coke Co., \$5.46 to \$5.66; Quemahoning Coal Co., \$5.35 to \$5.49.

Fifty thousand tons run of mine for delivery at Washington, D. C.—W. C.



C. E. Bockus

Newly elected treasurer of the National Coal Association, in which office he succeeds S. Pemberton Hutchinson, the new president. Mr. Bockus also is president of the Clinchfield Coal Corporation, Dante, Va.

Atwater & Co., \$2.24; C. G. Blake, \$5.19; Brinker Coal Co., \$4.56; Chesapeake & Virginia Coal Co., \$2.21; Cumberland Coal Co., \$5.42; Davis Coal & Coke Co., \$5.28; Dexter & Carpenter, \$5.25; Eastern Coal & Export Corporation, \$5.36; Eastern Fuel Co., \$5.64; Emmons Coal Mining Co., \$4.96; L. A. Sneed Co., \$4.90; Steamship Fuel Corporation, \$5.47; White Oak Coal Co., \$5.30; David E. Williams & Co., \$5.18; Fayette Smokeless Fuel Co., \$4.99; W. C. Huber & Co., \$4.79; Johnstown Coal & Coke Co., \$5.08; Leckie Coal Co., Inc., \$4.97; Lick Run Coal & Coke Co., \$4.96; Logan Coal Co., \$5.51; W. A. Marshall & Co., \$5.27; A. T. Massey Coal Co., Inc., \$2.35 f.o.b. mines; New River Coal Co., \$2.52 f.o.b. mines; Quemahoning Coal Co., \$5.19; Seiler Coal Co., \$4.98.

### Figures Close for Indian Head

Twenty-eight thousand tons run of mine for delivery at Norfolk, Va.—Md.—W. H. Bradford Co., \$5.52; Brinker Coal Co., \$5.49; Cosgrove & Co., \$5.63; Davis Coal Company, \$6.05; Dexter-Carpenter Company, \$5.82; Eastern Fuel Co., \$6.41; Emmons Coal Mining Co., \$5.61; South Port Coal Mining Co., \$5.82; Steamship Fuel Corporation, \$6.04; Weston, Dodson & Co., Inc., \$5.97; David E. Williams & Co., \$5.75; Seaboard Fuel Corporation, \$5.54; Fidelity Coal Mining Company, \$5.78; Hall Bros & Co., \$5.71; Johnstown Coal & Coke Co., \$5.93; Logan Coal Co., \$6.08; W. A. Marshall & Co., \$6.06. Maryland Coal & Coke Co., \$5.98; Seiler Coal Co., \$5.77; Fayette Smokeless Fuel Co., \$5.16; Fort Dearborn Coal Co., \$5.35.

Twenty-five thousand tons run of mine, for delivery at Norfolk, Va.—W. C. Atwater & Co., \$2.24; Black Diamond Coal Mining Co., \$6.78; C. G. Blake, \$5.32; Chesapeake & Virginia Coal Co., \$2.22; Crozier Pocahontas Coal Co., \$5.18; Dexter & Carpenter, \$4.81; Eastern Coal & Export Corporation, \$5.18; L. A. Sneed Co., \$5.03; W. H. Brown Coal Co., \$5.37.

### Hoover Urges Rail Mergers To Lower Coal Rates

Consolidation of railway properties as provided for in a bill introduced by Senator Cummins, Iowa, was indorsed by Secretary Hoover May 21 before the Senate Committee on Interstate Commerce.

Mr. Hoover said the plan would result in more equitable rates, as the rate structure could be reorganized without disturbing the present earning levels of the roads. It would permit relief in lower rates to agriculture and coal, he believed, by imposing a heavier burden on finished goods.

The most important preliminary to railway consolidation, Secretary Hoover declared, is the passage of such a law as that proposed by Senator Cummins, as the chief essential now is affirmative action by Congress. He suggested that neither the Interstate Commerce Commission nor Congress should do anything final in that direction, however, until the public had had opportunity thoroughly to consider and discuss whatever consolidation plan the commission may recommend.



## West Virginia Institute To Discuss Stray Current, Shooting and Explosions

Methods of preventing the occurrence of stray current in coal mines will be described by E. E. Jones, superintendent, E. E. White Coal Co., Glen White, W. Va., at the meeting, June 17 and 18, of the West Virginia Coal Mining Institute, which will be held at Elkins, W. Va. Other notable addresses will be one by Charles M. Means, consulting engineer, Pittsburgh, Pa., on "Grounding of Electric Coal-Mining Machinery"; Engineering and Accident Prevention," by Newell G. Alford, mining engineer, Pittsburgh, Pa.; "Abuse of Explosives," by Arthur La Motte, E. I. DuPont de Nemours & Co., Wilmington, Del.; "Explosion Hazards in Coal Mines," by J. W. Paul, mining engineer, U. S. Bureau of Mines, Pittsburgh, Pa.; "Rock Dust as a Preventive of Coal-Dust Explosions," by Captain E. Steidle, supervisor, co-operative mining courses, Carnegie Institute of Technology, Pittsburgh, Pa., and "The Value of the Local Mining Institute" by Bruce S. Davis, chief engineer, Logan County Coal Corporation, Lunda, W. Va. J. J. Rutledge will lead the discussion of Mr. Means' paper. On the night of June 17 a banquet will be held, and during the course of the meetings, a visit will be made to the mine of the West Virginia Coal & Coke Co., where the "V" system of mining and conveyor haulage is in operation.

## Urges Economy by Railroads In Use of Fuel Coal

Greater economy in the use of fuel coal by the railroads of the country was urged by R. H. Aishton, president of the American Railway Association, in an address before the International Rail Fuel Association, in Chicago, May 26.

"In 1923, when the railroads carried the largest freight traffic in their history," said Mr. Aishton, "it required 160.2 lb. of coal turned into steam to move one gross ton of freight a thousand miles or a thousand gross tons one mile. This was 2.8 lb. less in 1922 and 1.8 lb. less than in 1921.

"If the railroads used 1 lb. less of coal per ton hauled this year than was used in 1923 and moved the same ton mileage as in 1923, it would mean a total saving of \$3,165,000 in the fuel bill of the carriers in 1924 on the basis of the prevailing price of coal.

"In the last decade every known appliance for effecting economy has been installed on new locomotives, and to a very large extent on locomotives as they go through the shops, and while I won't undertake to say what the total expenditure has been, in the matter of superheaters alone it runs up over \$150,000,000 of capital expenditures, to say nothing of all the appliances that promote economy both in labor saving and in consumption of fuel.

"I think what we must immediately attack is the problem as it is, the tools as they are in our hands today, and by the application of knowledge, initiative and a desire to bring about accomplishment get an immediate result."

## Will Idle Miners Get Aid?

In many union fields which have signed up their operators on the Jacksonville basis, appeals are being made to Intentional headquarters for aid for the workless. The most recent appeal is from the miners of Kansas, who "won" from their employers on May 3. Having done the bidding of International President Lewis, they found that practically none of the mines was able to run, so their victory was hollow. On May 18 they petitioned Lewis for financial aid. Locals in the Pittsburg (Kan.) district are voting on a proposal that every man who works five days a month be assessed \$1 a week to aid the others. About 2,000 in that region are working while 7,000 are jobless. The problem of aid for the workless is a live one in Illinois, where tremendous pressure is brought on state officials to break down the District 12 rule against issuing such aid.

## Illinois Miners Vote Against Out-of-Work Benefits

Extending their biennial convention into its third week, Illinois miners deprived their president of the appointive power and decided by a vote of 369 to 130 that the finances of the district are in no condition to permit payment of out-of-work benefits. The resolution turning down the proposal for benefits reads as follows: "Owing to the large number of members now idle, we are unable to devise any means of raising finances that would make possible the payment of out-of-work benefits and therefore decide against paying same."

Approval of the three-year wage agreement reached at Jacksonville, Fla., was obtained over a strong minority opposition, which insisted that the shorter work day would solve the district's unemployment problem. President Frank Farrington denounced the 6-hour work day as impractical at this time. "The 6-hour work day," he said, "would stop every mine in the Central Competitive Field if it effectively replaced the 8-hour day at the same wages."

Earlier in the convention a resolution was adopted instructing the legislative department to co-operate with the American Federation of Labor in getting a federal law providing for unemployment compensation "out of industry."

Two proposals for old-age pensions also were offered. The first would tax every member \$2.25 a month and pay every miner who is 60 or over and who has worked 15 years continuously \$25 a month. The second plan would pay the same to miners 65 or over who have worked 20 years continuously, and would tax the members \$1 a month. It was reported that there are more than 4,301 miners over 60 in Illinois. Assessments would start July 1, 1924, and payment of the pension begun July 1, 1925.

## Walsh Wants More Inspectors At Same Outlay

At a conference in Wilkes-Barre, Pa., last week twenty-one mine inspectors from various sections of the anthracite field discussed a proposition submitted by Joseph J. Walsh, Secretary of Mines, calling for reorganization of the State Inspection Bureau which would provide twenty additional inspectors without increased expense.

The reorganization plan calls for the division of the state into a smaller number of inspection districts, the reduction of salaries of some of the present inspectors, and appointment of twenty additional men. While the plan was received with favor by the mine inspectors, no action was taken. It will be presented to the bituminous inspectors before it is put into effect.

At present Mr. Walsh has fifty-five inspectors in the anthracite and bituminous fields, each presiding over an inspection district. With a smaller number of districts, each district would be in charge of a chief district inspector, and working under him would be a senior and a junior inspector.

The inspectors went on record as favoring legislation to compel the firing of blasts in the mines by electric batteries instead of fuses and squibs, as a safety measure.

The following anthracite inspectors attended the conference sessions: August McDade, of Taylor; Frank Kettle, of Nanticoke; S. J. Phillips, of Scranton; P. J. Moore, of Carbondale; M. J. Brennan, of Pottsville; C. J. Price, of Lykens; P. J. Friel, of Shamokin; J. J. Corgan, of Kingston; J. J. Stickler, of Hazelton; I. M. Davies, of Lansford; J. C. Reese, of Scranton; Evan Evans, of Coaldale; L. M. Evans, of Scranton; B. I. Evans, of Mt. Carmel; D. J. Roderick, of Hazelton; William Reid, of Centralia; T. J. Williams, of Kingston; Archibald B. Lamb, of Shenandoah; P. J. Fenton, of Mahanoy City; D. T. Williams, of Scranton, and E. C. Curtis, of Kingston.

## Ruhr Coal Miners Reject Proposed Mediation

The four German miners' unions have voted to reject arbitration proposals recently made in Berlin as a means for settling the dispute that resulted in a lockout at the coal mines in the Ruhr. The rejection was voted because the proposals failed to provide pay for overtime. The belief is that the operators will favor the arbitration proposals rendered through the mediation of Minister of Labor Brauns, and that the lockout will continue.

While the miners agreed to accept the covering schedule regulating wages they are holding out for recognition of their demands for overtime. They assert that they are willing to work in order to enable Germany to carry out the obligations imposed by the "Micum" accord and accuse the operators of arbitrarily keeping them from work.

The miners' unions warn members against yielding to Communistic propaganda, which is declared to be attempting to incite lawlessness throughout the Ruhr Basin.



## J. G. Bradley Foresees Readjustment of Three-Year Wage Agreement

Alternative, He Thinks, Is Production Only During Maximum Demand by Mines Affected—Sees Investigation of Freight Differentials as Effort to Combat Non-Union Competition

Pleading the cause of the non-union operator and at the same time branding Governor Gifford Pinchot, of Pennsylvania, a political coward, J. C. Bradley, president of the Elk River Coal Co. and former president of the National Coal Association, aroused the members of the National Association of Manufacturers to a high pitch of enthusiasm May 21 at the annual convention of the association in New York City.

Touching upon the overdevelopment "which has been very much emphasized by union leaders and by the Coal Commission," Mr. Bradley said it is to the interest of the miners' leaders to get as many men on the union rolls as is possible and hold them there. Unionization of the coal industry or any other industry, if intelligently conducted, he said, would be to the great advantage of those industries, "but I have never seen it intelligently done."

Stating that the public has been led to believe that the coal industry is controlled by a few men who fixed the price and struck the profits in their pockets, Mr. Bradley declared there are more coal mines and coal-mining companies today on the verge of bankruptcy than have ever been known in any industry in this country.

### Urges Competitive Wage Scale

Mr. Bradley contended that the best way to reach the right wage scale is by open competition within the labor market, saying that if "you pay too little, men won't come and work for you; if you pay too much, you can't stand competition. We are not only not guaranteed, but we are not even given that open competition in a large part of this industry today. We see two-thirds of the producing territory tied up to a rate of wages which has shut down those plants. Most of the coal which is coming to the market today is from the non-union fields.

