

COAL AGE

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

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We and They

INVOLVED in the oil scandal are many men who have been foremost in condemning the coal-mining industry. It was McAdoo who believed that the coal men profited unduly, and loudly did he proclaim it. It appears that the price may be too high for coal but cannot be too high for influence at the capital. Someone has well said that "McAdoo would sooner be *in* right than President." It was Palmer and Daugherty also who lamented the lack of patriotism of mine operators. These government officials, past and present, may be suffering from undue public suspicion, and the coal man, himself too often suspected with little reason, will do well to treat these men with a caution in judgment and a temperance in statement that Palmer and Daugherty too often have failed to evidence.

A Job of Gloom

ONLY a few years ago our thick-walled factories with their small windows were places of dust and dirt, where men worked under a considerable handicap. Did they want to see anything clearly they took it to a window—an open window, the dirt on the windows hiding the sun rays—or to an open door. Now we have larger windows and at night bright lights. Everything can be inspected anywhere in the building. By night or day work goes on unimpeded by gloom, and manufacturers have found that light has paid dividends.

The mines alone have continued dark. They have with few exceptions relied on the uncertain light of cap and hand lamps—in this country principally the former, in Europe mostly the latter. Surely the time is coming when the practice at some mines of illuminating face as well as roadways will be standard.

In the present glutted state of the market clean coal is needed. Theoretically, the operator weighs the coal and refuse that the miner loads, throws away the refuse and pays the miner for all he sends out. As a matter of fact at some mines he probably docks those sending particularly bad coal so heavily that he comes more nearly even when he compares his railroad with his mine-car rates.

However, it is not just to distribute all the cleaning burden on the evil doer and in some cases the loss falls largely, if not entirely, on the operator. In consequence he will do well to give the mine worker of honest intentions a good light whereby to clean his coal. He may save considerable losses at the tippie by so doing. The greater light will cause less material to be wasted, will make it easier to watch the roof, will speed up the work and will make the miner more cheery and less discontented.

Mining is gloomy work at best. A little light at the faces will brighten the day's toil. In the roadways when the men watch the roof for low wires and timbers, they frequently fall by stumbling over coal and slate, upstanding ties and traversing rails. Similarly

when they watch the floor they strike their heads against wire and timbers. A light in the roadway will prevent such accidents which are serious, especially where locomotives are about to run down the fallen man—a trip rider, for instance.

Ten years from now, we shall be wondering, as we look back, that in these days we were contented to light our mines with only the meager light of cap lamps. The change suggested is not a large one, no larger than the change in factory illumination in the past few years.

Light Is Light

NO MATTER the source of advice, if it is good, it is well to heed it. The Coal Commission was in many matters not fair, but this at least is true of it: It expressed the public mind, and after all, it is the reactions of the public that the coal operator has to meet and appease. Let us regard its pronouncements, therefore, as revelations of the popular appraisal of the coal industry and, not seeking in anger to meet its false judgment, endeavor to find a way to merit popular approbation.

The fact is the coal industry is not properly "sold" to the American public. The coal man has argued in heat and passion and not with due calmness. The man who is upset and indignant in making rebuttal is usually not prudent or convincing. He in general only involves himself in his argument.

His better plan is to ask questions and put the public on its defense with a "How?" and a "Why?" The average man thus confronted, asked to give an answer, usually ends by giving convincing evidence that he does not know or appreciate what he has been saying. At least this is gained from the report of the Commission: that every one concedes that it had no solution, had no "How" and no "Why" to give the consumer, the coal man or the mine worker. Where no one can provide a remedy, the public must needs be patient.

What is said about the main part of the report should be modified, because some of its parts, especially the engineering report, was written by efficiency engineers aided by mining men. Unfavorable to our mining practice as it is, it does not err in the direction of excessive censure. Good mines were picked out deliberately for investigation, yet the findings were sufficiently distressing. Fortunately, they were made just at the time when instrumentalities were coming into being that may profoundly modify the inefficiencies described.

There is hope, bright hope, that a few years hence the miner will lose no time at the face, the trips will not stand at the parting and the daymen will not idle at the tippie. The engineering report does not say much about the cure. Like much work by efficiency engineers it relies on co-ordination and co-operation to end evils that only mechanical engineering adequately can remove and that management can merely improve. The conveyor that has revolutionized many industries

is on hand to reconstruct ours. Badly is this tool of industry needed, for the mechanical loader has completely broken down our already faulty transportation system.

The failures to get the anticipated tonnages from mechanical loaders are convincing evidence that the Commission's strictures on irregular mine-car service are justified, and the only way to make loaders do a good day's work with broken roof behind the loading machines is to have a conveyor to remove the coal to some place with an unbroken roof, where cars can be filled steadily. Where several mechanical loaders are used, the only way to prevent the congestion inevitably consequent on the use of several conveyors feeding to several trips is to have an aggregating conveyor receiving from several gathering conveyors and feeding to a single trip or carrying the coal direct to the tippie.

The main Coal Commission report has told what the public thinks. The engineer's portion of it has revealed the glaring inefficiencies that exist underground. Light is light, even if it comes from a commission of which a few at least were men who could not run a mine themselves were they given it without any debt or other encumbrance.

The Commission may have feared to tell the whole truth about the unions, may have palliated what cannot be excused or forgiven, but it told us some matters we would do well to take to heart. Though good counsel was marred often by bad logic, many a true word slipped in and a poor plan it would be to let the evil overshadow the good.

Prices and the Wage Contract

REMARKABLE and almost impossible to forecast has been the trend of recent events in the bituminous-coal industry. It was thought that the western Pennsylvania coal operators would not appear in Jack-sonville to negotiate a settlement, but pressure from President Coolidge and Herbert Hoover brought them there.

It seemed almost incredible that with business being lost almost beyond recovery by reason of a high wage scale the operators would consent to sign for the present wage, even though the irresistible though more indirect logic of the situation pointed that way. But sign they did.

Indications pointed to a long fight on the period of contract. But even there again the needle pointed in the wrong direction. The contract was signed for the three years, the miners wanting a four-year contract, and many—perhaps most—of the operators wanting to sign for a single year.

Now that the wage scale has been approved for a period of three years by the subcommittee of miners and operators the public will be wondering what effect the settlement will have on the price of coal. That is a natural question but one not easily answered. The settlement will result in a glutted market for coal, and lower prices might be expected as a result if they had not already attained the irreducible minimum for the present union wage scale. The losses incurred by the operators of union bituminous-coal mines are rapidly drawing them into bankruptcy.

However, the price may be somewhat higher rather than lower. Contracts for coal delivery are lapsing. It was well known that these contracts were all that enabled some operators to keep going. When they come

to an end the mines that relied on them will have to suspend or get a higher price for spot coal. That will tend to stiffen the market. The removal of the weaker brethren will make it possible for those who remain in the field to ask for their coal something a little nearer cost, enough in short to make it more profitable to face the losses of operation in preference to the greater losses of shutdown in an industry where shutdowns are extremely expensive. That hope may be blasted by the low prices of a non-union field ready to cut wages to any figure that will keep its mines running.

Those who close their mines will do so for a long time. They will disband their forces, board up their houses and in some cases let their mines flood if they are shallow and relatively easily drained. It will be clear to them that only a measurable increase in price will make it worth while to undertake the high costs of resumption. In fact their finances during the interim becoming more involved may prevent them from resuming. The low-cost mines, therefore, will get the benefit of the business of those operations which cannot continue to work.

Another element in the situation may enter, however, to get the public cheaper coal—the conveyor and the mechanical loader. The prospect of cheap coal for a long period will force more economical methods of production. It will be recognized that cheaper operation and better preparation will be the only way to keep in the market. The miners will be amenable in view of the financial stress and they will not oppose complete mechanization of the mines. This will have its effect in reducing price. So after all is said it is difficult to forecast the ups and downs of the index of prices, swayed as it is by many adverse influences of an imponderable character.

Safety a Major Consideration

ONE of the first thoughts when business gets unprofitable is to cut off all indirect expenditures—those which do not produce immediate profit. Expenditures on safety are among these, but the cost of running risks is too heavy to make such economies profitable and savings of this kind are certainly not moral.

In fact, at no time is safety more neglected by the mine workers and foremen than during a time of low profits. The miner anxious to make a big day during an unsteady run fails to put up a prop if thereby he can the more promptly fill a car. The motorman and his trip rider, harried to transport a large tonnage and so cut the cost of haulage, run risks in coupling cars, in opening doors and in taking switches. The foreman seeks to reduce costs by bringing pressure to bear on those who would report places for gas. He seeks to have all his men engaged in directly profitable labor and not at work that, as he would put it, merely assures safety.

At such times it is more than ever necessary to remember the cost of physical hazard and to have safety men around the works whose whole standing with the company lies not in the cheapness of coal but in the freedom from accident. Every day's coal should be charged with the accident costs of operating the mine so that the hazard always would be remembered as part of the cost to be lowered. Accidents are not unavoidable charges in mining. They are costs which good management will much reduce, and to overlook them is to involve the mine in difficulties sooner or later.



Lewis Mine Provides Against Electrical Shutdown And Uses Block System of Development

Alternating Current Used for Everything Except Haulage—Main-Line Haulage Equipment Pressed Into Service to Gather Cars—Gob on Two Sides of Pillar Coal Does Not Prohibit Extraction

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

FEW operations in the East utilize alternating capacity for all purposes other than haulage. The Lewis mine of the Hudson Coal Co., located at Wolf Summit, W. Va., is one of these. As a result the electrical system employed at this mine is well worthy of careful consideration.

Adoption of alternating current forestalls many of the troubles to which direct-current equipment is subject. At the present time, however, this mine is not developed so extensively that appreciable line losses would be incurred if direct current were employed. Consequently no necessity at present would exist for an excessive yardage of copper feed cable. The officials of this company are, however, anticipating the future needs of this development and providing for the time when the workings will be sufficiently extended to warrant the use of another underground substation, one already having been installed. When such time shall arrive the foresight of the officials who have recommended the present use of alternating current will become apparent.

Briefly, future plans call for the stepping down of a

NOTE—Headpiece shows the tippie of Lewis Mine of the Hudson Coal Co. Because circular picking tables are used the building is more nearly square than most structures of this kind. A belt conveyor brings the coal from the underground workings to the preparator.

22,000-volt incoming line potential in a bank of transformers to be located near the tippie. These will reduce the voltage to 2,200. Branch lines carrying this potential will radiate from the primary transformers to various points on the property, where they will enter the underground workings through boreholes. At these various points, underground transformer stations will be installed to feed the direct-current haulage lines.

Several precautionary measures have been taken at this operation to obviate possible shutdowns, either momentary or prolonged, as well as to surmount the difficulties entailed by fluctuating line voltage. Such measures call for the exercise of considerable study and ingenuity in order to adapt them to the requirements of any particular plant. J. P. Rosier, the electrical adviser at this installation, has solved the difficulties with which he was confronted in a manner that invites the adoption of similar plans at other developments.

ALL EQUIPMENT NOW USES 440 VOLTS

In the present alternating-current system an incoming potential of 22,000 volts is stepped down to 440 volts by means of a bank of three 50-kva. transformers in a surface station near the tippie. Incidentally, this will become the primary transformer station, when proposed extensions and alterations to the system are

made. All equipment now installed, both on the surface and below ground, is rated at 440 volts. At the present time the main conductors are taken down the airshaft to the underground distribution circuit. In order to protect the 440-volt lines and the equipment connected to them from single-phasing and line burn-outs, which might result from falls of roof or from other causes, an alternating-current breaker is employed.

A single-phase and reverse-current relay operates in series with the fan circuit, so that single- or reverse-phasing in the high-tension incoming lines results in shutting down the 50-hp. induction motor, by which the 5-ft. reversible centrifugal fan is driven. This relay automatically opens the main-line alternating-current circuit breaker and holds it open until such time as the phasing difficulty is corrected, after which the breaker closes automatically. The fan must, however, be restarted by hand.

Within the mine the alternating-current lines of 4/0 bare copper are strung on glass insulators fastened to the ribs of the entries. Where these lines cross haulage roads and manways they are suitably protected.

Interruptions to power supply and the burning out of the ventilating-fan motor are imminent causes of worry to the mine manager if he is not prepared to meet such emergencies. Steam, gasoline or oil engines are in many cases installed as stand-bys to provide against such contingencies. The Hudson Coal Co., however, has employed a different type of auxiliary equipment in the form of a 20-hp. direct-current motor that can be driven from the storage battery of a gathering locomotive in the event of a lasting power interruption or from a motor-generator in the underground substation in case the main fan motor should burn out.

This auxiliary direct-current motor is installed directly below the fan pulley, as may be seen in one of the accompanying illustrations. It is provided with a tension or belt tightener in addition to the drive pulley on the motor shaft. This tension may be adjusted by means of a take-up and compression spring, which facilitates a quick adjustment of the driving belt between the auxiliary motor and the fan.