"And this wage agreement which we have seen heralded by the political crowd as being a settlement for three years is by no means a settlement. What working man would agree to a settlement which would shut him out of work for three years? Either the coal fields of those northern states are going to produce coal only in the time of maximum demand, or else the miners in that section of the country are going to demand a readjustment of this agreement."

Telling the manufacturers that the only assurance they have of getting coal at a reasonable price above the cost of production is the non-union fields, Mr. Bradley continued:

"You can't get hard coal, you can't get your domestic fuel except at a price which is fixed by the United Mine Workers and the anthracite operators

and the Governor of Pennsylvania. And you have got to remember the political commission that you are paying to the Governor of Pennsylvania.

"When he made that award, it was so against the facts that the only deduction that could be drawn was that he was giving a subsidy to the organized hard-coal miner."

Stating that if the non-union operator is able to co-operate with his men on one side, whereas the union operator can't, the chances are that he will be able to co-operate with the consumer rather than the union operator.

Referring to the application before the Interstate Commerce Commission to change the freight differentials between the union district north of the Ohio River and the non-union districts to the south, Mr. Bradley said the reason for the application was that the union operator in his struggle with organized labor has failed.

### Jacksonville Scale "Uneconomic"

"He has signed a wage scale which is uneconomic," he declared, "which is higher than he ought to have signed. He forgot that he was a quasi-trustee for his consumer; that he should have protected him and refused to sign that agreement. And now, having thoroughly messed the thing up, he is going to the Interstate Commerce Commission asking that freight rates be so readjusted that those who declined to sign—who didn't haul down their flag, who stood out for the open shop and free competition—shall have any advantage therefrom taken away from them."

"This particular case only asks for a readjustment in regard to rates on lake coal, but it is the entering wedge. When the principle in that case is established, when that differential has been widened so that the coal from the Central Competitive Field can get to the consumer at an advantage over their competitors in the non-union fields, then the same thing will be asked on every other rate north of the Ohio River."

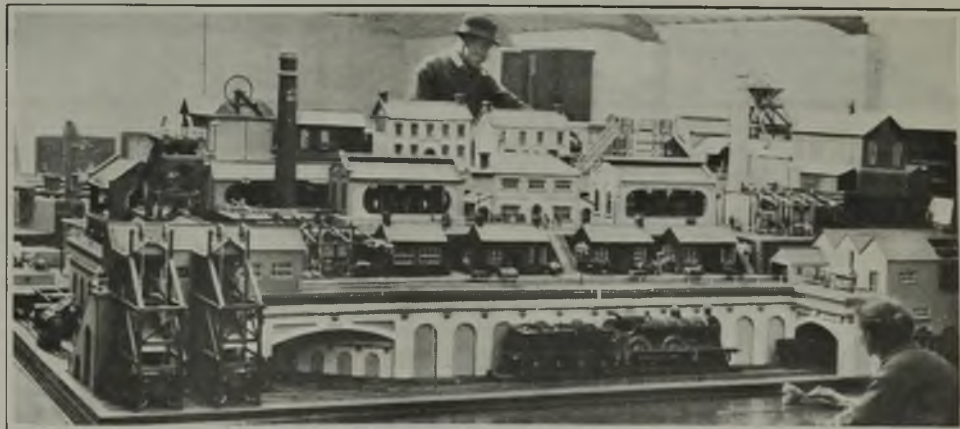
### Here's a Wet Mine!

The normal product of a coal mine in most states is coal, but you can't always tell about Oklahoma. That was the state in which an oil well produced ordinary, useless "wind gas" which turned out to be priceless helium. So there is less surprise in the news that a handful of investigators for the Volstead department of the state government got to prying around a coal mine near Scales, May 18, and found the mine was yielding quite a volume of beer. The officers arrested Sam Courtney, owner, and charged that he had beer down the shaft and was loading it out through the office. The officers' report showed not a single "no bill" on track.

### Much Talk of Hazard Mergers

At least two consolidations of mine groups in the Hazard field of Kentucky are now discussed vaguely. One, aimed to effect the merger of about twenty-five mines, is making slow progress while the six or seven mine owners talk of valuations and stock distributions in the proposed consolidation and while the fate of the three Jewett, Bigelow & Brooks mines and the three Maynard mines, now in the hands of receivers, is decided. The six may be purchased by any one of several interests now bargaining for them, and may thus be brought into a merger if a merger is possible after a purchase is made.

The other consolidation is reported in indefinite language by P. B. Ver Planck, of Chicago. Mr. Ver Planck says that a large Chicago coal consumer has already reached an agreement with the owners of fifteen Hazard mines within a radius of 14 miles to buy the group and will complete the deal within the next forty-five days. Thus he says this interest will acquire the heart of the No. 4 Hazard seam and will re-equip most of the mines, install mechanical loaders where it is practicable, and otherwise rehabilitate the properties. A selling agency to handle part of the output on a commercial basis is already in existence.



Coal-Mine Model at Wembley Exposition

This working of the Treherbert Colliery, which forms a part of the British Empire Exhibition, took twenty years to construct. It is the work of Mr. and Mrs. William Phelps, who are shown in the illustration.

Wide World Photos





## Practical Pointers For Electrical And Mechanical Men



### Waste Saturating Tank For Mine Service

The most common method of lubricating the bearings of locomotives and mine-car journals is by means of oil and waste. To get the best results, the waste should be well saturated before it is packed in the oil wells. This is done by soaking the waste for a certain definite time in oil and then setting it aside to drain.

The materials used for this work should be a clean, long-fibre wool waste and a good reliable grade of neutral mineral car oil. Such waste will absorb about four times its weight of mineral oil.

#### SOAK WASTE FOR 24 HOURS

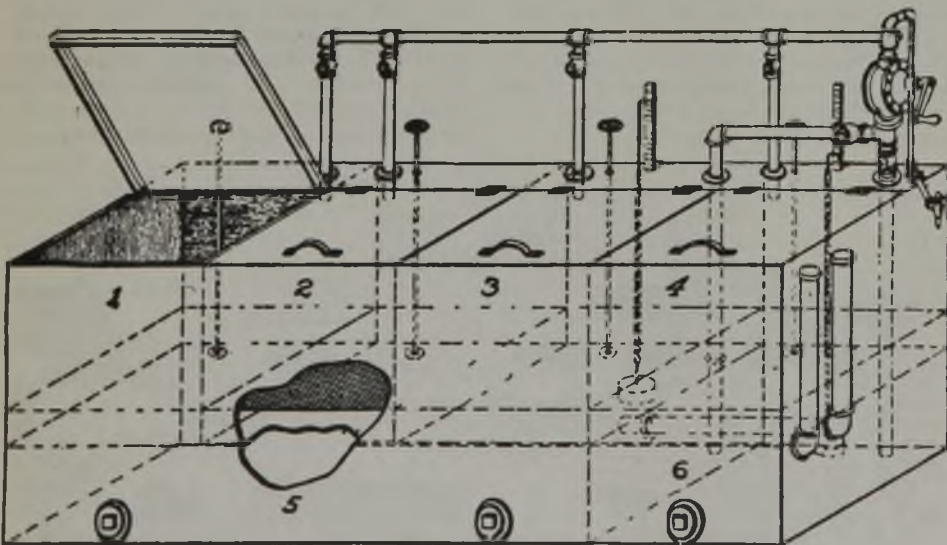
The waste is placed in a closed can or tank of oil and left to soak for at least twenty-four hours. During this process, some companies apply heat, thus reducing the time required to saturate the waste. The waste is then lifted out of the oil and placed on a screen or grid and drained until all excess oil has dripped off. This draining takes about twenty-four hours, after which the saturated waste is placed in closed cans ready to be packed in the oil wells.

A very convenient and efficient tank, designed for doing this work, is shown in the figure. The dry waste is placed in sections 1, 2 and 3, and the fresh oil in section 5. By means of the pump on top of the tank, the oil from section 5 is lifted into chambers 1, 2 and 3, which are filled with waste. After the waste has thoroughly soaked for

twenty-four hours, the oil is drained back into tank 5, and used again. About twenty-four hours after the oil is drained off, the waste is ready for use. Chambers 4 and 6 are used to re-saturate old waste. The oil used for this purpose is kept separate from the new oil. Large clean-out plugs are provided for both oil chambers, which are also fitted with float gages to indicate the amount of oil in them.

A very simple and cheap tank can be made with one or more chambers, having a screen or grid shelf about half way down on which waste is placed to drain after being saturated. The dry waste is placed in a wire basket and immersed in the oil contained in the lower half of the tank. When thoroughly soaked, the basket is lifted out the shelf and the oil drains off.

One large company has in operation a very successful tank which supplies waste for 1,600 cars. Their system consists of two tanks, approximately three feet wide, four feet long and two feet deep, with drain boards on both ends. New waste in one tank is used for armature bearings and old waste in the other is for use in axle bearings and journal boxes. The tanks are of double wall construction, a hot water jacket being used to keep the oil at an even temperature of approximately 120 deg. F. Each tank holds about 75 gallons of oil and 110 pounds of waste. The waste is left in the tanks three hours, after which it is removed and left upon the drain board several hours until ready to be placed in containers for transportation to one of the repair shops or lubricating centers.



Tank Where Wool Waste Can Be Thoroughly Saturated

Oil is pumped from compartment 5 into compartments 1, 2 and 3, and there it is poured over the waste. The excess oil is drained off through the screen at the bottom of the upper compartments. Sections 4 and 6 are used for re-saturating old waste. Steam coils may be used to make the oil flow more freely and thus increase the saturating capacity or effectiveness of the tank.

### Instrument Records Abnormal Voltage Surges

Because of the high frequency of abnormal voltage surges, it has always been very difficult to obtain detailed information concerning them. Ordinarily, the cause of such surges is unknown and, as a result, information regarding such sudden impulses is rather limited, leading to questionable conclusions about their cause, effect and remedy.

To record such abnormal voltage surges on transmission lines the Klydonograph has recently been developed by J. F. Peters, of the Westinghouse Electric & Mfg. Co. This instrument makes a graphic record of voltage surges of extremely short duration, indicating at the same time the polarity, magnitude, and steepness of the waves.

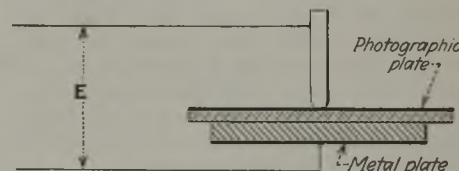


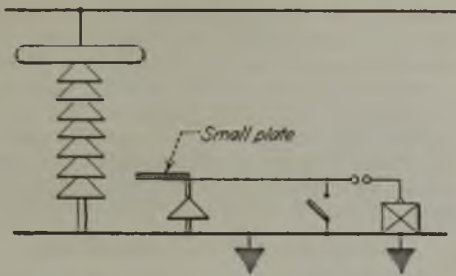
Fig. 1—Diagram of Klydonograph

This instrument consists of a photographic plate which, when developed, shows the shape of the high voltage surge impressed on the instrument.

The principle of operation depends upon a discovery made in 1777 by Dr. Lichtenberg, who found that if he discharged a condenser, such as a Leyden jar, across a spark gap onto a terminal in contact with an insulating plate placed between the terminal and a ground plate, and then removed the terminal and sprinkled powder over the plate, the small grains of powder would arrange themselves in a peculiar appearing figure. Later, it was found that by using a sensitized photographic plate, the emulsion in contact with the terminal showed the same peculiar figure when developed.

The new instrument in its simplest form is indicated in Fig. 1. If a voltage is impressed between the terminal and the ground plate, as at *E*, figures will appear on the photographic plate that give pertinent information concerning the nature of the voltage impressed. If, for instance, the voltage is in the form of a surge that is unidirectional, with a sheer front or a tapered front, the figure on the photographic plate will differentiate between the tapered front and the abrupt front, and it will also indicate whether the surge was of positive or negative polarity. The size of the figure also gives the magnitude of the surges, although the positive and negative figures have quite





**Fig. 2—Instrument Operated by Clock**  
When equipped with a clock, this device shows the exact time of any line disturbance.

different proportions. Usually the figures for the positive surge are considerably larger than those for the negative surge of the same magnitude.