A lead-armored, jute-covered cable extends from this direct-current motor down the air shaft to a bare 2/0 conductor leading to the main switchboard in the

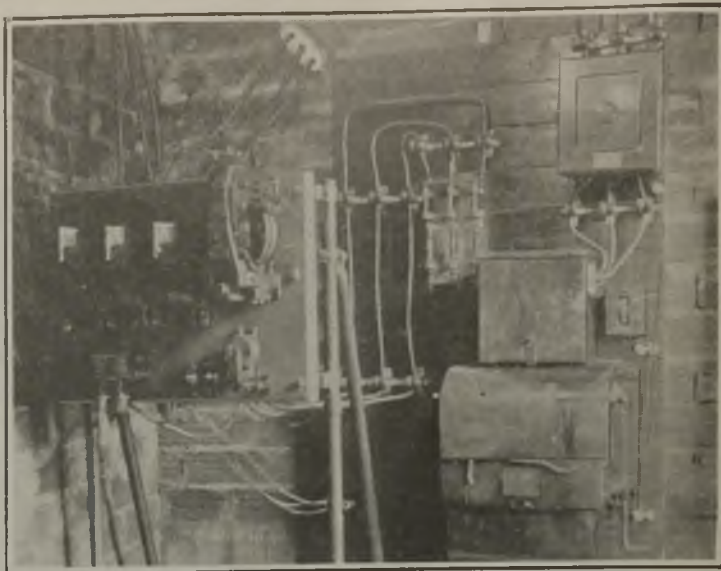


Fig. 2—A.C. Circuit Breaker and Out-of-Phase Relay
The upper cabinet contains the relay which automatically opens the circuit breaker and holds it open until the phasing difficulty has been eliminated. The breaker then closes automatically.

underground substation. Through this switchboard, connections may be made with a 60-kw. 125-volt motor-generator set. This connection will be used in case the regular alternating-current fan motor should fail.

Furthermore, a connection may be made to the storage battery of a 6-ton gathering locomotive in the motor barn should power fail on the incoming line. The capacity of the storage battery on the locomotive is 440 amp.hr., which is sufficient to drive the fan for about 5 hr. at half speed, or 125 r.p.m. When operating at this rate the fan will generate about 50,000 cu.ft. of air per minute.

In addition to the motor-generator set already mentioned, the present underground substation houses a 100-kw., 275-volt, 150-kva. synchronous motor-generator for correcting the power factor. This latter machine is of the three-wire type and is used for charging storage batteries and for supplying direct current to the trolley lines. Should an accident befall this motor-generator set, the 125-volt motor-generator can be switched to the trolley line and one of the storage-battery gathering locomotives can draw power for operation as a main-line trolley machine. This particular locomotive is specially wired and equipped to meet this requirement.

Proper balancing of equipment and the application, in new combinations of principles already known, will confine periods of shutdown to the time required to change over from one source of power to another. There can be little doubt that broader co-ordination of electrical lines and equipment can be so executed as to serve other similar purposes.

MOST OF THE COAL RECOVERED ON SECOND MINING

It is the firm belief of this coal company that in first mining not more than 10 to 15 per cent of the ultimate recovery should be removed from any room section where the roof is tender and falls readily. As a result, the block system of mining, the general layout of which differs but little from that originated in the Fairmont field and used successfully elsewhere, has been chosen. A system of operation was sought for this mine that would incorporate narrow rooms and wide pillars, as these pillars were expected to stand for a long period with a minimum of timbering. It was necessary also that the pillars should be of such dimensions that

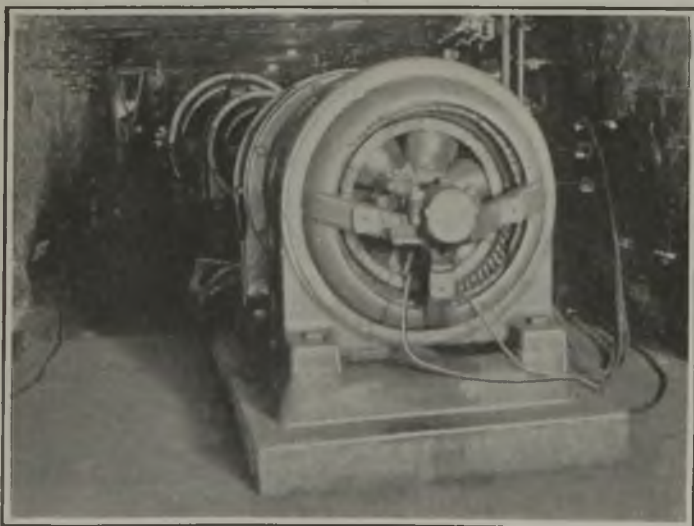


Fig. 1—Motor-Generator Sets Underground

One of these units furnishes direct current at 275 volts to the trolley lines; the other furnishes 125 volt direct current for battery charging, for operation of the standby fan motor and for operation of a storage battery and trolley locomotive when the main haulage unit fails.

they might be split, slabbed or split again to form wing pillars.

It was the conviction of the officials of the Hudson Coal Co., that flexibility in the recovery of big pillars would eliminate some of the dangers usually encountered in retreat working and make possible the mining of gob-encroached pillars that otherwise might be lost. Furthermore, the system adopted possesses an additional advantage, in that it permits pillar blocks to be mined if desired by some modification of longwall method in conjunction with mechanical loaders and conveyors. No other system could be found that would meet the present and future needs of the Lewis mine, and as a consequence, no other recourse remained but to adopt the block system of room-and-pillar working, which in reality is only a modification of the almost universal system in vogue throughout this country.

Coal is mined by the block system in several other operations in the Fairmont field, and at Fleming, Ky., the Elkhorn Coal Corporation is operating in this way in the thick Elkhorn bed under the typically heavy cover of the Kentucky mountains, an exceptionally high recovery being attained. I mention these instances of the successful utilization of this system to substantiate its practicability and to refute various rumors that have received circulation recently and that tend to foster a contrary belief.

In some cases this system has been unsuccessful and much coal has been lost, not only by isolation of stumps and larger portions of blocks in the goaf, but by the squeezing as the result of negligence of large areas already laid out in blocks. The prime principles governing successful mining by rooms and block pillars are no different from those that must be observed in all other working-place layouts.

These are, (1) that no pillars must be allowed to lag behind the line or front of retreat; (2) that every body of coal, large or small, lost in the gob adds to the difficulty of controlling the roof and, (3) that every precaution must be taken to make the roof break as near as possible to the retreating pillars. Officials of both the Elkhorn Coal Corporation and the Hudson Coal Co., believe that success with this system throughout long periods of time and with little or no reduction in recovery is dependent on the ability of the mine foreman to make his daily advances regularly and systematically.

The Lewis mine operates in the Pittsburgh seam which has an average thickness at this point of 7 ft. It is located in a tract of 1,034 acres. At the tiple, which is located at the northwestern corner of the property, the thickness of cover slightly exceeds 50 ft. Consequently, as mentioned in *Coal Age* of Dec. 20, 1923, p. 919, the coal is brought to the surface by a belt conveyor 247 ft. long center to center and installed on an inclination of 18 deg. The main heading is driven southward from the slope bottom on the strike of the coal and incidentally in close proximity to the western boundary of the property. Five entries have been thus driven. One is employed for haulage, one as a manway and three as air courses. Two of these passages are intakes and three are returns. They are driven 10 ft. wide on 40-ft. centers and are protected by barrier pillars 400 ft. wide.

Face headings on 350-ft. centers are driven eastward to the rise at an angle of 72 deg. to the main headings. Rooms are driven parallel to the main heading on 90-ft. centers and the pillars between them are

subdivided into 80-ft. blocks by crosscuts on 90-ft. centers, these crosscuts being driven parallel to the face headings. The relative directions of headings and crosscuts with regard to the faces and butts of the coal have been fixed as described for the reason that the major part of the tight working in the blocks is against the faces. Rooms are made 12 ft. wide. The layout differs from the block system as usually employed, in that crosscuts are driven in adjacent room pillars in such a way as to stagger the pillar blocks. By this means, the roof is not greatly weakened at the corners of the blocks.

PILLAR COAL IS EASILY RECOVERED

The pillar coal is easily recovered by splitting a block in two and by pulling the wing pillars from crosscuts in each half of the block. It is needless to go into further details, for the methods of attack of necessity vary with the conditions encountered. Most of the tight work is facilitated by top cutting with arcwall machines, so that, in shooting, the roof is not disturbed.

Rooms and pillar blocks are at present developed in an area of about 125 acres, of which only a small portion has been completely mined. A pillar section off No. 2 heading and one off No. 6 heading yield most of the present output, amounting to 1,500 tons daily. Another section is being started off No. 9 heading, in compliance with the development plan which calls for an ultimate daily capacity of about 3,000 tons. Gob lines are maintained at an angle of about 45 deg. to the heading. Where they meet, they will form an angle of 90 deg. Eventually, when these three sections are

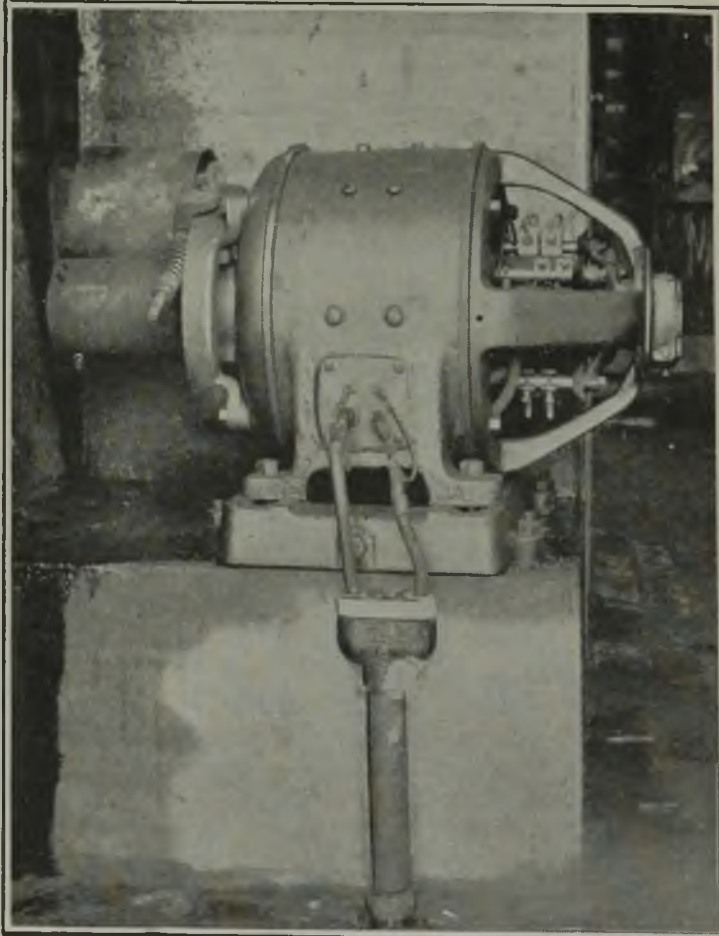


Fig. 3—Standby Motor for the Fan

This d.c. motor, installed with its pulley directly under the fan pulley, may draw current either from the 125 volt motor-generator set in the underground substation or from the storage battery of a gathering locomotive in the motor barn.

FIG. 4

Main Heading

Because the bottom in this mine swells excessively under the action of moisture the ties are here so closely spaced as to almost floor the track. Drainage ditches also must be kept open religiously. Both the ribs of this heading and the steel roof beams fitted with lagging have been white-washed thus greatly aiding in the illumination. Abundant light at points such as this is a great aid to accident prevention.



connected through the goaf the continuous line thus formed will be in the shape of saw teeth.

Some engineers hold that additional roof trouble is encountered at the point where gob lines of two approaching pillar sections meet in the manner above described. No doubt this is true to a certain extent, but difficulty of this kind so far experienced has not been sufficiently great to induce those who have adopted this plan to alter it. No unusual roof trouble is apparent in either of the two approaching pillar sections, and it is hardly probable that much coal will be lost at the point where the two sections meet.

The junction angle between the gob lines, however, should not be less than 90 deg. The early attainment of capacity production necessitates such a procedure, otherwise a sufficient number of working places would not be available. Advocates of the saw-tooth gob line assert that the loss of coal in the trough of these teeth is not excessive. Although these points have not yet been created in the Lewis mine, the management does not anticipate any serious difficulty when the gob lines close.

The conditions prevalent in this mine are almost ideal for the use of storage-battery locomotives for gathering. This is because the main heading is on the strike of the coal, which dips only sufficiently to establish a natural grade of about 1 per cent in favor of the loads on the cross-headings. It should be recalled, also, that practically all the coal lies east of the main heading.

Five 6-ton storage-battery locomotives gather the coal and deliver it to the main sidetrack located 2,000 ft. from the slope bottom. From this sidetrack the entire output, totaling at present 1,500 tons per day, is hauled to the rotary dump at the foot of the slope by an 8-ton duplex trolley and storage-battery locomotive. Inasmuch as this latter machine is equipped with two motors, one drawing its energy from storage batteries and the other taking current from the trolley wire, it is prepared to assist in gathering when not engaged in haulage.

The wisdom of this choice of equipment is imme-

diately apparent. All five gathering locomotives are kept busy throughout the shift, each serving about twenty working places and gathering 300 tons of coal and hauling it a distance of approximately 1,800 ft. to the main sidetrack. The provision of a storage battery on the main-line haulage locomotive renders this machine a self-contained unit capable of traveling anywhere in the mine regardless of whether the track is trolleyed and bonded or otherwise. It thus adds greatly to the flexibility of the haulage system and to the utility of the machine itself.

ROMANS BURNED BRITISH COAL.—Excavation has proved beyond all doubt that coal was used by the Romans; ashes and stores of the unburnt mineral are being found all along the Wall, at Lanchester and Ebchester, in Durham, at Wroxeter, in Shropshire, and elsewhere. [The Wall to which reference is made is the Roman wall between the Tyne, near Newcastle, and the Solway on the western coast.] For the most part, it appears to have been used for working iron, but it was possibly also used for heating hypocausts [furnaces which heated the floors of Roman bathhouses]. There seems good reason to believe that it formed the fuel of the sacred fire in the temple of Minerva at Bath, as Solinus, writing about the end of the third century, comments on the "stony balls" which were left as ashes by this sacred fire. That such coal as was used by the Romans was obtained from outcrops, where the seams came to the surface is more than probable. There appears to be no certain evidence of any regular mining for coal at this period.—*English Industries in the Middle Ages*, by L. F. Salzman.

W. W. ODELL, fuel engineer, U. S. Bureau of Mines, has commenced the study of peat as a fuel, and is spending some time at the Minneapolis experiment station of the bureau, in the northern peat district. So far he has made preliminary studies as to the best methods of attacking the problem with the funds available.

How the Modern Underfeed Stoker Works, and Why*

Number of Underfeed Stokers Has Increased Rapidly—What Special Features in Design Have Been Introduced for Burning Western Coals—Progress of Ash in Fire Must Be Given Serious Consideration

BY JOSEPH G. WORKER†

IN ANY study of fuel-burning equipment, we must discriminate between theory and good practical operating engineering. Our problem in fuel burning is not entirely one of selecting the most efficient thermal system. We must consider also those physical factors in the fuel bed which vitally affect its combustion and determine its ultimate efficiency.

Low flue-gas temperatures, preheated air, hollow-wall construction, etc., affect the overall efficiency of a combustion system from five to ten per cent, but they are not a part of any one particular combustion system, although they may be provided with any one of them. In our endeavor to find any given condition which will give the best results from a dollar-and-cents basis great care must be taken to see that the results obtained are not attributed to the wrong causes.

The mechanical stoker, more than any other piece of boiler-room equipment, has made it possible to design boiler plants of the present high capacity, to burn

were equipped with one type or other of underfeed stoker, about 200,000 hp. were provided with some type of chain-grate stoker and about 50,000 hp. with some kind of overfeed stoker. That is, about 75 per cent of the stokers sold in the United States during the year 1922 were of the underfeed type.

Though these figures throw some light on our subject, they are perhaps as expressive of economic conditions as they are of efficiencies in the different combustion systems. These figures may be surprising, because only a few years ago any of us would have correctly stated that most of the stokers sold in the West were of the chain-grate type. The change has come about slowly. It may have been delayed at times, but we are now at the point where almost as many underfeed stokers are being installed in the West as in the East.

CONFUSE FUEL BURNING WITH CLEANING

We may have been correct in the past in claiming that no stoker handles all grades of coal with the same degree of satisfaction. In that thought, however, we allowed ourselves to consider difficulties in mechanical operation that were in no way a part of the fuel-burning system, but were to a large extent a part of the cleaning process of the fuel bed.

There have always been two types of stoker designers. One had tendencies toward building a machine that would offer the best combustion possibilities, irrespective of the cleaning devices. Others mixed and confused the problem, with the result that stokers have been designed which, though they were not the most efficient in the burning of coal, handled clinkers so satisfactorily that their lack of combustion efficiency was willingly overlooked.

We have heard many times that the underfeed was all right for Middle-west coals, except that when it was used the clinkers gave too much trouble. In many

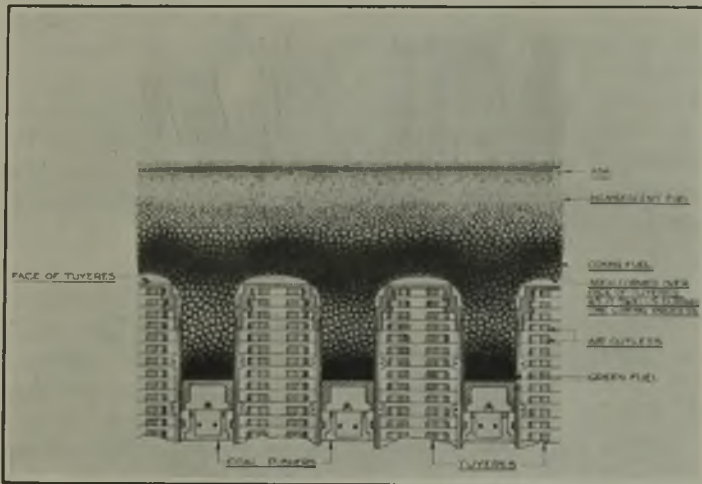


Fig. 1—Fuel Bodies of an Underfeed Fire Bed

During the coking process, the coal swells and forms arches over the tuyeres. The incandescent fuel is on the top and the coking area extends back into the retorts.

the fuel efficiently and rapidly and to obtain as much as 6 kw. of generator capacity per boiler horsepower. Only fifteen years ago, we were obliged to install a boiler horsepower for every 2 kw. generated.

Many types of stokers have assisted in this development. The underfeed stoker has played its part and has figured prominently in this progress. To appreciate the extent to which it is now used to burn Mid-west coals, a survey was made and the following facts were revealed:

A little over 1,000,000 hp. of boilers were sold in the United States during the year 1922, by twenty-eight boiler companies. This includes about 800,000 hp. of all types of mechanical stokers. Of these, 550,000 hp.

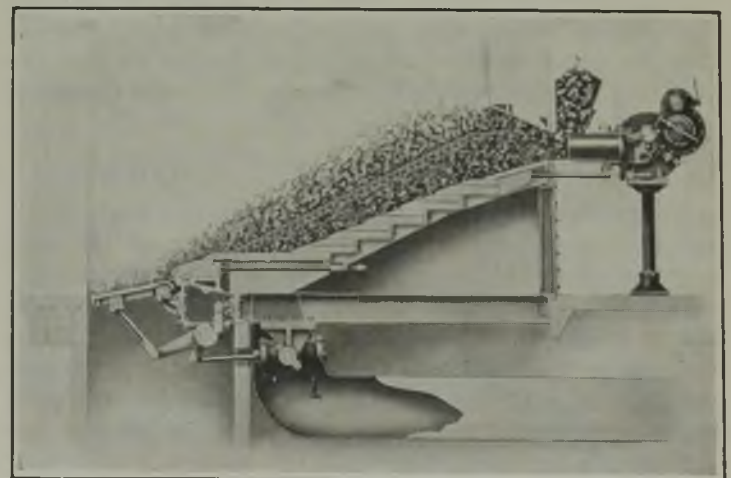


Fig. 2—Taylor Underfeed Fuel Bed

This illustration shows the gravity ash feed. The fine ash floats on the top of the fuel bed and slowly works its way down into the ashpit.

*Abstract of address delivered at Chicago Section, American Society of Mechanical Engineers, Jan. 15.

†President, Stoker Manufacturers' Association.

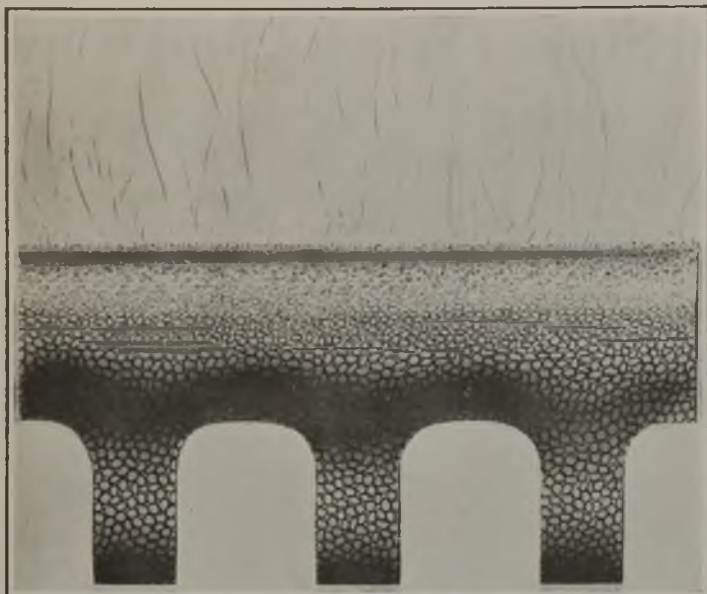


Fig. 3—Section Through Fire Bed

The arched areas correspond to the positions of the tuyeres shown in Fig. 1. The fuel bed is supported by the green coal in the retorts.

instances those who made this statement failed to investigate how this difficulty could be overcome without disturbing the primary combustion system.

Years ago, when the underfeed principle was being developed, some of the power stations of the East had a somewhat similar experience. Some people could not see its virtues, and almost endless discussion resulted. Improvements were made on one part or other of the controlling mechanism, but the underfeed method of burning coal was, probably more than any other single element, the reason for the success of the whole system.

Many new stoker developments were started in the West, but rarely were their problems finally and definitely worked out. If they were, it was when some other part of the country took up the problem. Even then, as the coal conditions in that section were not so severe as in the West, the solution of the difficulty gave such an impetus to the stoker business that no further effort or money was spent in modifying a particular stoker to suit Western coals.

It is important to obtain a clear idea of the principles involved in the burning of a fuel bed on a multiple-retort underfeed stoker. An endeavor has been made to exemplify in Fig. 1 some of the ideas of Elwood Taylor, by whom this type of stoker was invented. The inventor's claim, when he petitioned for patents on this device, explains clearly the movement of the fuel.

UNDERFEED FUEL BED IS NOT AGITATED

Many have the idea that an underfeed fuel bed is agitated and that the fuel is pushed across the supporting structure from the point where it enters the fuel bed to the point where it is discharged as ash; but the inventor stated that in the operation of his stoker, the fuel bodies in the several retorts constituted the legs of a single fuel bed. This bed burned with the incandescent fuel on top and with the coking fuel underneath extending back into the retorts.

Owing to the cohesion and arching properties of the fuel as it swells during the coking process, the fuel bed receives its support from the walls of the retort and is fed outwardly by the retort pushers.

It arches over the tuyere faces and so is kept substantially free from them as shown in the sketch. This illustration also plainly shows the partially coked coal extending into the retorts, an endeavor being made to make plain the way in which the coke arches over the tuyeres. This operating principle and the claim of the inventor has been demonstrated in research work in connection with this stoker. It has also been substantiated by expert engineering testimony.

COKE ARCHES HOLD UP FUEL BED

Few have realized that the coke arches in the underfeed stoker act in the combustion process as the refractory arches do in the chain-grate and other stokers. These underfeed arches are made up of partially burned coal and are continuously being burned up and reformed. Immediately over these arches of partially burned coal is the incandescent and major fuel bed extending across the openings of the retorts.

Finally, it will be noted that the fine ash floats on top of the entire fuel bed, Fig. 2. These particles of ash are small and were originally independent pieces of green fuel. The ash is fed by gravity down the slope of the fuel bed, the movement being induced by the periodical introduction of cartridges of fuel which give a weaving movement to the fuel bed and an outward feed movement across the mouth of the retort.

Often the idea is advanced that the agitation of underfeed fuel beds is undesirable where a high-ash coal is used. A careful analysis of these fuel beds will show, in fact, that the fuel is not agitated or mixed as is generally supposed. The injection of these cartridges of fuel is so slow that the movement at the time the coal is introduced is hardly perceptible to the eye. The arching of the fuel in the retort relieves the pressure on the coal pushers when they retreat for another charge, and consequently the fuel movement is always outward.

ASH ROLLS DOWN SLOPE BY GRAVITY

The operation of the underfeed stoker is thus easily distinguishable from that of forms of mechanical stokers employing inclined grates in which the green fuel is fed by the overfeed principle. No grate or fuel support, such as is employed by overfeed or chain-grate stokers, is used in the underfeed types, the fuel instead being supported from the retorts. This is made clear by Fig. 3, in which all the supporting structure of an underfeed fuel bed has been taken away. This shows how the underfeed fire is supported on legs of coal and the major weight of the fuel bed is transmitted to the retorts.