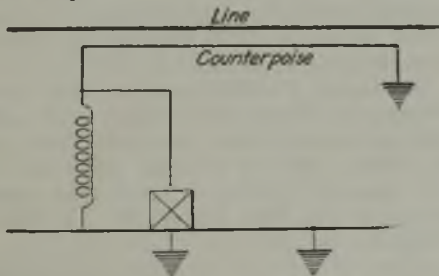
For practical use, the instrument is made continuously operative and is capable of recording the exact time of the occurrence of any disturbance. Fig. 2 shows an instrument suitable for such applications. This device makes use of a 10 x 12 in. plate in a special plate holder. The moving parts are driven by a clock that makes one complete revolution in 24 hr. The device is practically a zero-current instrument and therefore can be connected to the line electrostatically. This makes it possible to use the instrument on high voltage lines without introducing the hazard of an insulation breakdown.

Fig. 3 shows the connection used to measure the steepness of the voltage wave. A counterpoise is run underneath or alongside the transmission line for 1,000 or 2,000 ft. with the far end connected direct to ground and the near end grounded through a high impedance. The Klydonograph is then connected between this balancing wire and the ground.

**MEASURES STEEPNESS OF WAVE**

The voltage induced in the counterpoise is a measure of the steepness of the current wave, and since the current wave and the voltage wave have exactly the same shape, it gives a measure of the steepness of the surge front. By comparing simultaneous readings of the instruments, one connected to the line through the electrostatic potentiometer and the other to the counterpoise, the following information concerning the surge may be obtained: Magnitude, polarity, steepness of front, and the direction in which the surge is traveling on the transmission line.

Magnitude and polarity are obtained directly from the first mentioned instru-



**Fig. 3—How Instrument Is Connected to Measure Steepness of Surge**

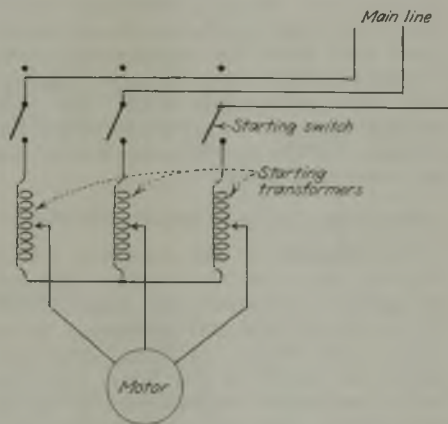
The counterpoise, run parallel to the transmission line, operates the instrument. In this way, it is possible to get the characteristics of the surge wave without connecting any recording devices directly to the line wires.

ment, steepness of front directly from the second, and from the relative polarity of the two figures, the direction in which the surge is traveling may be obtained. If the polarity of the two figures is the same, the surge is of the same polarity and is traveling in the direction fixed by the manner in which the recorders are connected to the system.

If the figures are of different polarity, the surge is of the polarity indicated by the recorder connected to the potentiometer and is traveling in the opposite direction from the one previously mentioned.

**Quick Repair to Important Fan Motor Starter**

Many accidents and delays due to the breakdown of electrical equipment are really far less serious than those which happen to mechanical apparatus. The reason why a small electrical failure creates an impression in the mind of the operator that something very serious has happened is mainly due to a lack of knowledge of electricity. If the men at the mines would try to understand their work a little bit better, I am sure that many a so-called serious delay will seem like nothing out of the ordinary.



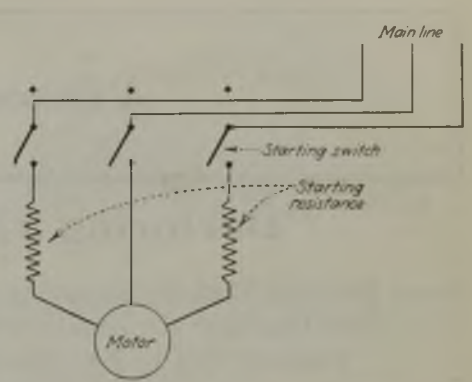
**Fig. 1—Transformer Connections to Motor**

When the starting panel was destroyed it was impossible to make a quick repair to the transformers and get the fan motor going again.

However, it is interesting to see how quickly some electricians work and here is an example showing how simple and easy it was for one to solve what appeared to be a very perplexing problem to the mine foreman.

The starting panel connected to the alternating-current fan motor driving the only fan at one of our mines was damaged. The starting transformers were completely destroyed and the motor had stopped.

It was still early in the day when the mine foreman learned that the fan had stopped. The miners had been at their places for a few hours and all the company day men had gone inside the mine and were at work. To shut down the mines for the remainder of the day would have meant a loss of tonnage and nearly a total loss of the overhead charges for the day, because the men had started work and would have had to be paid for nearly a full day.



**Fig. 2—Starting Resistance in Circuit**

Several banks of locomotive resistance were placed in the circuit. In this way the starting voltage for the motor was sufficiently reduced to prevent a high inrush current and the motor was started just as smoothly as with the usual starting transformers.

Soon after the electrician arrived he saw that it was impossible to repair the starting transformers which were connected as shown in Fig. 1. All three transformers had been badly burned by the heavy current.

The power supply to the fan motor was 440 volts. The electrician quickly reasoned that he could soon have the motor running if some means could be provided to reduce the line voltage sufficiently to provide a reasonably low starting current. I suppose he said to himself, "the transformers reduced the line voltage, therefore resistance in the circuit will do the same thing."

**RESISTANCE USED FOR TRANSFORMERS**

No 440-volt resistance was available but the electrician knew that 250-volt locomotive resistance was rated high enough to stand 440-volts, so he quickly gathered several banks of locomotive resistance together and connected them into the starting circuit of the fan motor as shown in Fig. 2.

By closing a double-pole starting and running switch, first in the starting position and then in the running position, the fan motor was started and the fan kept running the remainder of the day.

There was nothing unusual about this scheme but it only goes to show how many an idle day may be avoided by a little intelligent consideration of a simple electric problem.

ELECTRICAL ENGINEER.

**Pack Locomotive Armature Bearings Regularly**

Even the ordinary type of motor bearing requires efficient lubrication. The waste, preferably wool, is first soaked in a good grade of car oil for about 24 hr., and then allowed to drain, after which it is packed firmly in the axle cap up to and around the bearing window. The axle cap is then filled up to within an inch of the top with waste packed comparatively loose. It is considered good practice to repack these bearings every three months, putting new waste close to the axle. All old waste should be removed about once every year and the bearings repacked with new waste.



## Discussion

### "Doctoring a Sick Industry"

Some Retailers Probably Adulterate Good Coal but the Practice Is Not Only Improper but Fatal to Successful Business—Sickness of Industry Due to Poor Quality and Bad Merchandising

By H. B. BLAUVETT  
Hackensack Coal & Lumber Co.,  
Hackensack, N. J.

UPON reading *Coal Age's* editorial criticism in March 13, page 377, of my anthracite article which recently appeared in the *Printer's Ink*, I thought that "the pot was simply going to call the kettle black" and, having so passed the buck from producer to retailer, let it go at that. Not so. There is real meat in that criticism and I feel that it is intended in the right spirit.

First, there is no battle on between wholesalers and retailers. Our interests are, or should be one: we both want to sell as much coal as possible at a fair profit—with repeat sales! Bad coal qualities make the latter impossible, so we are both interested in the very best quality of coal obtainable.

#### SNOW BIRD RETAILERS TROUBLE TRADE

*Coal Age* raises a good point. There are undoubtedly "snowbird retailers" as there are "snowbird producers," and probably they have indulged in the dishonest practice of mixing the "abominable, unburnable stuff" with good coal. Again reputable producers have common cause with reputable retailers, for are not both interested in cleaning up the industry and putting it on a basis of honest competition where they will not be at a disadvantage.

Let no mind draw a distinct line of cleavage between producer and retailer. Their interests are identical. Each is a direct necessity of the other. Any good producer knows that a live, reputable outlet for his coal is more to be desired than much, very much, pure gold, in fact he is not to be bought.

The solution of the "snowbird retailer" is so simple that his occurrence is not a cause of serious worry. Let the reputable producer make it possible for the reputable retailers to obtain good coal and the "snowbird" will not be able to continue adulterating his good coal if he wishes to stay in business. The public is quicker to discover bad qualities in coal than anything else. The honest retailers try to stand behind their coal and most of them take out unsatisfactory coal immediately upon complaint thereon replacing it with new well-screened coal at no charge. This costs money. The "snowbird" could not afford to keep doing it

Note—E. Blauvett, president Hackensack Coal & Lumber Co., writes that H. B. Blauvett was leaving for England when he received the editorial "Doctoring a Sick Industry." He took it with him and answered it while abroad. This accounts for the delay in making reply.

and if he didn't do it his customers would drop him and go elsewhere.

Such news spreads quickly, and retail trade invariably flocks to the retailer who has the best coal. Make it possible then for the reputable retailer to get good coal, and you will put the "snowbird retailer" out of business. We are heartily in favor of any move to promote quality in coal, in fact, disinterested public inspectors at the retailer's yard sound good to us. A careful reading of the report of the "Coal Commission" will show the quality phase to have been more abused by the "snowbird" producers than the retailers. It is common knowledge in the trade that some producers do adulterate good coal with the unburnable stuff. Unquestionably many reliable retailers took "the unburnable stuff" last year because they had to get something. The pressure of the public was heavy, and the need was pathetic.

#### PRODUCER CANNOT RETAIL HIS COAL

The thought of the producer retailing his own coal is possible but not probable. Let him try the heart-breaking detail of the retail business. A ton here, a ton there, the large coal contracts cut down to the bone, and bad credits with slow collections on top of that. It's a slow and, unless times are particularly favorable, not an especially profitable game. Compared with the results derivable from corresponding effort centered on his producing problems, the operator could not afford to spend his time fooling with retailing.

*Coal Age* aptly hits the nail on the head when it says that popular outcry and legislation would never permit this consolidation. Nor is such a step advisable. The retail end is a distinct business in itself and must be run as such—the continual effort must be to "keep the people pleased," a difficult and sometimes thankless task.

A word more. The last paragraph of the *Coal Age* editorial is the kernel of the whole nut. We agree: Advertising will pay (if not, why then the full-page ads in *Coal Age*?) but advertising is useless unless truthfully used and those used truths are backed up with quality in the advertising article. The causes of "sickness" in the hard coal industry are still two (excluding labor), (1) a poor quality. (2) bad merchandising—including lack of public education through advertising. With proper advertisements, egg and pea can be merchandised and this without breaking down the former to stove

and nut as *Coal Age* tells us on page 407 is being done with egg coal to make its merchandising possible. With advertising, buckwheat can be sold to the general public by teaching the consumer how to burn it. As to the costs of advertising, if the buckwheat market could be slightly stiffened it would be easy to pay the charges.

#### ADVERTISING A TWO-EDGED SWORD

Advertising is a two-edged sword; if strikes make it impossible to ship good coal tell the public so that they will be prepared and know the producers are not at fault. The coal industry has nothing to conceal. Tell all the facts and the public mind will be fair.

If the "companies" can't get together, let them advertise individually. The Philadelphia & Reading and the Lehigh Coal & Navigation Companies have already begun. Let the others follow their good lead. The solution of the hard-coal industry is to produce good coal and sell it all—steam sizes included—with steady educational advertising.

I must say a word in personal defense. You overlook the fact that "What's wrong? Too many mines. Too many miners. Too much seasonal variation in consumption. Too much railway politics," was plainly labelled a quotation from *Collier's Weekly*. Though there seems good sound truth in it I disclaim being the originator of the ideas contained therein.

Second, I am no expert, and make no claims as such. An expert is an unhealthy proposition; he usually says (as did *Coal Age*) "Believe this expert; he knows." The minute a man claims "he knows" it means that he thinks he is too wise to learn. Let us hope that the hard-coal industry is not too wise or self satisfied to learn. The fact still remains that it is an industry characterized by bad merchandising. Let's do our best to clean it up by turning out a good quality of coal and advertising that fact. My plea is for the honest producers and the honest retailers to get together in a common cause and put the coal business back on a sound honorable basis, for no business can survive unless founded upon honesty.

#### Lehigh University, Not Illinois

At the bottom of page 606 of the April 24 number of *Coal Age*, the information regarding Prof. A. C. Callen is somewhat misleading. Professor Callen's "Alma Mater" is Lehigh University, as he graduated from the course in Mining Engineering in June, 1909, receiving the degree of E.M., and the degree of M.S. in 1911.

Professor Callen went to the University of Illinois some years later and was associated with the late Prof. H. H. Stoek, (also a Lehigh E.M. but of the class of 1888), up until the time of going to the University of West Virginia in 1917.

Here at Lehigh, we feel very proud of Professor Callen, and congratulate the University of Illinois upon the selection which has been made for the Deanship of the School of Mines.

HOWARD ECKFELDT.

Prof. of Mining Engineering.  
Bethlehem, Pa.