The formation and progress of the ash of an underfeed fuel bed is generally misunderstood. No pushers or rams compel the ash in an underfeed fuel bed to progress through the fire. It can be proved that the

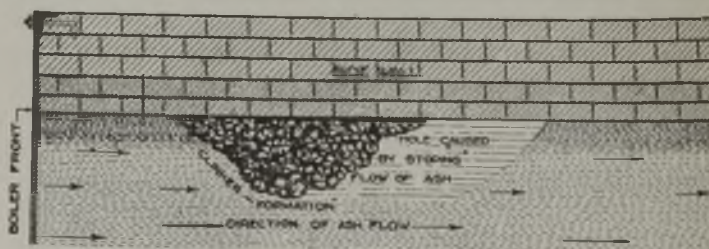


Fig. 4—Formation of Clinker on Side Wall

Unless the ash continues to flow in its natural course a clinker quickly builds up and grows larger until removed.

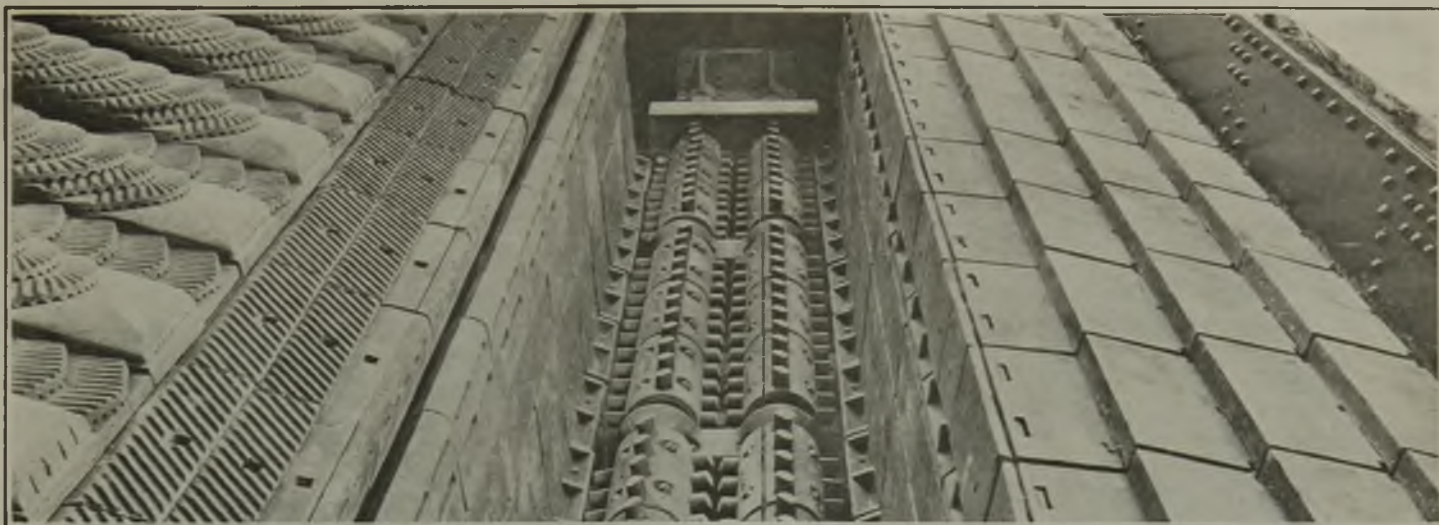


Fig. 5—Rotary Ash Discharger Which Prevents Formation of Clinker

This is one of the latest devices adapted to stokers. The illustration shows a series of air backs and water backs frequently used on the front face of the bridge wall to prevent stoppage of the ash in its course to the clinker grinder. Clinkering coal no longer presents serious difficulties to stoker manufacturers.

feed of green fuel induces the ash to move by gravity down the slope of the fuel bed. A close-up view of the surface of such a bed would show clearly that the fine particles of ash travel down the incline. The inclination of the fuel bed must be such that the ash will move in this manner.

Having developed the principles of a proper fuel-burning process, have we given enough thought to the machinery necessary to allow a fuel bed to function according to its principles? If there were no side walls nor bridge walls or other refractory parts surrounding an underfeed stoker, and nothing to retard the flow of ash from the top of the fuel bed to the bottom, would clinkers form?

A particle of ash in a fuel bed, as shown in Fig. 4, if stopped in its proper course down the slope adheres to the side wall and backs up the oncoming ash, thus commencing the formation of clinker. Unless it is started on its course again, it will gradually grow until it builds out underneath the fuel bed and in some cases down into the retorts.

In developing the furnace construction for underfeed stokers, side-wall air plates, air-cooled crusher plates, water backs, etc., have been devised and constructed, all for the purpose of keeping the ash from stopping in its course down the fuel bed. Side-wall air backs are now quite generally used with underfeed stokers. These plates are working quite satisfactorily and, of course, are much better than the refractory material which they have replaced.

ASHES STOPPED AT BRIDGE WALL AND CLINKERED

If we assume that the ash is not stopped in its descent of the slope of the fuel bed, it will eventually reach the bridge wall. When multiple-retort underfeed stokers were first installed they were equipped with dump grates, and unless this part of the stoker was handled properly, the ashes would stop at the bridge wall and gradually accumulate and back up so that large clinkers would form. These would not only lie on the dump grates but would build up into the fuel bed.

Without disturbing the principles of this fuel bed, the designers tackled the problem of the stoppage and clinkering at the bridge wall and the result was what is commonly termed the rotary-ash discharger shown in Fig. 5. This device is necessary for the continuous

progress of the ash and clinker from underfeed-stoker fires.

It is obvious that under certain conditions of operation, it would not be necessary to actuate continuously the crusher in the ash well. It is therefore only operated to keep in tune with the formation of ash as it proceeds down the slope of the fuel bed. Air backs and water backs are used on the front face of the bridge wall to prevent the ash or clinker from being stopped in its downward course through the ash wells and through the crusher rolls into the ash pit.

The West is now solving some of these clinker problems. No longer are we in fear of what the ash in the coal may do. At least, the clinkering of Western coals is no longer allowed to hinder good engineering progress.

Mechanizing French Coal Mines

In order to meet the increased cost of operation, French coal-mining companies have given special attention to mechanical equipment suited to the conditions in French mines. This has resulted in the increase in the percentage of coal produced by machines in one district from 4.27 per cent in 1913 to 16 per cent in 1922, says Chester Lloyd Jones, Commercial Attache, Paris, in a report to the Department of Commerce.

The character of the deposits is such that certain types of coal mining machinery as used in the United States will not always work with efficiency. Nevertheless in the Pas-de-Calais and in the Nord marked advance has been made in recent years. In the Pas-de-Calais there are two American machines of special type and one bar coal cutter in use or under trial. The most successful type employed is that of the mechanical pick-hammer. Of these there were in use in 1911 only 743, in 1913, 1,392; but in 1922, 2,872 were employed. Perforating hammers of the hand type have also become prominent, the number in use having risen from 1,878 in 1913 to 2,343 in 1922.

In the Nord the coal mined by mechanical means before the war was about 2.5 per cent of the total, but in 1922 this had increased to 10 per cent. Six coal cutting machines were operated during the year, but, because of the nature of the coal deposits, they showed a yield of only some 17,000 tons.

Just How Harmful Is Dust?

Coal Miners Not Immune from Tuberculosis According to Insurance Statistics—No Physiological Trouble from Stone Dusting

“ANY dust insoluble in the fluids of the respiratory passages and in sufficiently finely divided form to float in the air and be breathed by underground workers will ultimately be harmful to health if the dust is in large quantities and is breathed by workers for considerable periods of time,” said D. Harrington, U. S. Bureau of Mines, in his paper at the fourth and final session of the Industrial Relations Committee, American Institute of Mining and Metallurgical Engineers, Feb. 20. “This applies to insoluble non-mineral as well as to mineral dusts or mixtures of them, and includes coal dust or mixtures of coal and other dusts.”

Dr. A. J. Lanza read Mr. Harrington's paper in his absence, and in commenting on it, stated that the latter had said many things that were unquestionably true. It has long been believed that coal miners are immune to tuberculosis, but more recent investigations would indicate that this may be far from true. Insurance statistics do not bear out the miner's immunity, and coal dust does not appear to immunize the lungs to the tubercular bacillus. If the ordinary tubercular risk, so far as an insurance company is concerned, may be regarded as being 100, that of the coal miners would be 475.

B. F. Tillson stated that fine dust seemed to be soluble in the lung fluids. He inquired concerning the relative danger of drilling upper holes and those drilled horizontally, and asked if the dangers from wet drilling are as great as those from dry drilling. Also, he wanted to know if limestone produced a dangerous dust. He called attention to the fact that every one breathed more or less dust and that it is probable that city dwellers take more fine particles of foreign matter into their lungs than do workers in metal mines.

In reply, Dr. Lanza said that in drilling upper holes the dust falls down almost directly upon the driller and gives the worst possible condition. In wet drilling heavy air pressures passing through hollow drill steel force dust back out of the hole in air bubbles. Naturally these burst and release the dust into the air.

IS DUST DRAWN TO DRILLER BY EXHAUST?

Some one then asked if the suction created by the exhaust of the drill might not draw the dust issuing from the mouth of a horizontal hole toward the driller. It was stated that some experiments tended to substantiate this idea. It was also said that ordinary limestone dust might be taken into the body in large quantities without bad effect, it being dissolved and thrown out practically as fast as it was absorbed. It was said also that sulphide dust appears to be no worse than any other dust. In general, the effect produced by any dust upon the human system is in proportion to the exposure to that dust, or, in other words, to the dosage.

The discussion then turned upon the physiological effect produced by stone dusting in the mine. Mr. Rice stated that in England and France, coal dusts were neutralized for explosions with limestone or shale dust, and in Great Britain rock dusting has been made compulsory by law. Experience so far would justify the belief that no ill physiological effects have resulted from this neutralization.

Ordinary wetting of coal dust has proved a failure in preventing dust explosions, but rock dusting appears to set up an efficient barrier to the propagation of the explosion flames. No physiological troubles have been experienced in Great Britain from stone dusting, although the English use a shale dust which contains as much as 30 per cent of silica. It is therefore believed that rock dusting is safe both from the explosive and the physiological standpoint.

ASTHMA DECREASING AMONG COAL MINERS

Mr. Taylor then stated that asthma appears to be on the decrease among miners. It is believed that modern coal-mine ventilation is sufficient to sweep out any dust which may be formed before it has time to act harmfully upon the miners' lungs.

Mr. Tillson said that mining men necessarily must compromise in seeking conditions theoretically correct and must submit to the requirements of practical mining. The ideal would be to allow no dust within a mine, yet stone dust is needed to prevent explosions. Furthermore, practical mining demands that blasting be done throughout the day, whereas the ideal would be to perform blasting only at night or when no men were in the mine. He asked what was the danger point so far as the quantity of dust allowable in mine air was concerned, and stated that this would be valuable knowledge from a practical standpoint.

In reply, Mr. Rice said that the Bureau of Mines has not yet reached any satisfactory conclusions on this point, but that investigations are progressing. Much experimental work already has been done, but the conclusions deducible from it have not yet reached even an approximately final stage.

Mr. Tillson suggested that in view of the importance of the dust hazard in mining a symposium upon it be held at the next annual meeting. It is quite probable that the Institute will take some action upon this point in the near future.

J. T. Ryan addressed the committee on industrial relations in European coal mines, illustrating his talk with a series of excellent lantern slides. He stated that European mine conditions differ greatly from those prevailing in America, but we may nevertheless learn much from Europe's problems in industrial relations and their solution.

European mines are constructed for operation over long periods, sometimes for as much as 400 years. All top works, as well as the miners' houses are built of durable materials and are designed to last for an equal length of time. The French pay more attention to welfare work than the British mine operators, and they have fewer strikes. Mr. Ryan's talk and slides show conclusively that continental mine operators pay far more attention to the human factors in mining and study more carefully than do those of Great Britain what might be termed the human failings and idiosyncracies of their workers.

W. R. Chedsey in the course of his remarks stated that the law of supply and demand cannot be superseded by state or national statutes. The slogan of a living wage for the worker is not all that might be desired. A better one would be a living wage and more for the workers with ample opportunity to earn it. The basis of payment for any person in an industry should be only that of value received, and the living wage should be earned and not gouged out of the public by union power or other means.



Crane Creek Tipple at McComas, W. Va.

Theory and Practice in Air-Table Cleaning and Results Attained in Field Operation*

What Pressure Is Needed to Lift Particles and to Raise a Bed of Coal from the Table—Screens and Dust Collectors Now Work Without Trouble—Ash in Some Coal Reduced 64 per Cent

BY RAY W. ARMS†
Chicago, Ill.

DRY cleaning, or pneumatic separation, is not, strictly speaking, a recent discovery. Among the archives of the Patent Office may be found many patents dating back as far as 1850 which cover early attempts to separate materials of varying specific gravity or of different shape by means of air. Hundreds of patents covering this art have been issued, which may be roughly classified into four general groups, as follows:

1. Stationary devices with pulsating air currents. In these the separating surface is usually riffled and air is supplied by bellows or compressors. This group also includes air jigs, which have been used rather extensively.

2. Stationary devices with continuous air currents. These submitted the material to a continuous current of air, either horizontal or vertical. Chaff is blown from wheat by such a device.

3. Reciprocating or vibrating devices with pulsating air. A small group in which the pulsating air is supplied by bellows and some motion provided in the separating surface to move the stratified material to various discharge points.

4. Reciprocating or vibrating devices with continuous air supply. This is by far the most important group,

and all recent developments have been of this description.

All these groups of machinery involve the stratification of material by air and include none of the dry cleaning devices that use other principles, such as the coefficient of friction, magnetism, etc.

In all the groups of air separating devices already mentioned the same phenomena are found as exist in water concentrators; that is, free settling will be found in some and hindered settling in others, with a complex action on the reciprocating tables similar to the wet tables.

The experimental value of the settling ratios of particles in air has never been determined but, following the formulas given in Richards' "Ore Dressing," they can be calculated. The formula for the settling velocity of particles in any medium is as follows:

$$V = C \sqrt{(d - d_1) D}$$

in which V = velocity of the particle; d = density of the particle; d_1 = density of the medium; D = diameter of the particle and C = a constant depending on the shape of the particle and the units used. This constant has never been determined for coal or slate, but in my estimation that for slate will be about 0.85 of that for coal because the slate is usually in tabular form.

To determine the free-settling ratio, which is the relation between diameters of particles settling in a

*Article entitled "Dry Cleaning of Coal," read at the February meeting of the American Institute of Mining & Metallurgical Engineers, New York City, Feb. 18-21.

†Contracting Engineer, Roberts & Schaefer Co.

medium at the same rate, the two velocities are equated and the ratio of the diameters determined. Thus:

$$100\sqrt{D_1(1.3 - 0.00124)} = 85\sqrt{D_2(2.6 - 0.00124)}$$

$$\frac{D_1}{D_2} = \text{free settling ratio of coal and slate in air} =$$

1.4, where D_1 = the diameter of the coal particle and D_2 = that of the particle of the slate.

In wet concentration, it is a known fact that the hindered-settling ratio is much larger than the free-settling ratio, and it is reasonable to suppose that the same holds true with air separation. From experiments that have been made so far, it is reasonable to assume that the hindered-settling ratio is approximately 2.5. This ratio governs the sizing that must precede concentration and will vary in different coals.

The theoretical calculation of the quantity of air that will be required to suspend a bed of raw coal sufficient to cause stratification is indeterminate, owing to the fact that this suspension is accomplished partly by the static pressure and partly by the velocity of the air; but the two limits caused by these factors may be found, and the calculation is determined to that extent. The effects of these two factors may be observed best by considering the extreme cases: first, of a single particle of coal being lifted or suspended by a blast of air; second, of an air-tight bed of particles being lifted by air pressure.

In the first case the lifting power of a blast of air is roughly equal to its velocity pressure. For example, a velocity pressure of 0.1 lb. per sq.in. will have an equal buoyant effect over the surface of the particle. Any particle weighing less than 0.1 lb. per sq.in. of cross-section will be lifted by this velocity and, conversely, a particle of more than this weight will sink. It is assumed in this discussion that the particles are roughly cubical or spherical and that the area subjected to the action of the air is cross-sectional area.

For the particles of any other shape, the minimum cross-sectional area should be used, as the particle will assume a position in a blast of air that will bring its long axis parallel with the direction of the air current. It is manifest that the above theory will be somewhat complicated by the eddying air currents, which vary considerably with the shape of the particles. It is presumable that cubical particles would be easier to support than flat slabs or more or less "stream-lined" shapes. The formulas required to figure the lift on a particle are derived from the elementary physical formula $V^2 = 2gh$; in which V = velocity of air in feet per second; g = force of gravity, and h = head in feet. In this discussion, this formula means that a pressure in pounds per square inch equal to the weight of a column of air 1 sq.in. section and h ft. high will cause air to flow at the rate of V ft. per second. For example, 0.1 lb. per sq.in. pressure at 32 deg. F. and 30 in. of mercury is obtained by a certain height of a column of 1 sq.in. section:

$$\text{Weight of air} = 0.080975 \text{ lb. per cu.ft.}$$

$$\text{Column 1 in.} \times 1 \text{ in.} \times 1 \text{ ft.} = \frac{0.080975}{144} = 0.000562 \text{ lb.}$$

$$0.1 \text{ lb.} = \frac{0.1}{0.000562} = 177 \text{ ft.} = h$$

$$V = \sqrt{2 \times 32 \times 177} = 106 \text{ ft. per second} = 6,360 \text{ ft. per minute.}$$

The size of coal that will be sustained by this velocity can be calculated by determining the size of particle having a weight of 0.1 lb. per square inch of sectional area. Using the cube as the shape:

0.047 lb. = weight of 1 cu.in. coal at 1.3 sp.gr.

Let x = any dimension in inches,

then $0.047x^3$ = weight of the coal particle,

$\frac{1}{x^2}$ number of particles covering 1 sq.in.

$\frac{1}{x^2} \times 0.047x^3$ = weight of 1 sq.in. of particles, but the particles weigh 0.1 lb. per square inch. Therefore, $\frac{1}{x^2} \times 0.047x^3 = 0.1$ and $x = 2.1$ in. Thus the velocity pressure of 0.1 lb. per square inch representing a velocity of 6,360 ft. per minute will support a 2-in. cube of coal.

Conversely, the velocity required to support any size of particle may be calculated as follows: Assume a $\frac{1}{2}$ -in. cube of coal,

$$\text{Weight per square inch} = \frac{0.047}{2} = 0.023 \text{ lb.}$$

$$h = \frac{0.023}{0.000562} = 41 \text{ ft.}$$

$$V = \sqrt{2 \times 32 \times 41} = 51 \text{ ft. per second} = 3,060 \text{ ft. per minute.}$$

Thus air at a velocity of 3,060 ft. per minute will support a $\frac{1}{2}$ in. cube of coal.

The second factor entering into the stratification of coal by air is the static pressure under the bed. If this bed of coal were so closely packed as to be airtight, the total pressure acting upon it would be the maximum pressure the fan or blower could produce. If a centrifugal fan or blower is used, it is possible to maintain a pressure as high as 8 or 10 in. water gage and this entire pressure would be exerted to lift and loosen the bed of coal until a certain air velocity could be obtained. The lifting power of this static pressure is quite high and is found as follows:

$$1\text{-in. water gage} = 5.2 \text{ lb. per square foot}$$

This will balance a solid bed of coal 0.77 in. deep; 8-in. water gage will balance $8 \times 0.77 = 6.16$ in. of coal

A fan of the type generally used, therefore, will provide sufficient static pressure to open up any bed of coal that may be put upon it but usually will not provide sufficient air to support the particles by velocity pressure alone unless the particles are very small.

In the operation of a dry-cleaning table, the air actually used is much less than is required to completely support the particle, and the pressure of the air immediately below the coal bed is low as compared with the maximum pressure the fan will generate. The condition sought is a loosening of the bed so that the refuse will sink and the coal tend to float. To obtain this condition it is necessary to find the balance between the weight of the particles involved and the static and velocity pressures of the air.

As cold air is heavier than hot air, less of it will be required by volume to support the coal, but the velocity pressure will remain the same. More power is required to move equal volumes of cold air but the requirements of cleaning will remain practically constant, as less of the cold air is required. In rarefied atmospheres, fan speeds should be relatively higher.

This discussion of theory leaves much to be desired in the way of a definite basis on which to make calculations but it is hoped that it may suggest some starting points for investigation, which will bear fruit in the form of data and constants which will be useful in the future development of the art of dry cleaning.

A large plant using air cleaning tables is being built and tested at McComas, W. Va. This plant started

TABLE I—TESTS ON DRY-CLEANING TABLES

Kind of Coal	No. of Tests Conducted	Per Cent Ash		Per Cent Reduction
		Raw Coal	Clean Coal	
No. 3 Pocahontas seam.....	18	10.04	5.37	46.51
No. 6 Illinois seam.....	4	13.37	6.93	48.17
No. 4 Indiana seam.....	4	11.15	6.79	38.69
Clinchfield, Va.....	1	11.64	4.63	60.22
No. 5 Ohio.....	1	19.95	8.25	58.70
Penna. Anthracite No. 2 buckwheat.....	1	18.70	8.50	64.30
Coke breeze.....	1	17.37	9.54	46.23

cleaning coal about the first of May, 1923, and has been operating more or less continuously since.* During this time the cleaning tables have operated with entire satisfaction. No structural defects have developed, and the tables have established themselves as efficient coal-cleaning devices. However, there have been unforeseen difficulties at McComas which have delayed the successful operation of this plant as a complete unit.

The collecting system proved to be inadequate for the large volumes of dust created in handling Pocahontas coal by methods of this kind. This problem was submitted to the B. F. Sturtevant Co., which installed a complete new system that is now handling the dust in a satisfactory manner. The failures of the original installation at McComas and at Raton, N. M., were due to the fact that the volumes of air handled through the dust-collector system were too small. The present system uses large volumes, large pipes, and large collectors, with a power consumption only slightly greater than the original system.

The screens originally installed at McComas were of the anti-gravity type with a head motion and details used for the first time on the McComas installation. This type of screen shows certain structural advantages, particularly in its adaptability to use on a level floor, but it had not been sufficiently developed mechanically to withstand the hard usage to which the screens were submitted, and breakage of parts frequently interrupted operation.

The vibrators which enlivened the screen surface also gave trouble and inefficient screening so interfered with the operation of the tables and caused the circulation of so much dust in the air, which should have gone to the undersize, that it was decided to replace the screens with Hum-Mer units, of which the operating characteristics are well known.

A 150-ton per hour dry-cleaning plant is now under construction at Wyco, W. Va. This is being built for the Wyoming Coal Co. This plant is designed and built by the Roberts & Schaefer Co., and uses the same types of pneumatic separators, dust collectors and screens as those mentioned as now being used in the McComas plant.

A dozen or more dry-cleaning tables are in course of development. Some are in the experimental stage, some are being transferred to coal cleaning from the field of ore concentration, and one at least is being included in the equipment of a plant under construction. None, however, has been placed on general sale except the American pneumatic separator.

This separator is capable of cleaning coal as large as 2 in. diameter and as fine as 100-mesh, by using the proper deck for the size treated. The coal is first sized so that the finest particles in the feed are about half the diameter of the largest. This limitation in the variation in size is found to give the best effect. The capacity of the table varies according to the size of the

coal; the table for coal of about 1 in. diameter having the highest capacity, namely, about 25 tons per hour. The power required to operate the table, including fan, head motion and feeder, also varies according to the size of the coal and the capacity and has its maximum at about 25 hp.

The cleaning tables at Raton, N. M., are of a smaller type than the so-called American pneumatic separator, being designed primarily for seeds, grains, and ores, but they are fully as effective, except that they have a lower capacity than the types installed at McComas and also at Wyco.

In all the tests made on this separator, the coal has been prepared for cleaning by a preliminary screening into several sizes. This has been the practice at the Raton and McComas plants, for thereby the best possible cleaning is obtained. Given the advantage of close sizing and middlings return, the pneumatic table will closely approach perfect cleaning on the sizes treated.

By perfect cleaning is meant the complete removal of all material heavier than a certain predetermined specific gravity, with the loss of none of the lighter

TABLE II—DRY CLEANING RESULTS AT RATON, N. M.*

Size of Coal	Per Cent Ash		Waste
	Raw Coal	Clean Coal	
1 in.— $\frac{1}{2}$ in.....	17	11	63
$\frac{1}{2}$ in.— $\frac{3}{4}$ in.....	17	10.5	65
$\frac{3}{4}$ in.—1 in.....	16	9.5	70
1 in.— $\frac{1}{2}$ in.....	18	10	66
$\frac{1}{2}$ in.— $\frac{3}{4}$ in.....	22	14	70
$\frac{3}{4}$ in.—60 mesh.....	25	19	70
Total.....	16.83	11.06	64.6

particles into the refuse. This perfect cleaning may not produce a clean coal with as small an ash content as may be desired, but if not, it is the fault of the coal and not of the cleaning.

If this perfection of cleaning is not required, and it is desired merely to remove a portion of the heavy material, it can be done with the dry-cleaning tables without such close sizing. Also, those coals which have small proportions of bone coal and other constituents of intermediate specific gravity will require less attention to sizing than coals with much of this material.