# Production And the Market



## Inertia Still Pervades Bituminous-Coal Markets; Anthracite Trade Notably Active

The revival in industry promised as the result of surveys in the industrial centers of the country is not yet in sight—at least visible evidence of it is still lacking. If the prophesied upturn bears any relation in size and strength to the so-called breathing spell preceding its inception it ought to be a sizable movement, for except during a labor disturbance the present period of depression surpasses anything of the kind in recent years in the coal trade. Save for a few temporary spurts due to cool weather the prolonged condition of dormance in the markets continues unabated. Running time at the mines shows no appreciable improvement anywhere, production in the southern Ohio field—an extreme example—holding around 10 per cent of capacity. Shipments to tidewater continue to shrink and the demand for lake tonnage is lagging considerably behind that of last year at this time. One of the few bright spots in the trade during April, the export movement at Baltimore, has practically faded out of the picture. May began auspiciously, but after the 2d there was a lapse of seven days before the next cargo cleared, and since the 12th the bottom of the export trade apparently has dropped out completely.

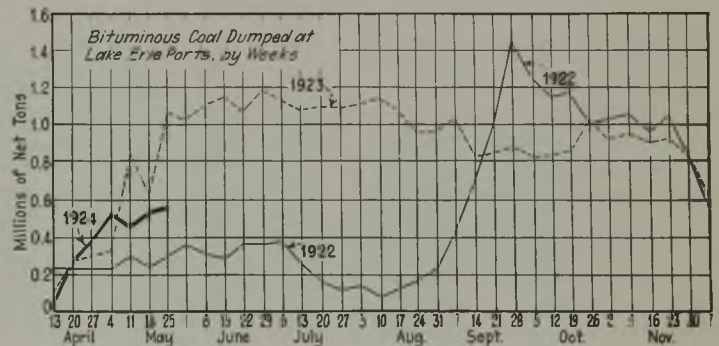
### Navy Bids Bring Out Keen Rivalry

The Navy Department's call for bids on supplying 330,000 gross tons of steaming coal for ships and 438,600 tons of coal for navy yards and other shore stations brought out the keenest kind of competition. Nearly one hundred companies submitted tenders, most of them making offers on a number of schedules. The award of contracts, which is expected to take place this week, may provide the needed impetus to start the market in motion.

Coal Age Index of spot prices of bituminous coal declined 3 points during the week ended May 26, registering 167, the corresponding price being \$2.02.

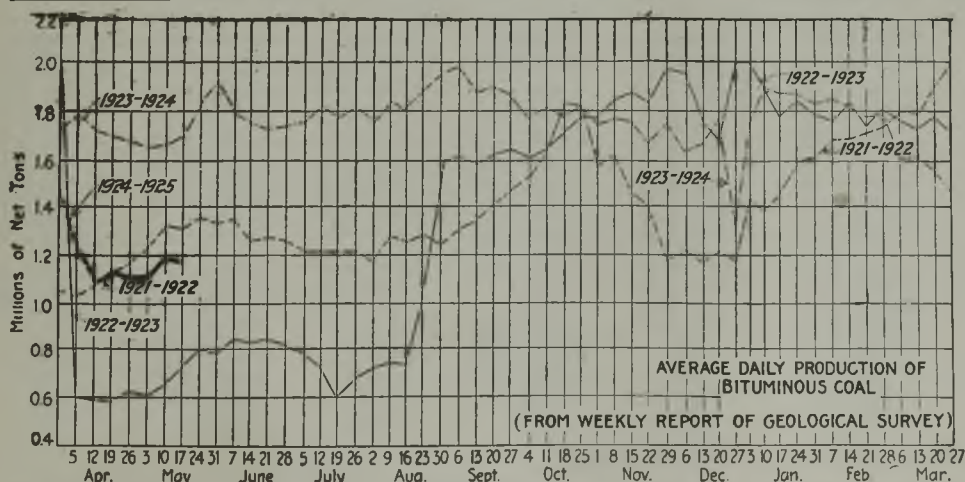
Dumpings at Hampton Roads for all accounts during the week ended May 22 totaled 241,490 net tons, as compared with 261,732 tons dumped during the preceding week. Coal dumped at Lake Erie ports during the week ended May 24, according to the Ore & Coal Exchange, were as follows: Cargo, 529,883 net tons; fuel, 35,478 tons. The totals for the previous week were 523,499 tons of cargo coal and 35,697 tons of fuel coal.

Production of bituminous coal declined slightly during the week ended May 17, according to the Geological



Survey, the output being 7,074,000 net tons, compared with 7,121,000 net tons produced during the previous week. The output of anthracite was 1,895,000 net tons, a falling off of 29,000 tons from the figures for the week ended May 10.

Intermittent labor troubles at large company operations have made it difficult for dealers to obtain as much company anthracite as they desire, with the result that the demand for independent coal is strong and prices are holding firm. The call for stove is still notably strong, playing its part in the activity for egg and chestnut. Production is picking up, and the market is expected to ease up somewhat.



### Estimates of Production

(In Net Tons)

#### BITUMINOUS

	1923	1924
May 3	10,061,000	6,832,000
May 10 (a)	10,175,000	7,125,000
May 17 (b)	10,270,000	7,074,000
Daily average	1,712,000	1,179,000
Cal. yr. to date (c)	207,542,000	183,360,000
Daily av. to date	1,764,000	1,561,000

#### ANTHRACITE

May 3	2,021,000	1,616,000
May 10	1,903,000	1,924,000
May 17	2,045,000	1,895,000
Cal. yr. to date	39,563,000	35,068,000

#### COKE

May 10 (a)	401,000	178,000
May 17 (b)	411,000	182,000
Cal. yr. to date (c)	7,584,000	5,248,000

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



Midwest Buys Some Lump

Unseasonably cold and raw weather throughout the Middle West caused a slight pick-up in the domestic business of that section last week. Many a coal bin that had been swept clean suddenly required another ton, with the result that the leading domestic coals got a dribble of much-appreciated business. A little hard coal moved readily along with the small stocking trade the retailers have been having and the call for smokeless picked up noticeably in view of the shortage of supply that happened to be on hand. Good Pocahontas even rose 15 to 25c. for a day or two as a result of the situation. Midwestern lump and egg also felt the cold a bit.

Generally speaking, however, the dullness of the whole Midwest industry continued. Contracting that was expected soon after May 1 has not yet materialized. Railroads have been signing up some small business at low prices, but industry has been notably backward. Prophecies of late summer industrial improvement have not moved purchasing agents to action yet.

The running time of Midwest mines was improved by a slim margin during the past week, partly because everybody was keen to get all the benefit they could out of the

cool weather and partly because a handful of mines have been opened "for better or for worse" in a determined effort to get business at any price rather than to stay down. Most of these operations have been able to get screenings business, but little else. Crushers have been working more than usual. Good Franklin County screenings move at \$1.90 and weaker grades from the same county bring \$1.75. Central Illinois sells for \$1.50@1.75 and Standard district fines move at less than that.

The St. Louis market is as low as it have ever been. There is no demand worthy of note for anything. In fact anthracite business is duller than most observers thought it could ever get. About the only thing that sells to householders is local coke. Big buyers of steam coal, both city and country, are taking some screenings, but the volume is not great. Wagonload steam business is dead along with domestic. The trade is now looking forward to some sort of improvement immediately after June 1.

Kentucky Drones Along

Things are quite dull in Kentucky. There is a little business from various scattered industries and prospects of some business from retailers, who are taking some stocking orders for future delivery. There has been just a little

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

Table with multiple columns for market quoted prices, dates (May 28, May 12, May 19, May 26), and categories (Low-Volatile, Eastern; High-Volatile, Eastern; Midwest; South and Southwest). Includes sub-sections for various coal types and regions.

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

Table with columns for Market Quoted, Freight Rates, and prices for May 28, 1923 and May 19, 24, and May 26, 1924. Lists various anthracite grades and their prices.

\* 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

Index	1924		1923	
	May 26	May 19	May 12	May 28
Weighted average price	\$2.02	\$2.05	\$2.05	\$2.63

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.

coal moving to domestic consumers and steam plants as a result of several cold days this month. Steam heat in office buildings on May 20 in Louisville is most unusual. However, immediate coal appears to be coming from yard cleaning rather than orders placed with mines.

Railroad consumption is reported fair and there is the usual run of small orders, representing coal moving to industries, utilities, etc., but Lake and Northern buying hasn't opened much as yet. Lower quotations are to be had on western Kentucky, but eastern Kentucky is firm, although some Hazard screenings are quoted as low as 95c., after a period of \$1 or better. Practically no screenings are offered out of the western Kentucky market, but price hasn't advanced, due to the fact that it is now at the mine-run level. Western Kentucky prices range from \$1.65 for mine run to \$2.35 for 6 x 1 1/4-in. egg.

Southern West Virginia mines in both high and low volatile territory are increasing production to some extent. Supply appears to be somewhat in excess of demand, though little distress coal is reported. There is a comparatively light demand at tidewater and yet prices there remain about the same on smokeless owing to the fact that smokeless mines are sending more coal to the lakes. High volatile splint lump is still hard to move.

**Price Cutting in Northwest Eliminated**

A drop in the price of screenings in Youghiogheny and Hocking, which are off to \$3.75 each, and a general tendency to eliminate the cutting reported a week ago featured the market at the Head-of-the-Lakes last week. There is little or nothing doing in either hard or soft coals, however. The price cut in screenings is an equalizing movement and

should not be construed as a possibility of further reductions. Many of the companies are bidding on large lots of coal for the independent mining companies, and in these cases the prices are off list. In one case it is known that 5,000 tons of Youghiogheny lump went for \$5.50, which is 50c. below list.

Receipts at Duluth were lighter last week. Only 18 cargoes entered the harbor. One was of hard coal. Docks are trying to clean old stocks before going into new coal and it is expected that shipments will gradually fall off until about midsummer. The Steel Corporation is bringing up very little because of its stock augmented by the large purchase from the defunct Superior Coal & Dock Co. Total Duluth-Superior receipts thus far this season are 451,660, tons of soft coal and 108,930 of anthracite.

In spite of the cold snap, trade is dull throughout the Northwest, even in small-lot business. Steam-coal buying in Minneapolis is markedly slow with big buyers sitting back with no money to spend. Prices are wabby, especially on rail coal from Illinois. Lump from there is offered all the way from \$2.50 to \$3 with little trade going on. Contracting is slow indeed.

Milwaukee trade is as slow as that of the rest of the country. The few buyers that are in the market are taking coal piecemeal. Manufacturers are buying slowly because their business is dragging. Country trade, both domestic and steam, is extremely sluggish. Anthracite receipts at Milwaukee for the season to date are 108,362 tons, which is up to standard, but soft-coal receipts total only 226,199 tons, which is 40 per cent less than last year.

**West Is Still Sluggish**

There is little activity in the Southwestern district. Few mines are working. The majority of these are shovel mines, capable of supplying the present industrial demand with slack and crushed mine run at \$2.50@\$2.75 a ton. No operators have announced storage prices on Kansas coal, and some say there probably will be no reduction of the present quotations of \$4.50 for lump, \$4 for nut, \$3.50 for mine run and \$2.50 for screenings.

A reduction of 50c. a ton on Arkansas semi-anthracite lump from winter quotations will become effective in June, when reduced freight rates to Missouri River points take effect. There is practically no work in Arkansas now.

The Colorado market continues slow with very little if any demand for other than domestic sizes. Mines worked an average of 19 hours last week and the weekly reports from the operators show that 35 per cent of the working time lost was attributed to "no market." There has been some talk as to a slight advancement in prices, but as yet there has been no change.

Utah operators are low in spirit because practically the entire demand for fuel has dissolved except for a dribble of domestic coal and a little steam coal for the smelters and cement plants. Prices are unsettled. Retailers are trying to get a reduction at the mines so as to make a lower stocking price to their trade. Lump is now \$3.50 and operators feel that that ought to be rock bottom. Mine tracks are burdened with "no bills."

**Tone Improves at Cincinnati**

A much better tone pervades the Cincinnati market than for some time, the feeling being that the worst is past. Lake business is again hitting its accustomed groove about this time of year, when the free movement from the lake ports sets in. Logan County operators are getting the best of the business, more through the fact that they have been able, through low cost of production, to undersell southeastern Kentucky producers.

The coal trade at Columbus shows little change from last week. Steam business is rather quiet, although there are signs of some improvement in the demand, as some larger consumers are nearing the point where they will be forced to replenish supplies. Utilities are buying to a certain extent and some business from iron and steel concerns also is being booked. Contracting is still quiet, as a large number of users are content to buy from the open market rather than to enter an agreement. Most of the contracting reported is simply the renewing of formal contracts. With output reduced there is not so much distress coal on the market and consequently prices are more steady. Domestic trade is still dull. Some Pocahontas and smokeless varieties are moving and there also is a limited demand



for splints. Lake trade shows little strength as far as Ohio coals are concerned. A considerable tonnage is being loaded at the lower lake ports but this is produced largely in West Virginia and Kentucky.