For efficient dry cleaning, therefore, close sizing is essential, but a considerable reduction in ash can be accomplished without it.

For the most efficient screening into the various sizes, the feed should be reasonably dry. Coal that is dampened by moisture other than "inherent" moisture screens with difficulty and carries much of the fine clinging material into the oversize. This is no great detriment to table operation except that it cuts down table capacity by subjecting much material to treatment from which it receives no benefit.

Coals which contained as much as 12 per cent of water have been treated on these tables with good results. It may be said, therefore, that any coal that can be screened can be cleaned. Thus the matter of superficial moisture in the coal becomes purely a screening problem, and even should the coal be screened on

TABLE III—SELECTED DATA ON RESULTS AT McCOMAS

Size of Coal, Inches	Per Cent Ash	
	Raw Coal	Clean Coal
2-1 $\frac{1}{2}$	15.8	6.5
1 $\frac{1}{2}$ -1.....	18.9	9.3
1- $\frac{1}{2}$	9.0	6.4
$\frac{1}{2}$ -1.....	9.0	6.6
$\frac{1}{2}$ - $\frac{1}{4}$	8.7	6.5
$\frac{1}{4}$ - $\frac{1}{8}$	9.1	7.6

*From paper read by Frank Young before Rocky Mountain Coal Mining Institute.

*Written in November, 1923.

wet screens with sprays, the sized products may be subsequently tabled.

On the separators at Raton, McComas and Wyco the various products are in plain sight and can be easily directed into clean coal, middlings, or refuse chutes, or as many different grades of coal as may be desired, by a simple adjustment. The present practice is to return the middlings to the feed, the purpose of this being twofold; first, to allow "accidental" middlings another opportunity to find their proper zone; second, to take care of any fluctuations in the refuse content of the feed. With this practice, the operator is not required to shift the divider with every variation of the refuse line.

Another advantage of this graded discharge is the possibility of adjusting the products to suit various market conditions. Portions of high-grade coal may be taken off to fulfil specifications by either wasting a certain quantity of the inferior grades of coal or mak-

ing separate disposition of them. The use of a large quantity of intermediate coal for steam around the plant will improve the remainder of the slack destined for shipment; in fact, the more of this that can be used, the better is the boiler fuel as well as the shipped portion.

Many coals have been tested on dry-cleaning tables with uniformly satisfactory results. Table I shows some actual tests made on representative coals; Table II shows results at Raton. The tables used at the latter plant are small in size but the quality of the cleaning is representative.

Difficulties have interfered with the continuous operation of the plant at McComas, therefore the average analysis of the products would fail to express what can be accomplished when the plant is operating properly. The figures in Table II, therefore, were selected from the actual results, which will no doubt be improved upon in the future.

Convenient Coal House Erected for Use Of New Mexico Miners

Fuel houses or "chutes," as they are termed, of the type illustrated in this article, have been erected by the Phelps Dodge Corporation at its mines in New Mexico. These chutes are designed to hold approxi-



Fig. 1—Coal Chutes as the Camera Shows Them

Backing the fuel chute up to the yard fence and shoveling the coal or coke from the rear end is not only convenient to the householder but keeps the wagon out of the yard when making a delivery.

mately one ton of coal and an equal weight of coke. They may be made double wherever a chute can be conveniently located so as to serve two houses.

These chutes are placed outside the yards by which the houses are surrounded. A hole cut through the fence permits the fuel, either coal or coke, to be shoveled out readily and conveniently as long as any remains in the chute. This arrangement renders it unnecessary for the coal wagon to enter the yard when making a delivery. Both pea coal and coke of the same size are used as domestic fuels, and these chutes give the householder a choice between the two. They are often built to accommodate only one fuel, however. In general they are cheap, easily built and convenient, and are a great improvement over the coal pile that in past years has all too frequently disfigured the miner's premises.

IN GREAT BRITAIN SHAKING CHUTES are being used to bring coal to the mouth of rooms up grades of 1 in 8 or 12½ per cent. The anthracite region has taken kindly to the shaking "chute" and there also the coal, where necessary, is carried uphill by the medium described. Strictly speaking, such shaking troughs with a slow forward motion and a quick return cannot be regarded as chutes in any proper sense of the term. Unfortunately no other word is forthcoming.

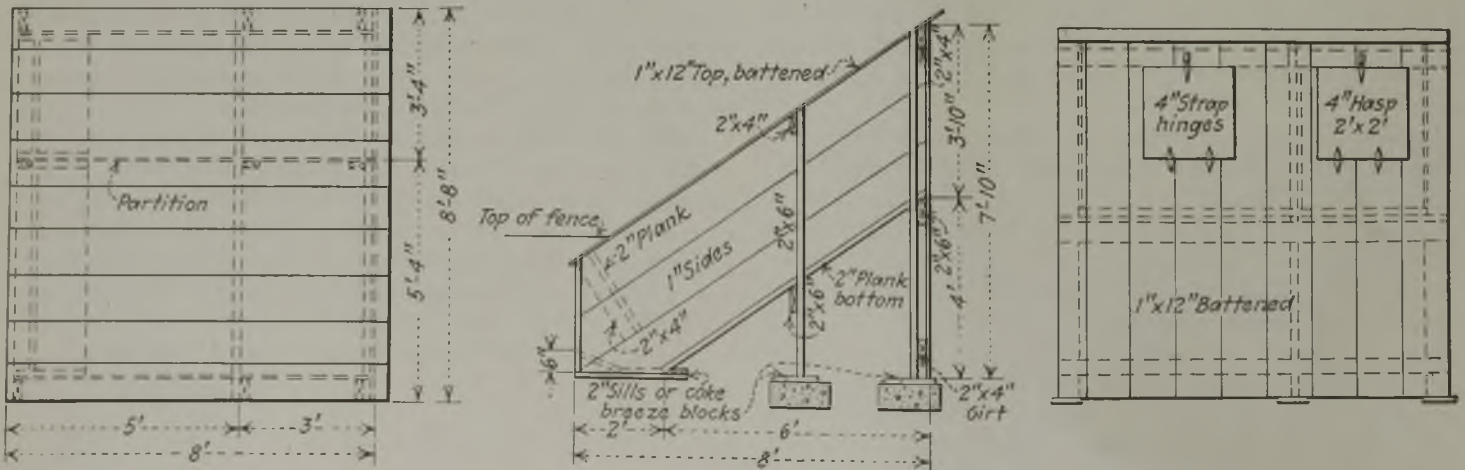


Fig. 2—Detail of Construction for Miner's Coal House

Except for the bottom plank a 2x6 is the heaviest piece of lumber employed in these chutes. Almost any "handy man" can build one. The verticals are set on small concrete foundations. Though the coal is delivered at wagon height it is not broken by the fall but slides gradually down the slope as it is used by the tenant.

Hydraulic Stowage at Home and Abroad

In European Mines Rock Is Crushed and Flushed into Mine
—When Workings Are Filled Hydraulically as Much as Forty
Feet of Coal Has Been Removed Under a City Without Damage

OF PARTICULAR interest to coal-mining engineers whose properties lie in densely populated regions, or those where the value of the surface is great, was the session of the American Institute of Mining & Metallurgical Engineers devoted to ground movement and subsidence. This meeting which was held in the Engineering Societies Building was presided over by Mr. Moulton. As a preliminary to the meeting proper, he described the methods employed in tunnel driving through sand in building subways in Brooklyn.

This procedure more nearly resembles that of forepoling than any other method normally employed in mining. Cuts about 2 ft. in length are made at a time. A small hole about 2 ft. in depth is driven in the upper right- and left-hand corners of a face and short props inserted. A third hole is then driven in the center of the tunnel at the top and another prop or a forepole inserted. Next, a thin slice is taken between these openings and a plank placed under the roof supported by a prop and the timbers in rear. When the slice has been taken clear across the upper portion of the face, planks are inserted and held up by timbers while the balance of the cut is taken out.

PACK EXCAVATIONS WITH BROKEN ROCK

Following this, George S. Rice presented a paper on ground subsidence and surface support as practiced in European mines. In France, it is considered that subsidence of the surface after mining is inevitable and all excavations made underground are filled. This filling is usually done by hand, the rock being packed with extreme care. Hydraulic filling is, however, employed in certain regions. Both the mine refuse and rock from the surface are employed in building the packs.

In hydraulic filling, where no sand or gravel is available, stone is quarried on the surface and crushed to suitable sizes before being taken into the mine. Hand stowage is done in an extremely careful manner. The ultimate subsidence experienced with careful hand filling is kept down to about 50 per cent of the depth of coal removed.

An excellent example of hydraulic stowage is found in Saxony. Here, about 40 ft. of coal is being removed and more or less destructive subsidence of the surface was present on the outskirts of a somewhat populous city. As a result, the city authorities were loath to grant permission for removal of coal inside the corporation limits. Permission to remove the coal from under the city was finally obtained, however, provided the workings were filled hydraulically. This has been done and the surface subsidence is only 5 to 10 per cent of the thickness of the coal removed. Practically no destructive effects are visible on the surface.

Mr. Rice showed a number of excellent lantern slides illustrating surface subsidence and its effect. Among others was shown a picture of an engine house that had settled about 20 ft., without material damage to the hoist engine. The shaft which this engine served, however, was thrown out of alignment. Another picture showed a beautiful old stone church, probably dating back several hundred years. This also had been subject to a settlement of about 20 ft., without any perceptible damage being done. Some of the other views showed stone dwelling houses in which slight cracks had made their appearance but which easily could be repaired. In some of the other illustrations, whole streets of populous towns or small cities had settled, due to the coal being removed from underneath them, yet no cracks had developed in the street pave-



Slush Discharge

This shows the delivery end of the flushing pipe. The silt or other material employed is retained in the rooms or other places to be filled by means of "batteries" or bulkheads so built as to allow the water to drain through them while the flushing material is retained.

ment. In comparison to some of the mine cave-ins and other troubles common in this country, this would appear to be a truly remarkable accomplishment.

Although various kinds of pipe and various pipe materials have been employed for hydraulic stowage, present practice throughout continental Europe seems to have settled upon ordinary cast iron. This pipe is made with flanged connections and long sweep fittings. Such pipe possesses the advantage that when worn from the abrasion of the material which it carries, it may be turned to four separate positions so that the pipe may be practically completely worn through before it is necessary to discard it.

In some mines, large quantities of granular materials are used in stowage. For instance, in some places as much as 5,000 cu.ft. of sand is flushed down a single shaft daily. The pre-war cost of this stowage was about 25c. per ton of coal produced. In some instances, the flushing materials, such as sand and gravel, are dug by steam shovel on the surface and transported several miles before being flushed into the mine.

Another and somewhat peculiar type of stowage was found by Mr. Rice. In one place, all coal is being taken out from under a river of appreciable size and the void space thus made is being filled with a weak concrete. This is being done to shut all river water out of the mine and effectively prevent subsidence of the river bed.

ANTHRACITE REGION THINKS STOWAGE COSTLY

In the discussion of this paper in response to an inquiry from the chair, R. V. Morris stated that the conditions existing throughout the anthracite region were materially different from those described by Mr. Rice. Hydraulic stowage in mines, beyond question, had its origin in the anthracite region, the first work of this kind being performed in the early 70's. Nevertheless, this method of surface support has never been extensively used in anthracite mines. In fact, the material there used for stowage has been confined almost exclusively to mine waste and the grade of fine coal now known as "slush," or that which passes a $\frac{3}{4}$ -in. circular opening.

Enough material to successfully flush the anthracite mines is not available in that region and little hydraulic filling is now being done there for the purpose of coal recovery alone. The principal advantage of this method of mine stowage is the prevention of damage to property on the surface, and many of the upper beds are now being filled in this manner. While the northern anthracite region might contain sufficient surface sand and other drift for flushing material, the cost of utilizing it would be prohibitive under ordinary circumstances.

Mr. Rice then asked Mr. Norris if he did not think that cities in time would demand hydraulic filling and that material would also be flushed under the beds of rivers and large streams to prevent the strata from fracturing through to the surface and flooding the mines.

In reply, Mr. Norris stated that conditions prevailing throughout the anthracite region had undergone a great change during his own recollection. In the past forty years, during which time he had been actively connected with the mines, commercial mining had been carried on in beds from 5½ ft. down to 2 ft. in thickness. In other words, forty years ago, a 5½-ft. bed was the thinnest that it was considered commercially possible

to mine. Today, a 2-ft. bed is thus treated. It is possible that in the future the price margins realizable for coal may be such as to permit hydraulic stowage of the coal measures, but Mr. Norris did not feel that that time had yet arrived or that it lay in the immediate future.

H. N. Eavenson then stated that a questionnaire bearing on this subject had been sent out to about one hundred coal-mine operators. Approximately two-thirds of these questionnaires had been returned, the majority of them lacking the information most desired. This was probably due to the fact that the management of the ordinary mine does not keep accurate records of the amount of surface subsidence that takes place over its workings. He believed, however, that by the end of the year, all available information would be in hand and ready for presentation at the next annual meeting.

H. Eustace Mitton stated that the paper and discussion had been of particular interest to him. Hydraulic stowage had been attempted in Great Britain only in extremely rare instances. Throughout that country, approximately 90 per cent of the coal was produced by longwall mining. This method of operation permits the withdrawal of coal from under surface structures with little or no damage to them, so long as the faces are kept advancing at a fairly uniform rate. A cessation of operation, however, over any appreciable period of time brings on trouble.

LONGWALL CHEAPER THAN ANY STOWAGE

During the great British coal strike a year or two ago, much damage was done to surface structures at points directly above or near the coal faces. Mr. Mitton stated that it was his opinion that the longwall system of mining would be cheaper than that employed in this country, if the places thus mined had to be stowed in order to prevent destructive subsidence and damage to the surface.

Charles Enzain stated that he had heard of a method of mining and back-filling that consisted of driving rooms, say 25 ft. wide and leaving pillars of approximately the same width or slightly wider between them. After a room had been driven, the bottom was shut up and the top shot down. Next, a narrow entry would



Flushing Pipe Entering Through Borehole

Refuse from picking tables and jigs is crushed at the breaker and flushed immediately into the pipe leading into the mine. This is a bell-and-spigot cast iron pipe the joints of which are made tight by wooden wedges.

be driven through the pillar left between rooms. This would be driven to the end of the pillar, when short crosscuts, either way, would be driven to the rock filling now occupying what had been the original room. These wing pillars would then be drawn back as rapidly as possible, the top being shot down and the bottom shot up meanwhile. If the top could be shot down to a sufficient height, so that the voids in the loose material would equal in volume the coal taken from the bed, it is probable that this system of back-filling would work successfully.

From the paper and the discussion it would appear that a certain quantity of surface subsidence is unavoidable if any large percentage of the coal is to be extracted from a bed. The real problem of the engineer conducting such operations is therefore, not to avoid subsidence, but to control it so as to nullify its destructive effect upon the surface or surface structures.

The Miner's Torch

Everybody's Business

LAST week I chanced into a friend's office (he is a coal-mine superintendent) and noticed the following proverb, neatly framed, hanging over his desk: "Let every man mind his own business and the cows will be well tended." When I entered the office I found my friend away for the day and his secretary, a rather attractive young woman, trying to amuse herself by executing pictures on her typewriter. The pictures were not word pictures but typed illustrations.

"Could you type a cow in that manner?" I asked, and was immediately sorry that I had been so brusque because she instantly looked up at the proverb and appeared to be greatly embarrassed.

Finally, but not without embarrassment to myself, I succeeded in convincing the young lady that I had had no intention of connecting the work she was doing with the precept on the wall; at least, not in the manner which she had assumed.

Then I explained that what I had desired to do was to make a few comments concerning the framed proverb, for the benefit of her boss, who happened to be one of my best friends, and it had occurred to me that a picture of a cow at the top of the sheet which I proposed to use would help to gain his attention quickly.

Of course, womanlike, she was curious to know what I proposed to write. Without further urging on my part, she put a blank sheet in her machine and began to hammer away at the keys; in a very few minutes she handed me a sheet with a creditable looking cow at the top. Seeing that I was pleased with her efforts, she offered to type underneath the comments that I proposed to make. This put the joke back on me because while watching the young lady manipulate the typewriter keys I had entirely forgotten what I had intended to say. Eventually, however, I managed to dictate thusly:

"Following most any cow path leading out of your village into the surrounding country, you will come face to face with a gang of moonshiners who are allowed to attend to their own business simply because you

and the other law-abiding citizens of your community feel that you ought to attend to your own business."

"These moonshiners have probably 'salted' away during the past two years about one-half of the total earnings of a good many of your employees, and today they might buy the controlling interest in your company if their ambitions ran in that direction. That they have been attending to their own business with a vengeance, no one can question. And what have they given your camp in return for all of this money? Poverty! sickness! and death! Sure, every one knows that! But if a man wants to risk his life for a drink or two, of course, that's his business.

"Just a word now about the last clause of the proverb: 'the cows will be well tended.'" Some men would starve their families before starving their cows, but even so you can find plenty of instances of cows having been starved because the money that should have purchased feed has been used to purchase whiskey. And consider the cows that have been taken from their stalls and led out to be exchanged for whiskey. Undoubtedly, they are being "well tended"; most moonshiners are country bred and their preference runs to milk rather than whiskey."

When I arrived home I found a telegram awaiting me. It read as follows: "Who tends the cows on your lot?" It carried two signatures, my friend's, the superintendent, and his secretary.

Car Body Built of Corrugated Sheets

FOR seven or eight years cars have been built in Great Britain at Bolton, Lancashire, with the body composed of corrugated sheets. Where a large area of a flat sheet would be distorted by a blow, a corrugated sheet would be affected only locally. The plate is bent around the car corners in a cold state by patented machinery without the sheets being thinned or stretched in any way and without the corrugations being lost at the angle. In fact, what is a sag on one side of the angle is a high spot on the other side. In consequence the angle stands out well and is quite stiff, not needing any stiffeners inside or outside the body.

Each car body is composed of five sheets, four corner bolts and four binding pins, no rivets whatever being used. Plates can be bundled and shipped insuring a low freight rate. The labor cost of assembling and repairing the plates is low, only a hammer and a wrench being needed for that work. In fact it is claimed that a body can be put together in five minutes single-handed, whereas a wooden or riveted steel body requires two men, one of whom must be skilled, several rivets, a furnace and some hours' work. The sheets are made interchangeable.

The manufacturers claim that the cars thus constructed have a long life and that the maintenance costs are low, that they are dust proof—a condition we are only just beginning to appreciate—that they save in weight of body and so reduce haulage costs and handling effort, that they last at least 100 per cent longer than riveted steel bodies and in general will not need repair for four or five years.

Of course, a car with corrugated sides does not dump as readily as one with smoother surfaces but where rotary dumps are used as in England and in parts of this country, an easy discharge of the coal, slate, sand-rock or clay in the car should be obtained.

Broadcasted Program Received In Depths of Mine

Whole Evening Program Received 400 Ft. Underground
—Possible Developments May Exert Great
Influence on Industry

BY EDGAR GEALY

IN THE early stages of radio experimentation, it was learned that when an oscillatory electrical discharge occurred, part of the stored energy setting up the disturbance was spent at each oscillation. Later it was found that these oscillations caused electro-magnetic strains or stresses in the all-pervading ether. In 1863 Maxwell formulated the theory that these disturbances traveled at the speed of light—186,000 miles per second. Some time later Hertz set up these disturbances, detected them and proved that they possessed many of the properties of light and radiant heat.

We have since learned that radio waves have many qualities much different from these and are not so closely limited in their range. When radio-telegraphy was developed, many of us were astonished to find that our sets could pick up messages on an indoor aerial, and we therefore concluded that the waves were capable of penetrating the walls of buildings. Not long ago we were somewhat surprised to learn that radio messages were picked up by a receiving set located in one of the Hudson River tunnels. This experiment was made under a great depth of water, but not being satisfied with this pioneering work, the men interested in the test decided to try the experiment in a mine. On Feb. 14 the test was successfully made and radio took one more forward step.

Many engineering men interested in radio will attach much importance to the success of this test. Radio engineers have long since believed that radio waves travel through buildings and even mountains, but their vertical penetration into the very bowels of the earth was something not altogether believed possible. The conditions in mines differ greatly from those in buildings or under rivers; they are often hundreds of feet deep and often covered with beds of coal—carbon—which might reasonably be expected to act as an absorbent or shield to all kinds of waves. Nevertheless, the experiment was entirely successful and has consequently opened up great possibilities.

Who knows how great a factor radio may become



Testing the Penetration of Radio Waves

Down where the dusty diamonds are mined, these men found radio waves which carried perfectly both human voice and music.



Music in Mine Air 400 Feet Underground

Here in the mine mules' pantry the party set up their instruments and heard station WQAN—"Willie Quick And Nellie."

in the mining industry; some of us are already cognizant of its possibilities in the homes of miners and mining officials. It is no wild stretch of the imagination to see how easily it may supplant the house organs and bulletins of mining companies and at the same time engender a more intimate contact between the mining officials and the men. It is easy to see a coal-company president sitting at home in the evening talking to his men, telling them how to do their work more safely and efficiently or even refuting the arguments of some Bolshevik who has been sowing seeds of discord at the mines during the day. In times of storms, floods, explosions and other mine accidents, how much more satisfactory and reliable will radio be than the wired telephone. Will those of us who like music with our noonday meal be outdone by our brother, the miner?

Whatever possibilities the future may hold, the men who conducted the test at the Pine Brook mine in Scranton, Pa., all agree that they had a real thrill as they sat in the mule barn in the Baltimore No. 2 vein and heard James Walsh sing "A Kiss in the Dark."

Just a few minutes before the strains of the music echoed through the dark chambers of the mine, Ralph D. Bunnell, vice-president and general manager of the Moon Radio Corp. of Astoria, Long Island, New York, had entered the mine with a standard receiving set and stretched a 25-ft. aerial over some timbers and ledges of coal. After setting up the instrument in several different locations in the Baltimore No. 2 vein, the equipment was removed to the China vein and here, at a level 400 ft. below the surface and about a half mile from the mine shaft, the program was listened to until the operator signed off for the evening.

An interesting feature of the event was the fact that during one of the underground tests the receiving set was located quite close to the power circuits of the mine, but regardless of this, the sounds were received without distortion or disturbance.

We now know that radio waves will penetrate into the mines, and perhaps the day is not far distant when, by means of radio, we may be able to illuminate the mining face of gaseous mines, fire shots more safely or operate drills and cutters.



Everett Drennen

President of the West Virginia Coal & Coke Co.

AFTER much patient experimentation Everett Drennen put into operation the V-system of coal mining described in our issue of Feb. 7, a method the publication of which has caused a veritable sensation among coal-mining men.

Mr. Drennen for years has been a quiet force in coal affairs. He was chairman of the Fair Price Committee of the Northern West Virginia Coal Operators' Association in which capacity he assisted in driving to cover the speculators who had boosted the price of coal to unprecedented heights. After a persistent campaign the price was cut from around \$14 to \$6. The work of the committee was approved by the federal authorities, the results showing that when Mr. Drennen starts out to accomplish something he succeeds.

Mr. Drennen was born in Minneapolis, Minn., about 38 years ago. After graduation from the University of Michigan he obtained employment in the department of maintenance of way and construction of the Pennsylvania R.R., remaining with the company two years, and then entered Cornell University, where he took up civil engineering and was graduated in two years.

His first employment after leaving Cornell was as engineer of road construction of Belmont County, Ohio, where he remained until he joined the forces of the

Consolidation Coal Co., becoming associated with its power and mechanical department. During the first five years of his connection with that company Mr. Drennen must have devoted nearly all of his time to work, as he also was general manager of the Fairmont Mining Machinery Co. and construction engineer of the Monongahela Valley Traction Co. which also has its headquarters at Fairmont, W. Va.

In 1912 Mr. Drennen was transferred to Jenkins, Ky., as manager of the Elkhorn Division of the Consolidation Coal Co. operations, remaining there two years, when he became connected with the Stonega Coke & Coal Co. as vice president and general manager. He left that company in 1917 to become vice president and general manager of the West Virginia Coal & Coke Co. and three years later was made president of the company, which position he still occupies.

The West Virginia Coal & Coke Co. was organized by the First National Bank of New York City to take over the coal holdings and operations of the Coal & Coke Ry. and the Davis Collieries Co. and allied interests of the Henry G. Davis estate and the Stephen B. Elkins estate. The company operates twelve collieries located in West Virginia having an annual output of about 1,500,000 tons.

News Of the Industry

Official Attitude on Trade Statistics Menaces Coal Industry

Data Essential to Intelligent Conduct of the Trade—Deadlock of Departments of Justice and Commerce May Require Intervention of President—Friendly Lawsuit May Be Way Out

BY PAUL WOOTON

Washington Correspondent of *Coal Age*

The uncertain status of trade statistics brought about by the activities of the Department of Justice has affected the coal industry seriously. It has all but disrupted the statistical activities of the National Coal Association. Since statistics are so essential to the intelligent conduct of the coal trade, it is hoped that this industry will be able to bring about a clarification of the situation. Allen H. Willett, director of the Bureau of Coal Economics of the National Coal Association, has called attention to the fact that the Department of Commerce and the Department of Justice are in deadlock and that the President might be induced to force the issue to a conclusion. A suggestion from another quarter is that a test case could be brought in a clear-cut statistical case without the consent of the Department of Justice. It is understood that the Department of Justice has declined to initiate such a proceeding.