Market conditions at Cleveland are exceedingly poor, inquiries being scarce. Industry is lagging, fuel consumption is correspondingly curtailed, and these conditions, coupled with the inroads being made by non-union fields have produced a depression not experienced in this field in a decade. Little contracting is being done, steam buyers looking to the open market for fuel supplies so far as the immediate future is concerned.

There is no noticeable improvement in the Pittsburgh coal market. Late production reports for the rail mines of the district show 20 to 21 per cent operation, against 18 to 19 per cent early in April. The increase probably is due to some shipments of lake coal by lake shippers who control mines in the district. Line consumption of coal has decreased considerably. Steel-mill operations continue to decline. There is talk among operators of union miners making overtures for reduced wages so as to develop some business, but little credence is placed in such gossip.

Demand at Buffalo is pretty light. There seems to be too much coal, in spite of the sharp cut in production, and too many people selling it.

**General Inertia in New England**

The market for steam coal in New England drags along with no sign of improvement. Shutdowns are the rule in the textile and shoe industries, and other lines share what appears to be a general depression. In no direction is there buying of any moment, and even public institutions in some instances are purchasing only sparing amounts, hoping that during June and July they may be able to obtain lower quotations than now prevail.

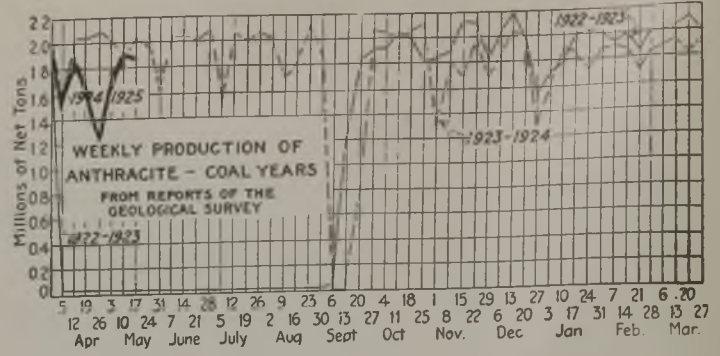
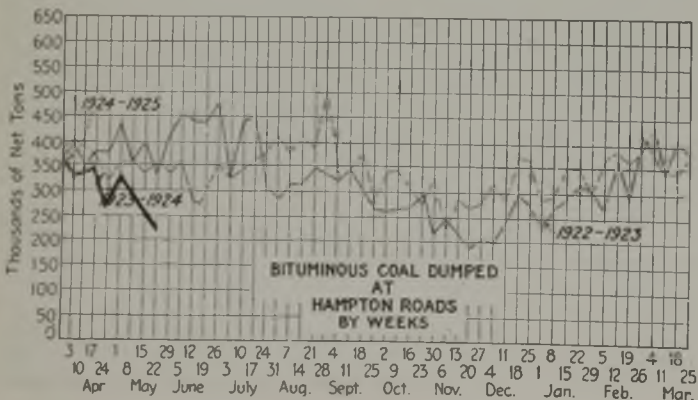
The price level f.o.b. vessel at Hampton Roads varies from \$4.35 to \$4.50 for No. 1 Navy Standard, but next grades have been reported sold at \$4@ \$4.10. Accumulations are not large, but they are sufficient to keep prices below the \$2 per gross ton contract basis. Fair tonnages are moving off shore and along the coast on seasonal arrangements, but for spot business there is next to nothing doing. Factors at this end who rehandle at their own wharves are exerting steady pressure on buyers in order to make room for weekly arrivals, but no one is enthusiastic over results.

For inland delivery prices on cars at Boston, Providence and Portland follow very closely the fluctuating market at Norfolk and Newport News, marine freights, discharging and insurance aggregating about \$1.15. In other words the on-car figure is now about \$5.50 for lots in excess of a few hundred tons, while for anything approaching a comprehensive order the trade has shown a willingness to accept offers down to \$5.35.

All-rail from central Pennsylvania the movement east of the Connecticut River continues extremely light. The same applies to shipments via the Philadelphia and New York piers. Even gas coals are being dumped in relatively small tonnages, and there is a great dearth of orders for coal of any grade at any of the piers.

**Atlantic Seaboard Consumers Indifferent**

Nothing has developed to change the status of the market at New York. Buyers continue indifferent to inducements offered to encourage restocking while transportation is good. Prospects, however, are bright and there is confidence in the immediate future of business. Most of the



coal available to the spot buyer is non-union product. Quotations for coal at tidewater remain steady despite lower receipts and the clearing away of distress tonnage. Cars on hand dwindled to less than 1,000 cars one day during the past week, but a few days later had nearly reached the 1,500 mark. The average was around 1,200 cars.

The market at Philadelphia continues inactive, consumers buying the minimum. It looks as if buying is to be left until coal is absolutely needed. Prices may be said to be holding firm, but only because the bottom has long since been touched. Business at tide is negligible.

The trade at Baltimore continues to plug along at a slow and unsatisfactory pace. Price variations are not extensive at present, for there is not enough active demand to bring up quotations sharply even for specialized coals and quick delivery. Consumers are buying in small lots for immediate needs only and there is practically no storing of moment. The export movement apparently has collapsed.

Business is coming in very slowly at Birmingham and is of comparatively small volume in aggregate. Consumers not having contracts are buying fuel needs in very competitive spot market.

**Anthracite Market Retains Much Strength**

Demand for the domestic sizes of anthracite at New York remains sufficient to absorb all sizes; the call for stove coal has been mainly instrumental in keeping egg and chestnut active. Chestnut continues to be more plentiful than either egg or stove and could be gotten from some shippers below the average quotation of \$9. Egg is nearly as strong as stove, but the demand is a trifle easier and would drop off considerably if the demand for stove became easier. The market for independent coals remains strong largely because of the inability of retail dealers to obtain sufficient company coal to supply the wants of their customers. This is due in large part to labor troubles. However, production is slowly recovering and with more company coal arriving in the New York market an easier situation is looked for. There has been a let-up in the demand for the buckwheat coals. No. 1 buckwheat is considerably easier and only the better grades are bringing top prices. Rice and barley are firmer, while birdseye is moving steadily. Unreasonable weather at Philadelphia has kept the market fairly active. Orders, however, are dropping off. The industrial situation is so unsatisfactory that workers are getting less money on account of curtailed working time.

**Coke Output Slightly Higher**

Coke prices are lower as a result of several important operators reducing wages to the 1917 scale, a cut of about 33 1/2 per cent. The remaining independents will reduce soon. They have had hopes that the Frick company also would reduce, but this seems improbable. After seven weeks of steady decline, the output of beehive coke recovered slightly during the week ended May 17, when, according to the Geological Survey, 182,000 net tons was produced, as compared with 178,000 tons during the preceding week.

**Car Loadings, Surplusages and Shortages**

Week ended	Cars Loaded		Surplus Cars		Car Shortage
	All Cars	Coal Cars	All Cars	Coal Cars	
May 10, 1925	909,187	136,046	324,779	180,888	
Previous week	914,040	127,165	329,489	193,061	
Same week in 1923	974,741	175,088	13,556	3,195	28,316 / 16,67



## Foreign Market And Export News

### British Markets Quiet and Irregular; Inquiry Indicates Better Outlook

The Welsh coal market is quiet and irregular, though the drop in prices has resulted in stronger inquiry for shipment during the next month or six weeks. This slight fillip is, however, somewhat discounted by the delay in shipping as a result of recent stormy weather. The foreign demand is very slow in recovery and the industry as a whole is still in a state of depression occasioned by the slump and the fear of a stoppage.

The downward trend of prices has been to a large extent arrested by the improved inquiry, though some operators are still offering concessions to effect immediate clearances. There has been some slight inquiry from South America, but buyers maintain a hand-to-mouth business. The Egyptian Government and the Sudan railways have ordered Monmouthshire large 100,000 metric tons at 38s. 4½d. and 50,000 tons at 38s. 2d. c.i.f. Alexandria.

The Newcastle market probably is as depressed as it has ever been, though, as in Wales, the demand has improved slightly on account of the lower prices. The Amsterdam gas works is inquiring for 10,000 tons of gas coals, and the Danish State Railway is in the market for 30,000 tons of steams for July to December shipment.

Production by British collieries during the week ended May 10, a cable to *Coal Age* states, was 5,220,000 tons, according to the official reports. This compares with 5,685,000 tons during the week ended May 3.

#### Business and Prices Slump at Hampton Roads

Business at Hampton Roads continues on the decline, with demand slumping and production at mines serving this port falling to a low level. Prices have slipped in keeping with the general trend of business. Lake shipments have begun to pick up, but the

majority of shippers have contracted direct from the mines or are moving coal from their own mines for the lake trade. Coastwise business is improving somewhat, but foreign movement and bunkers show little life.

The tone of the market is extremely dull. Shippers are disappointed over the situation, having expected better business. Buyers, apparently, are not willing to come into the market for more than their immediate needs.

#### French Markets Quieter in Tone In Sympathy with Iron Trade

The French coal market is beginning to feel the influence of the quietness of the iron and steel industry. Not that the French mines are complaining of lack of business, but the demand is less urgent. The demand for house coals has improved somewhat since the beginning of the month.

The summer prices for British anthracites and Ruhr briquets have been established for May only, but for other grades the June rates will be 4 fr. higher than those of May; July, 5 fr. above those of June, and August, 6 fr. above those of July.

Imports from Cardiff have declined noticeably during the past week, in spite of a decrease in the prices at the shipping docks.

Rolling stock has been supplied regularly to the mines, and freight is lower at 22.50 and 22 fr.

Deliveries of indemnity fuels are now averaging 42,700 tons daily. By an agreement just signed by France, Belgium and transport firms for regulating shipments of indemnity fuels by the Rhine, 500,000 tons monthly will be shipped through Strasburg and 350,000 tons through Rotterdam and Belgium.

French coal and lignite production in March totaled 3,772,734 metric tons, against 3,648,878 tons in February. In these two months there were 26 and 25 working days respectively, the daily

average output being 145,100 and 145,955 tons.

During April the O.R.C.A. was supplied with 592,332 tons of coke, or nearly 20,000 tons daily. From April 28 until the lockout the deliveries fell off to about 12,400 tons a day.

#### United States Domestic Coal Exports During April

	(In Gross Tons)	
	1923	1924
Anthracite.....	421,922	245,483
Value.....	\$4,500,531	\$2,679,072
Bituminous.....	1,384,879	942,638
Value.....	\$8,674,885	\$4,651,903
Coke.....	201,788	45,382
Value.....	\$2,405,744	\$324,527

#### Export Clearances, Week Ended May 24, 1924

FROM BALTIMORE		Tons
For Porto Rico:		
Am. Str. Gov. John Lind.....		403
FROM HAMPTON ROADS		
For Brazil:		
Br. Str. Whitegate for Rio de Janeiro.....	6,199	
Br. Str. Saint Dunstan for Rio de Janeiro.....	6,843	
Amer. Str. Robin Hood for Rio de Janeiro.....	8,599	
Br. Str. Hindustan for Rio de Janeiro.....	6,809	
For Canada:		
Nor. Str. Lorentz W. Hansen for Gaspe.....	2,445	
Swed. Str. Freja for Halifax.....	1,506	
For Cuba:		
Br. Str. Havenside for Havana.....	3,290	
For France:		
Br. Str. Hughli for Marseilles.....	5,526	
For Italy:		
Ital. Str. Pollenzo for Civita Vecchia.....	8,468	
For Uruguay:		
Br. Str. Shannonmede for Montevideo.....	5,995	
For West Indies:		
Nor. Str. Mathilda for Fort de France.....	5,487	

#### Hampton Roads Pier Situation

	May 17	May 24†
N. & W. Piers, Lamberts Pt.:		
Cars on hand.....	1,126	1,459
Tons on hand.....	70,178	86,910
Tons dumped for week.....	96,498	82,737
Tonnage waiting.....	10,000	30,000
Virginian Piers, Sewalls Pt.:		
Cars on hand.....	1,215	1,375
Tons on hand.....	84,900	98,950
Tons dumped for week.....	73,295	78,034
Tonnage waiting.....	3,000	10,697
C. & O. Piers, Newport News:		
Cars on hand.....	633	1,356
Tons on hand.....	33,125	67,580
Tons dumped for week.....	63,886	54,855
Tonnage waiting.....	10,485	8,200

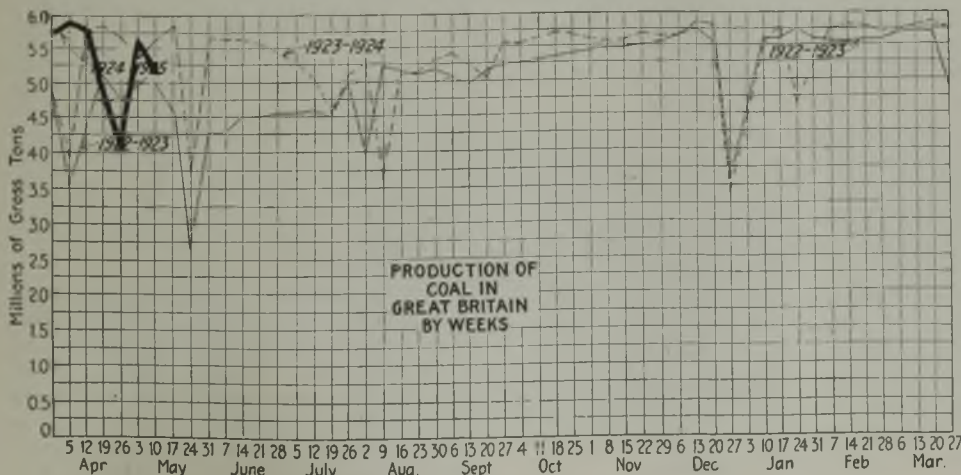
#### Pier and Bunker Prices, Gross Tons

	PIERS	
	May 17	May 24†
Pool 9, New York.....	\$4.85@ 5.00	\$5.85@ \$5.00
Pool 10, New York.....	4.65@ 4.75	4.60@ 4.75
Pool 11, New York.....	4.40@ 4.80	4.40@ 4.50
Pool 9, Philadelphia.....	4.70@ 5.05	4.70@ 5.05
Pool 10, Philadelphia.....	4.45@ 4.80	4.45@ 4.80
Pool 11, Philadelphia.....	4.30@ 4.55	4.30@ 4.55
Pool 1, Hamp. Roads.....	4.40	4.35@ 4.40
Pool 2, Hamp. Roads.....	4.15	4.20@ 4.25
Pools 5-6-7 Hamp. Rds....	4.00@ 4.15	4.00@ 4.10
BUNKERS		
Pool 9, New York.....	5.15@ 5.30	5.15@ 5.30
Pool 10, New York.....	4.95@ 5.05	4.90@ 5.05
Pool 11, New York.....	4.70@ 4.80	4.70@ 4.80
Pool 9, Philadelphia.....	5.00@ 5.40	5.00@ 5.40
Pool 10, Philadelphia.....	4.75@ 5.00	4.75@ 5.00
Pool 11, Philadelphia.....	4.50@ 4.80	4.50@ 4.80
Pool 1, Hamp. Roads.....	4.50	4.35@ 4.40
Pool 2, Hamp. Roads.....	4.25	4.20@ 4.25
Pools 5-6-7 Hamp. Rds....	4.00@ 4.15	4.00@ 4.10

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

Quotations by Cable to Coal Age		
	May 17	May 24†
Cardiff:		
Admiralty, large....	26s@ 28s.6d.	28s.
Steam smalls.....	19s.	18s @ 19s.
Newcastle:		
Best steams.....	26s.	26s.
Best gas.....	25s.	23s.6d. 24s.
Best bunkers.....	23s.	23s.

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







## News Items From Field and Trade



### ALABAMA

The Rainbow Coal Mining Co., Montgomery, has filed articles of incorporation with the Secretary of State. The company will engage in general mining business, having an authorized capital stock of \$100,000, with \$80,000 paid in. Incorporators are Homer F. Baird, Q. M. Selzer and Leonard B. Baird.

The Cahaba Domestic Coal Co., Inc., has filed papers in Birmingham, with capital stock given at \$3,000. The company was incorporated by Eudora, E. J. and E. R. Blackwood, Birmingham, and will engage in coal mining, etc.

Several independent coal companies, including the De Bardeleben and Pratt Consolidated, have reduced wages of miners.

### COLORADO

During April Colorado mines produced 722,424 tons of coal, this being a decrease of 24,693 tons from April, 1923. The total number of men employed in and about the mines in April of this year was 12,943.

### KENTUCKY

The John P. Gorman Coal Co., Lexington, has purchased the property of the Hazard Elkhorn Coal Co., at Sandlick, in Letcher County. The company on May 1 bought the Elk Creek Coal Co. property at Blackey, in Letcher County. The Gorman interests have announced that they planned to materially enlarge the capacity of the Hazard-Elkhorn plant.

According to word reaching Williamson, W. Va., from the Pond Creek mining section of Kentucky, the mines operated by the Henry Ford interests have been closed down and will remain inactive until organizers representing the United Mine Workers leave the field. The mines are operated on an open-shop basis, the scale paid being equal to that fixed by the union. Unsuccessful efforts were made to organize the Pond Creek section about the time the union sought to organize Mingo County miners. Organizers affiliated with the miners' union appeared in the Pond Creek section several weeks ago.

### MINNESOTA

The Colorado Coal Corporation, of Minneapolis, has filed articles of incorporation, capital \$50,000. The incorporators, who are all of Minneapolis, are William J. Hughes, David and Rudolph Christie and Matthias J. Schoeffer.

### OHIO

The Southern Ohio Coal Exchange reports for the week ended May 10 an output of 69,975 tons from 439 mines having a full-time capacity of 644,122 tons. This leaves a shortage of 574,147 tons. Labor shortage was responsible for a loss of 1,700 tons; strikes, 7,250 tons; mine disability, 2,110 tons and "no market" 562,011 tons. During the same week the eastern Ohio field ordered 9,930 cars and loaded 7,878 cars.

Suit has been brought by the Martin Ebersbach Coal Co. and the Peacock Coal Co. against the Great Lakes Coal Co. and the New Pittsburgh Coal Co. to collect \$450,000 alleged due on the sale of certain coal properties to the defendant companies in 1920.

C. H. Winefordner has purchased an interest in the Beverly Coal & Coke Co., a jobbing concern in the Atlas Building, Columbus, and has assumed with R. B. Beverly a part of the active management.

Noah F. Andrews has been appointed a deputy mine inspector by the Ohio Division of Mines and assigned to Hocking County. He resides in Logan.

### OKLAHOMA

All union coal miners of the McAlister area and at Wilburton, Pittsburg County, are idle and the mines not in operation pending settlement of new wage contracts. Approximately 2,500 miners are idle in this district. Representatives of the miners and operators are in conference now and it is expected that new wage contracts will be signed in a few days.

### PENNSYLVANIA

James L. Cooney, general manager of the Scranton Coal Co., was named president of the company by the board of directors May 23 to succeed Frank E. P. Latt, deceased. Mr. Cooney has been an officer of the company for about two years. He is widely known in anthracite mining circles.

An examination for certificates of qualification as mine foreman, assistant mine foreman and fire boss for the First, Sixteenth, Twenty-First and Twenty-Seventh Bituminous Inspection Districts was held in Turner Hall, Sixth Street and McKean Avenue, Charleroi, May 27, 28 and 29, 1924. The examining board was composed of the following: C. P. Byrne, chairman, Joseph Edwards and Michael Timlin, with Alexander McCanch and W. H. Howarth as assisting inspectors.

At recent meetings of the Hudson Coal Co. general grievance committee efforts to call a general strike by alleged radicals in the ranks of the union proved fruitless. The grievances submitted are being adjusted by the company and the Conciliation Board.

Coal loadings in central Pennsylvania have been showing slight gains in May over April, which is regarded as the poorest month of the year. Up to May 17, 28,527 cars were loaded as against 24,366 for the corresponding period of April. Loadings of 50,000 cars are predicted for the entire month.

The mines of the Glen Alden Coal Co. flooded several weeks ago by the Lackawanna River are still being unwatered. Pumps are in operation at several shaft openings. It is estimated it will require at least another month to complete the work and prepare the mines for operation.

The Pennsylvania Coal Mining Institute is planning a big first-aid meet on the Cambria County fair grounds near Ebensburg. President W. A. Swift has appointed the following committee to consider the proposition and make a report at the next meeting of the institute, on June 20: T. J. Davis, John Reed, V. A. Stanton, D. Hopkins and T. A. Stevenson, of Johnstown; J. E. Cheynoweth, of Boswell; James Gatehouse, of Seward, and Isaac Rounsley, of Kelso. A committee composed of F. J. McKernan, George J. Playez and D. L. Boyle was named to obtain a larger and more suitable place for the meeting on June 20, when Floyd W. Parsons, formerly editor of *Coal Age*, will deliver an address.

John Brophy, president of District No. 2, United Mine Workers, has appointed Paul W. Fuller, of Pittsburgh, as director of education of the district. The union's department of education is a new departure and was created at the annual convention held in Altoona in March, last. Mr. Fuller entered upon his duties at the close of the State Federation convention in Allentown last week. For the present, headquarters of the new department will be in the district office building in Clearfield while Mr. Fuller makes a survey of every local in the district which consists of about 50,000 miners. The new department will co-operate with the department of education of the Pennsylvania Federation of Labor.

The Bethlehem Mines Corporation, with extensive operations at Johnstown, Heilwood, Wehrum and Slicksville, all in central Pennsylvania, and at Preston, W. Va., announces that, effective at once, the company's 5,400 miners will be placed on the 1917 scale of 72c. per ton instead of 92c.



Owing to a disagreement between operators and miners over the payment of a 10c. bonus on each ton of coal produced, the greater portion of the Broad Top coal field is closed, with every indication of a long period of idleness unless the union miners relinquish their bonus claim. The wage agreement was not signed by operators in the Broad Top region because the union refused to abolish the bonus, which, it is contended, the United Mine Workers pledged themselves to take out of the wage schedules in that district since April 1, 1918. The union has started to distribute relief and there is a general feeling of satisfaction among the miners.

Indications point to a long-drawn-out strike of all employees of the Lehigh Valley Coal Co. in the Pittston field. The district union officials have made it clear that they will have nothing to do with the strikers or their committees because of the fact that the walk-out is illegal. The company officials will not meet with the men until the collieries are working.

No improvement is observable in the Connellsville coke region. W. J. Rainey, Inc., has put out 300 ovens at the Allison plant, but is still working the Allison mines full. The Lincoln Coal & Coke Co. has closed 400 ovens at Keister, near Uniontown. The Consolidated Coke Co., near Masontown, has reduced wages to the 1917 scale.

Work has begun on the erection of 200 new homes at Shenandoah Heights and families are ready to occupy the houses when they are constructed. The tract is on a mountain over Shenandoah and was sold to the present owners by the Philadelphia Board of City Trusts, which administers the Girard Estate.

The Eastern Fuel Co., of Pittsburgh, announces the appointment of J. M. Gates as resident manager at Philadelphia in charge of sales in the Philadelphia and nearby districts of New Jersey, Delaware and Eastern Pennsylvania. The Prudential Coal Co., which was affiliated with large Canadian interests and with which company Mr. Gates was interested as vice-president, is liquidating its business in the United States. It is expected that the Eastern Fuel Co. will take care of the operating connections, as well as the old customers of the Prudential company. An addition to the sales force of the New York Office of the Eastern Fuel Co. is Edward C. Clark. Mr. Clark is a Yale graduate and a former resident of Boston. The resignation of H. J. Burkey, formerly of the Pittsburgh office of the Eastern Fuel Co., became effective May 10.

Announcement was made Saturday, May 3, of the purchase by the Hudson Coal company, of Scranton, of several lots in Carbondale, Pa., from William T. Carden, for \$14,000; and in Archbald from William R. Gilboy, for \$10,000. An unconfirmed report is to the effect that the land will be used for the erection of homes for colliery superintendents.

W. A. Chandler, formerly consulting electrical engineer of the Hudson Coal Co., Scranton, recently was placed in charge of all the engineering and construction work of the company, including the shops and laboratory.

James D. Sisler, associate geologist, Topographic and Geologic Survey of Pennsylvania, is in the coal fields of western Pennsylvania. During May and June he will study the geologic occurrence of various coal beds and investigate new methods of mining and the use and application of new mining machinery.

Charles F. Barrett has taken the management of the Buena Vista Coal Co., of Butler, with office in the Butler County Bank.

Mine No. 13 of the Pennsylvania Coal & Coke Co., at Hastings, Cambria County, has indefinitely suspended operations, due to the present depression. Employees of the mine are razing the tippie and the pumps and other machinery, which will be transferred to other operations of the corporation.

TEXAS

The State Board of Control of Texas, sitting at Austin, has awarded contracts to supply the various state institutions with fuel for the remaining portion of the fiscal year that ends on Sept. 30 to the McAlester Coal Co., of Dallas, and the Sparks Lignite Co., of Rockdale. Prices for coal average \$2.14 per ton, while the price for lignite is \$1.53 per ton.

The Texas Power & Light Co., of Dallas, has acquired lease on several thousand acres of land in Henderson County, near Malakoff, and is now testing this land to determine the extent of the lignite beds that underlie it. It is proposed to open extensive lignite mines, if the fuel is found in sufficient quantities, and to mine it for use as fuel in the company's electric-generating plants in Texas. A part of the electric company's development program also calls for the establishment of another great electric plant on the site of the lignite beds near Malakoff, and thus eliminate cost of haulage. The Malakoff plant will cost \$2,000,000

and it is planned to open sufficient mines to give employment to approximately 1,000 miners and other employees.

UTAH

The Union Carbide Sales Co. has lodged a complaint against the amendment to the safety code proposed for Utah coal mines which would require the use of electric lamps in coal mines. The company holds that not all coal mines in Utah are gaseous and that for this reason some of them are safe for the use of the open-flame lamp. It asks that the amendment be drawn to permit the chief mining inspector for the Industrial Commission to designate the kind of lamp to be used.

Eli F. Taylor, local U. S. land office registrar, will auction off 1,818.84 acres of coal land in Castle Gate district on June 18.

Production of coal in Utah in April was 325,195 tons, as compared with 286,352 tons in April a year ago and 255,319 in April, 1922.

The Utah Briquetting Co. has been formed and is applying for permission to sell \$50,000 worth of stock for financing the company. George W. Love, Mohrland, is president of the company and inventor of a process.

The Utah Oil Refining Co., of Salt Lake City, one of the largest oil-refining concerns in the West, has decided to go back to coal for use under its stills. Coal consumption will be 80,000 to 100,000 tons a year.

VIRGINIA

Directors of the Virginia Iron, Coal & Coke Co. voted May 22 to omit the regular semi-annual dividend on common stock. At a meeting in November last a declaration of 1½ per cent was made and a year ago a 2 per cent semi-annual dividend was ordered. The regular semi-annual 2½ per cent preferred dividend was declared, payable July 1.

The Chesapeake & Ohio Coal Exchange, of Newport News, Va., the last of the coal exchanges now in operation at Hampton Roads, will cease operation as an exchange May 31.

Clayton M. R. Wigg, Southern representative of the Houston Coal Co., has been elected president of the Hampton Roads Coal Club to succeed T. M. Bailey, resigned. T. R. Licklider, manager of the Norfolk office of the Trans Ocean Coal & Transport Co., was elected vice-president to succeed Mr. Wigg. Chester B. Koontz continues as secretary and treasurer.

Transporting Coal in China

Basket below ground, the backs of coolies and lumbering wagons on the surface make coal expensive in the Orient, despite cheap labor.





## WEST VIRGINIA

The Richard Mine of the Bethlehem Mines Corporation was shut down indefinitely during the second week of May and about 140 men who have been working on a part-time basis were affected. So far as can be learned only the Masontown and Bretz mines of the company are now in operation. The understanding is that the 1917 wage scale has been put in effect at the mines still continuing in operation. Mines of the Bethlehem Mines Corporation on the Morgantown & Kingwood R.R. are operated on an open-shop basis.



**Inn at Glen Rogers**

Owned and operated for the benefit of employees by the Raleigh-Wyoming Coal Co., Glen Rogers is in Wyoming County, West Virginia.

The body of George Holliday, Sr., mine foreman, has been recovered from the Benwood mine. Further exploration brought to light another body—that of an unidentified miner. In all 119 miners lost their lives in the explosion which wrecked the mine, on the morning of April 28.

The West Virginia Super Fuel Co. has just been organized with a capital stock of \$400,000 to operate in the northern panhandle of West Virginia. The general office of the company for the time being is at Moundsville. The organizers of the company are A. R. Bice, of Bellevue; Ernest Fry, Stephen Steranchak, and J. R. Dorsey, of Pittsburgh, Pa. and H. S. Allshouse, of Irwin, Pa.

The Three Fork Coal Co., of Ellamore, is installing an up-to-date screening system in addition to building a large number of houses for miners, a storehouse and a club room. This company has been mining nothing but run of mine coal heretofore but having learned that the coal under careful mining and preparation will screen about 75 per cent lump, it was decided to install the necessary screening apparatus. Such a large percentage of lump is a little unusual for Sewell coal, but inasmuch as the coal comes within the area of the Deer Park anticline, it is unusually hard. About 20,000 acres of coal land are owned by the company.

Oren F. Kelley, representing A. J. Thompson, of Titusville, Pa., is in Elkins with a corps of men and is starting to open the Sewell coal on a tract of 2,000 acres near Woodrow, in Randolph County. Present indications point to the existence of several hundred acres of high grade Sewell coal underlying the property, averaging about 40 in. in thickness, there being one other vein of good coal.

Operations have been resumed at the Pursglove mine of the Connellsville By-Product Coal Co., on Scotts Run, after a short suspension. This mine is owned by the Paisley interests, of Cleveland. This is a union plant but was shut down for a time pending agreement on a new wage contract. About 300 men are normally employed at this time.

A loss of about \$35,000 was sustained when the store building of the Booth Supply Co. at the Riverseam mine of the H. J. Booth glass interests, of Pittsburgh, was destroyed by fire. A cold-storage plant operated in connection with the store also was destroyed.

Fire early in May destroyed tippie No. 5 of the Raleigh Coal & Coke Co., entailing a loss aggregating several thousand dollars. The fire was of unknown origin. Although the mine had not been in operation since July, 1923, several men including a watchman have been kept at work in order to keep the equipment in shape. The No. 5 mine is located between Beckley Junction and Beckley.

Although hardly more than a year old, the mine of the King Fuel Co., of which A. J. King, of Huntington, is the head, has attained an output of 1,800 tons a day.

## WISCONSIN

Construction of a modern coal dock at Superior, Wis., to cost at least \$750,000 was announced by the Reeves Coal & Dock Co. May 20. The new structure, to be electrically operated, will replace the wooden dock now being dismantled. Permission to extend the shore line, granted by the United States Engineer's Office, will provide the dock with 150,000 sq.ft. additional storage space. The Reeves property, 23 acres in extent, is one of the best sites on Superior Bay. Work on the new dock is expected to start as soon as the old one is torn down.

## CANADA

Briquetting of Saskatchewan lignites as the lignites of the Dakotas are now being briquetted, is proposed by the Lignite Utilization Board, supported jointly by Saskatchewan and Alberta. The board has just reported that it has developed a successful method and is asking for an additional appropriation so that it may demonstrate the process to convince capital that the scheme offers a good investment. The

board wants to run its plant longer so as to determine exactly the cost of materials, labor, repairs, replacements and technical supervision and control.

Coal production in British Columbia for April totaled 144,205 tons, a decrease of 58,725 tons from March. This is explained by the lack of output in the Crows Nest Pass field, where a strike is in progress. In March the Crows Nest district produced 69,007 tons. April figures show that the Vancouver Island coal mining industry is improving. The output of the Canadian Collieries (D), Ltd., improved by 3,398 tons, that of the Western Fuel Corporation by 5,538 tons, and other collieries advanced to the extent of 2,060 tons. In the Nicola Princeton field, however, there was a slight drop of 714 tons.

Major S. J. Robins, and Captain Henry Davies, both of Cardiff, Wales, representing a syndicate of Welsh coal operators, have spent some months inspecting coal properties in Alberta. They are now on their return journey to England to report to their principals who have in view the development on a large scale of the Western coal fields for supplying eastern Canada. Major Robins and Captain Davies have purchased extensive coal areas for the syndicate from individuals and small companies not having sufficient capital to carry on development.

A noticeable improvement in the Cape Breton coal trade is reported. All the British Empire Steel Corporation collieries in Cape Breton except the Jubilee are working with good outputs and shipments to Montreal are in full swing. There has been considerable activity at Louisburg with several bunker steamers as well as cargo steamers in port.

Charles Camsell, Deputy Minister of Mines for Canada, and Thomas Molly, Minister of Industry for Saskatchewan, have been appointed to the Lignite Utilization Board.

## Industrial Notes

The following executive changes were made in the Timken Roller Bearing Co., effective May 1: George C. McMullen, formerly manager of sales of the industrial bearings division, became district manager of sales of the Timken interests on the Pacific Coast, with headquarters at San Francisco, Cal., and Harry H. Gildner, formerly in charge of the Chicago office of the company, became manager of the industrial division with headquarters at Canton, Ohio.

The Pittsburgh office of the Sullivan Machinery Co., which has for many years occupied quarters on the fifteenth floor of the Farmers Bank Building, moved April 1 to larger space and now occupies rooms 517-520 in the same building. William R. Jarvis has been the company's Pittsburgh manager since 1904.

In connection with the opening of a mine at Calvin, Va., by the Blackwood Coal & Coke Co., of Blackwood, Va., the company will have a large tippie with revolving dump and reinforced concrete storage bins of a capacity of 2,500 tons. The contract for the construction has been awarded the Roberts & Schaefer Co. of Chicago.

The Canadian budget, just presented, should have far-reaching benefits to manufacturers of machinery in the United States. The duties have been considerably reduced on coal-washing and coke-making machinery and on mining machinery and equipment.



## Traffic News

### Ohio Collieries Co. Alleges Discriminatory Rates

Alleging discriminatory freight rates the Ohio Collieries Co., of Toledo, lodged a complaint against the Hocking Valley Ry., with the Ohio Public Utilities Commission. The complaint asks that the commission determine a rate which will place the Ohio Collieries Co. on an equal basis with companies operating in the Pomeroy fields and in West Virginia and charges that rates to Columbus over the Hocking Valley line now give these companies an unfair advantage.

The Ohio Collieries Co., it is stated in the complaint, operates coal fields near Poston, Ohio, whence shipments are made to Columbus over the Hocking Valley Ry. Keen competition exists in this Columbus market between companies operating in the Pomeroy fields and the complaining company, it is charged.

That, to Columbus, on its line, the defendant maintains and assesses a common or group rate from all shipping points, is an allegation made in the complaint which charges that the Hocking Valley company collects a "discriminatory and therefore unlawful rate" on bituminous coal from the Hocking district to Columbus.

## Obituary

Frank E. Platt, treasurer, vice-president and acting president of the Scranton Coal Co., died at his home in Scranton, Pa., May 13, aged 65. Death was due to heart disease. Mr. Platt came of a family of early settlers in Scranton. With his brother-in-law, Joseph H. Scranton, and Sanford Grant, J. Curtis Platt, father of Frank E. Platt, established the first steel and rolling mills and blast furnaces in Scranton. After graduating from Rensselaer Polytechnic Institute, Troy, N. Y., Frank E. Platt, engaged in the iron business. He gave his entire attention to the management of the blast furnaces. Mr. Platt served for a time as director of the Moosic Powder Co., the Weston Mill Co., the Roverton Mills Co., and other companies. Since the organization of the Scranton Coal Co., he was active in official capacities for that organization.

## Association Activities

The board of directors of the Central Pennsylvania Coal Producers' Association has named a committee of twenty-one to act as an advisory board to the members of the association. The committee is divided under three heads: mining methods, machinery and power. The work of these committees will be to furnish information to the members of the association upon these subjects which would otherwise require considerable individual time. Following are the committees: Mining methods—A. B. Crichton, Johnstown, chairman; Fred Vinton, Indiana, vice chairman; C. D. Oldknow, Du Bois; R. W. Austin, Clearfield; C. L. Patterson, Pottersdale; William C. Faulk, Elton; J. W. Stephenson, Hastings; Malcolm Mc-

Dougall, Sonman; Thomas L. Jones, Altoona, and S. T. Brown, Indiana. Machinery—L. W. Householder, Indiana, chairman; Richard Peale, St. Benedict, vice chairman; R. V. Williams, Bethlehem; Fred Norman, Kittanning; C. J. Hamilton, El Mora; Robert F. Roth, Altoona, and F. D. McBellis, Gallitzin. Power—E. K. Davis, St. Benedict, chairman; A. S. Wilson, Johnstown, vice chairman; E. E. Hewitt, Indiana, and James M. Cook, Johnstown.

The West Kentucky Coal Bureau, holding its monthly meeting in Louisville on May 13, re-elected C. W. Taylor as representative of the association on the Board of Directors of the National Coal Association, and heard a report from M. B. Lanier, representative of the National Coal Association, to the U. S. Chamber of Commerce meeting in Cleveland the previous week. A communication also was read from Secretary Hoover concerning summer stocking of coal.

## Recent Patents

**Overturning Mine Cage.** Andrews Allen, Chicago, Ill.; 1,482,536. Feb. 5, 1924. Filed Jan. 21, 1921; serial No. 438,844.

**Automatic Mine Shaft Gate.** Robert Quigley and James Cunningham, Portage, Pa.; 1,483,243. Feb. 12, 1924. Filed Aug. 21, 1922; serial No. 583,294.

**Mine-Car Coupler.** Charles W. Lauby, Vincennes, Ind.; 1,483,628. Feb. 12, 1924. Filed Nov. 6, 1922; serial No. 599,237.

**Coal Jigger.** Earl J. Wagner, Tamaqua, Pa.; 1,483,958. Feb. 19, 1924. Filed June 7, 1923; serial No. 643,966.

**Intermittent System for Treatment of Coal.** James T. Fenton, Salt Lake City, Utah; 1,484,256. Feb. 19, 1924. Filed Aug. 24, 1922; serial No. 584,038.

**Continuous System for the Treatment of Coal.** James T. Fenton, Salt Lake City, Utah; 1,484,257. Feb. 19, 1924. Filed Aug. 24, 1922; serial No. 584,039.

**Actuating Mechanism for Coal Dump Cars.** Jonathan B. Dodd, Cumberland, Md.; 1,484,764. Feb. 26, 1924. Filed June 1, 1923; serial No. 642,869.

## Coming Meetings

**American Wholesale Coal Association.** Annual convention, White Sulphur Springs, W. Va., June 3-4. Secretary, G. H. Merryweather, Chicago Temple Bldg., Chicago, Ill.

**West Virginia Coal Mining Institute.** Annual meeting June 3 and 4, Elkins, W. Va. Secretary, R. E. Sherwood, Box 1026, Charleston, W. Va.

**The National Foreign Trade Convention.** June 4-6, Boston, Mass. Secretary, O. K. Davis, 1 Hanover Square, New York City.

**National Retail Coal Merchants' Association.** Annual meeting, Hotel Virginian, Bluefield, W. Va., June 4-6. Secretary, Walter D. Rogers, Transportation Building, Washington, D. C.

**Southwestern Interstate Coal Operators Association.** Annual meeting June 10, Kansas City, Mo. General Commissioner, W. L. A. Johnson, Keith & Perry Bldg., Kansas City, Mo.

**Illinois & Wisconsin Retail Coal Dealers Association.** Annual meeting, June 10-12, Delavan, Wis. Secretary, I. L. Runyan, Great Northern Bldg., Chicago, Ill.

**Illinois Mining Institute.** Annual meeting, June 12-14 from St. Louis via boat down the river. Secretary, Martin Bolt, Springfield, Ill.

**Midwest Retail Coal Association.** St. Louis, Mo., June 17-18. Secretary F. A. Parker, St. Louis, Mo.

**American Society for Testing Materials;** annual meeting, Chalfonte Hotel, Atlantic City, N. J., June 23-27. Secretary, Edgar Marburg, University of Pennsylvania, Philadelphia, Pa.

**American Institute of Electrical Engineers,** annual convention, June 23-27, Edgewater Beach, Chicago, Ill. Secretary, F. L. Hutchinson, 29 West 39th St., New York City.

**First International Management Congress,** Prague, Czechoslovakia, July 21-24.

**World Power Conference,** Wembley, London, England, June 30-July 12. O. C. Merrill, Federal Power Commission, Washington, D. C.

## New Equipment

### New Reflector for Highly Concentrated Light

For use in industrial operations where highly concentrated light over a limited area is desired, a new reflector has been developed by the Westinghouse Electric and Manufacturing Co. It has been designed to give maximum light distribution from a 25- or 50-watt mill type lamp, insuring intense illumination. In such work as coil winding, machining, planing, drafting and any other operation requiring accurate vision, it is particularly suitable.

The body of the reflector is a one-piece steel stamping covered with a ground coat of fired porcelain enamel and a finishing coat of white enamel. It is provided with a brass holder so that it may be fastened to a brass-shell socket without other support.



Reflector Intensifies Light Over Limited Area

In buildings where there is considerable vibration the use of mill type lamps has greatly increased. This reflector has been designed to obtain the maximum possible light distribution from a 25- or 50-watt mill type lamp.

### Headlight Built to Sustain Bumps on the Road

A mine locomotive headlight possessing a number of improvements over previous designs has been developed by the General Electric Co. This light is of especially rugged construction to withstand rough usage.

The frame incloses a simple focusing mechanism which adjusts the lamp to the focal point of the reflector by a horizontal movement of the socket. Heavy door pins, hinges and guard grids add to its ruggedness. The leads enter through water- and moisture-tight stuffing boxes, and the lead itself is covered with soft but durable rubber, thus insuring a tight joint. The general contour of the unit is such that blows from falling objects glance off without doing any damage. The casing is supported on springs and spherical headed studs, permitting universal movement.

The glass door is recessed in the casing, and is protected by a grating heavy enough to withstand severe shock in case of collision. The glass itself





#### Headlight for Mine Service

Manufacturers are now giving more and more consideration to adverse mine conditions. Here is a headlight designed particularly for mine locomotives. It is claimed it will withstand severe shocks without damage.

is reinforced with wire. Both the door and mirror reflector are cushioned with tarred rope for the dual purpose of insuring the interior against dampness and of affording some degree of resiliency in case of shock.

The reflector is of heavy glass, silver-plated and copper-coated to protect the silvering and strengthen the mirror.

#### Fifteen-Ton Dump Car Cuts Strip-Pit Costs

One of the biggest types of dump cars used anywhere in coal mining is the 15-ton car recently put into service by the Penova Coal Co., at its strip pit in Adena, Ohio. This company, backed by such experienced coal strippers as Grant Holmes of Danville, Ill., who has been actively interested in stripping for 40 years, decided the average 4-yard dump car was too small and also that an automatic dumper was

needed in order to reduce costs. The Western Wheeled Scraper Co. of Aurora, Ill., manufactured the 15-ton car shown herewith to meet these requirements.

This car handles fully four times as much coal as the average 4-yard car; it is a double truck, one-way, air-dump, self-righting car built for 36-in. gage track. The dumping angle is 35 degrees. This, the operators think, reduces breakage of coal as it is being discharged. The double truck feature reduces the spillage along the track because it produces good riding qualities.

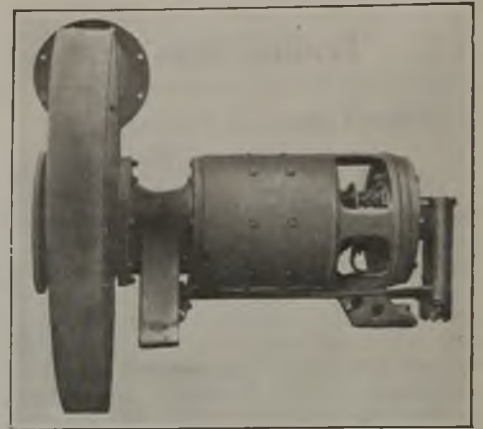
Two cars are spotted at a time and are dumped by a man below who directs the loading of a conveyor belt. He pulls a cord which lifts a trigger on the cars' air dumping mechanism. The two cars discharge their loads, right themselves automatically, and are pushed ahead.

#### Well Balanced Air-Compressor

A new design of single-stage centrifugal compressors, has been perfected by the General Electric Co. and is now on the market. The new compressors are of two types, single- and double-inlet. The single-inlet type is designed for general use; the double inlet type being necessary when the ratio of impeller inlet and exit diameter reaches a value demanding its use.

The machines are available in capacities of from 500 to 75,000 cu.ft. per min. at 0.75 to 6 lb. pressure. They are provided with oil pumps designed to furnish plenty of oil to the bearings. Capped holes in the tops of bearing linings are eliminated, thus preventing dust from entering the lubricating system. A heavy hinged cast iron cover is provided on one side of the middle bearing bracket which may be lifted to inspect the return flow of oil from the lubricating system.

The pulsation point of these machines occurs at very light loads. The



#### Motor-Driven Air Compressor

Unit construction makes it possible to design this compressor so that it vibrates only slightly at very low speeds.

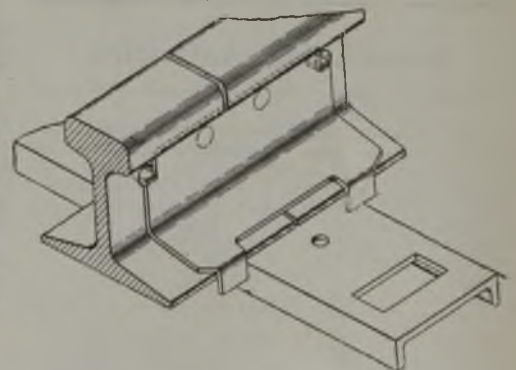
efficiency curves are very broad, thus showing an improvement over older types. The no-load power consumption is between 60 and 70 per cent of that required for previous machines.

Outstanding construction details include bearing supports of strong construction, the casing being attached to the bearing bracket by a flange. The weight of the casing, although not great, has been distributed in such a manner as to make the unit mechanically strong. This is made possible by the use of steel plates varying from  $\frac{1}{2}$  in. to  $1\frac{1}{2}$  in. in thickness in the various parts of the compressor.

#### Fish Plate Holds Rail and Tie in Position

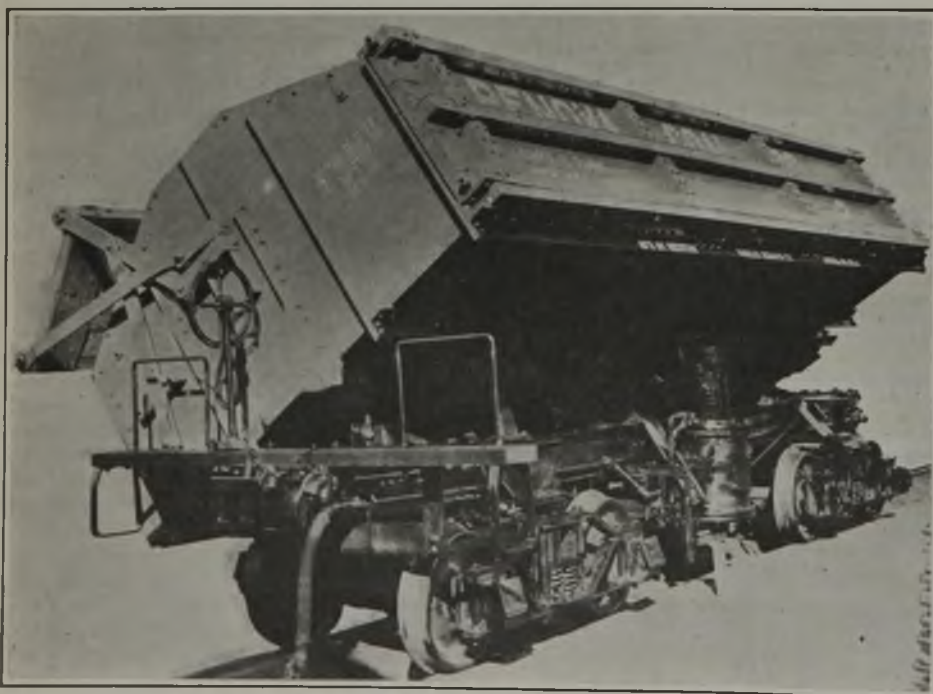
The illustration shows a fish plate or splice-bar which can be used with most track ties. It is made from a single piece of sheet metal and at each of its upper corners are laterally projecting lugs formed by cutting the metal and bending the free ends as shown. These lugs are located so that they project into and through the rail bolt hole.

At the bottom of the vertical section is a laterally extending base or flange which conforms to the rail flange. Extending downward near the ends are lugs which are formed by cutting away part of the metal. These two lugs are spaced so that the fish plate straddles the cross tie and locks it in position on both sides. This plate not only holds the rails together, but holds the ties in position. No special tools are necessary for its adjustment and no bolts and nuts are required. It has lately been put on the market by S. M. Casterline of Crafton, Pa.



#### Splice-Bar Performs Two Functions

When used with a suitable cross tie, this fish plate assists in holding the rail ends together and secures the tie in position.



#### Large Dump Car for Coal Stripping

This 15-ton car was built for the Penova Coal Co., Adena, Ohio, to speed up the output and help reduce the cost at the company's big strip pit. The air mechanism shown under the side of the car dumps and rights its automatically so that no employee need go onto the tippie.