Under Sec. 7 of the Sherman Anti-Trust Act, any person injured by any violation of the act is given expressed permission to sue in any Circuit Court in the district where the defendant resides. For example, any consumer of Pocahontas coal who might be convinced that, as a result of the statistical activities of the Pocahontas Operators Association he is being injured, could seek an injunction. A case could be brought equally as well against any other of the local coal associations. While it would be a friendly suit, it is thought essential to the case that the consumer bringing the action should view the matter in much the way as is done by the Department of Justice.

Those who are keeping closely abreast with the trade-statistics situation are convinced that no industry is more dependent on current facts and figures than is coal. It will be recalled that Secretary Hoover pointed out during the last strike that, had figures been available on the rate of consumption, prices would not have mounted as they did. Such figures would have squeezed much of the speculation out of the situation. The need is accentuated by the far-flung character of the business. Conditions in one

field affect, directly or indirectly, the situation in the others.

There never was a time in the history of the coal business of this country when figures were so necessary. The industry is entering upon a three-year armistice. A period of intense competition is ahead. The business situation is uncertain. Drastic curtailment of immigration is having its effect on the labor situation. If there ever was a time when careful and systematic planning was necessary, it is now.

The coal industry has the advantage of a better statistical foundation than have most industries. At this critical time, however, current returns on coal are being so curtailed as to impair their value materially. Many concerns that happen to be in a position to operate to advantage if some of their competitors have no figures to guide them are taking advantage of the Attorney General's activities to decline to make returns.

It happens also that there is a press-

Department of Mines Plan Gets More Indorsements

Indorsement of the Department of Mines bill continue to reach Senator Oddie. John Hays Hammond has gone on record favoring the plan in an unqualified way. The Nevada Senator also is in receipt of an indorsement of the bill from J. E. Spurr, which reads in part as follows:

"I am very strongly in favor of a Department of Mines and consider it absolutely necessary for the welfare of the mining industries and for the proper prolongation of the general business prosperity of the country. I do not think it should be regarded as a sop to the mining industries but should be considered as a help to the other industries that depend upon the proper conduct of mining, one of the greatest and most important of the basic industries of the country. You may be sure of my enthusiastic co-operation."

ing necessity just at this time to call the country's attention to some serious phases of the existing situation. It has been said rather glibly that the three years of peace which stretch ahead will be a good thing for the industry, in that it will eliminate a lot of high-cost mines. Reference to the statistical records of the U. S. Geological Survey will emphasize the fact that this squeezing-out process is going to be a serious one. In addition to all the wagon mines and the country banks, there are 5,000 companies engaged in the production of coal falling in the class with an output of less than 100,000 tons. All of the mines of these companies, which include the higher-cost mines, could be eliminated and still the country would have a capacity in excess of its probable needs during the next three years.

It is certain that these properties can not be relegated to a state of stand-by without trouble. If nothing else, their elimination would give rise to such dissatisfaction on the part of a large body of miners that a strike could not be avoided, many think. The situation is a serious one and one that calls for full facts, yet just at the time when the industry and the country need coal statistics most, the statistical foundation is threatened.

Fail to Agree in Kanawha; Wage Parley Broken Off

Cincinnati, Ohio, March 3.—After two days of negotiations on a wage scale between operators of the Kanawha district whose properties lie north of the Kanawha River and in what is known as the K. & M. territory and representatives of District 17 of the United Mine Workers, deliberations were broken off on Friday afternoon without an agreement having been reached. No statement was offered and it is believed from what little has been said that a parting of the ways has been reached.

No future date was set for resuming the conferences and those operators who attended the meeting say that there seems little likelihood of their continuing after April 1 except on an open-shop basis. The point at issue was the same as in the Tennessee-Kentucky arbitration case recently argued here. The operators believed that they should be allowed a scale which would allow them to compete with non-union fields adjoining. In the Kanawha field operators on the south of the river have been operating open shop for some time past with a wage scale of approximately \$4.68 per day as against \$7.50 to the north of the river.

Illinois Begins Three-Year Acid Test

Mines Are Shutting Down Fast—May Eventually Drop to Number Operating in 1914—Stripping Operations Increasing Rapidly

Shutdowns of many Illinois mines last Saturday night marked the real beginning, in that state, of the great three-year acid test of the coal industry. Ever since the signing at Jacksonville, Fla., Feb. 18 of the three-years continuance of the 1919 wage scale for the Central Competitive Field, Illinois operators have been trying to guess just where the inevitable lightning is going to strike within the state and how much damage it is going to do. The first shutdowns, numbering about a dozen mines, make up the opening touch of the storm. The general opinion is that there will be many flashes before April 1 and that the state has a hard row to hoe during the coming summer. However, nobody expects any collapse of the state's coal industry, but rather a purifying of it by fire.

There are 363 shipping mines in the state, not to mention the 800 locals. Of the shipping operations, less than 300 were producing at the end of 1923, but the number increased a little during January, when several mines got the best run they had had since the winter before. The mines which opened in order to get a slice of January business were sorely afflicted during February, however, and most of them are now down. It is estimated by one of the best-informed Illinois operators that by April 1 the number of properties ready to operate will have been reduced to 254, which was the 1914 total.

Salvation in Cost Cutting

A number of companies whose existence cannot be justified in the face of the conditions of the next three years will silently quit business on or before April 1. But also the big companies with strings of mines are preparing to close up all but the most advantageously situated operations within their ownership. This process, in fact, has been going on for months. Thus every sound company in the state is beginning by trimming down all the mines it can, thus obtaining the best possible working time for the others. The Old Ben Coal Corporation, for instance, is now running four out of twelve mines. Scrupulous care is exercised to reduce the cost of coal to the absolute rock bottom. Therein will lie the salvation of many a company, according to the prevailing sentiment.

Stripping in Illinois also is getting a great deal of close attention. "If I can't stay in business operating a shaft mine, then I'm going to try stripping," said a well-known mine owner, as he went over a sheaf of records on his desk comprising engineers' reports on several sections of possible stripping land in Jackson, Williamson and Fulton counties. Outside the Danville field, more than half the output of which is strip coal, there has never been much shallow mining in the state except a handful of shovel operations in Williamson County. During the autumn

of 1923, however, two great stripping plants and several small ones were opened in Jackson County and the Peoria field.

The Black Servant Coal Co., owned by the Hartshorn interests, of Danville, is operating at Elkville, and the United Electric Coal Co. began an important operation near Cuba. The next big strip put will be opened at once by the Gayle Coal Co.—the Crerar Clinch interests—south of Duquoin. These are expected to be followed into the field by several other companies, who hope to go into stripping on a big scale, get into production quickly, and produce coal for a little over \$1 a ton—if luck breaks their way.

But what effect is the three-year contract going to have on Illinois? The opinion of many operators boiled down produces little except the obvious. The number of mines will be reduced about one-third, but it will take at least eighteen months to accomplish that because of the fact that only a few companies are under pressure of short-term financial obligations and, history repeating itself, many a property will be handed around from owner to owner three or four times before the collapse. The state will see an intense effort of engineering and management to cut the cost of producing coal. Two or three tremendous new mines will turn out a great volume at the low costs which usually prevail in new operations whose haulage is short and ventilation charges small. Margins on coal will be trimmed down to extreme thinness to hold most of the markets the state serves.

And Illinois will go on about the business of producing and selling 60,000,000 or so tons a year with fewer miners than for any 60,000,000 tons it ever produced before. During 1923 nearly 90,000 miners got out the state's approximate 75,000,000 tons, but from now on there will be 50,000 or 60,000 jobs for men who can efficiently serve those Illinois mines whose output the country really needs.

Pays \$800 for Lost Miner

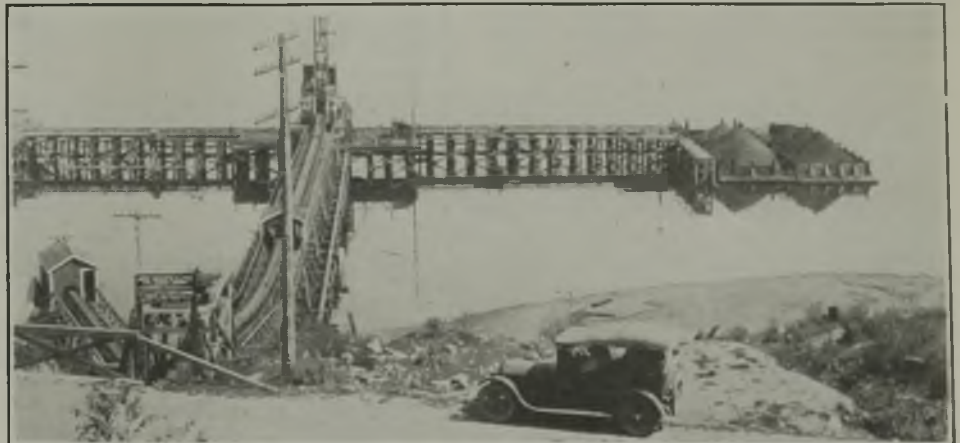
An insurance company has been required to pay the face value of a policy on the life of a miner in southern Illinois even though nobody could prove him dead. Seven years ago George Biondi went below in the Zeigler No. 1 mine, at Zeigler, Ill. At his working place eventually were found his dinner bucket and denim jumper, but he never came out of the mine and has never been found. After prolonged litigation the beneficiaries of Biondi won their case in the Circuit Court at Benton, Ill., last week and the insurance company was ordered to pay them \$800.

Alberta Coal Output Grows

More than 2,000,000 tons of coal produced in the Province of Alberta were sold at Canadian points outside the province last year. This statement is made in the annual report of the Alberta Mines Department recently presented to the legislature. The total output for the year was 6,866,923 tons. Of this 1,382,788 was consumed in Alberta; 1,937,753 tons was disposed of in other provinces and 83,557 tons went to the United States. While there was an increase in Alberta coal exports to the East it is shown that United States coal came into Canada from the Rocky Mountains eastward to Fort William to the extent of 1,151,629 tons in excess of the 1922 importations.

What are termed the domestic coal fields of Alberta produced 3,161,741 tons last year. Much of this came from the vicinity of the City of Edmonton, as is shown by the following details: Tofield, 104,886 tons; Clover Bar, 395,371; Edmonton, 130,112; Strathcona, 5,361; Namao, 13,264; and Cardiff, 72,139.

The production of the bituminous fields was 3,241,614 tons, of which the Crows Nest Pass Mines contributed 1,865,000 tons; the Brazeau Field, 493,378; Jasper Park, 248,659; and Mountain Park, 634,474 tons. The sub-bituminous fields produced 463,401 tons, the greater part of which came from the Yellowhead fields with 377,574 tons.



Loading Docks of the Cassidy Collieries

These collieries, located on Vancouver Island, are subsidiary of the Granby Consolidated Mining, Smelting & Power Co.

I. C. C. Takes Recess in Rate Case Till April 22

Southern operators and the railroads will have until April 22 to prepare their case in the Pittsburgh-Ohio rate controversy, the Interstate Commerce Commission having taken a recess until that date after conducting hearings from Feb. 13 to 21.

The case involves coal-freight rates from the so-called inner crescent territory to Lake Erie ports. It originated from a petition filed by the Pittsburgh Coal Producers Association alleging that rates from western Pennsylvania and eastern Ohio points to the lake ports were unjustly high and that rates from other points of competitive shipments were out of proportion in that they gave operators in these other territories a preferred position in lake coal business. The Northern West Virginia Coal Operators Association filed a similar petition in behalf of its members, directed against the Baltimore & Ohio and other railroads. A number of intervening petitions were filed in opposition.

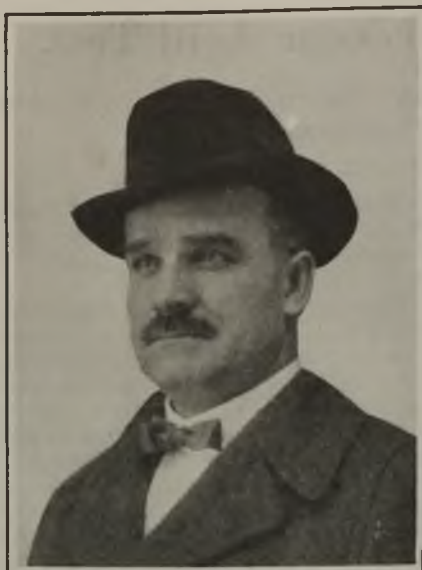
The case was heard before H. C. Hall, chairman of the commission, assisted by Examiner Gerry.

Testimony in behalf of the petitioners was to the effect that differentials of 25c. per ton from the Pittsburgh district, and 28c. from Ohio and northern West Virginia, with 48c. from Kentucky-Tennessee mines, are not sufficient to properly care for the added mileage; therefore the rates from the petitioners' territories should be reduced to widen this differential. Many tables of statistics were introduced to establish that coal shipment to the lakes from distant points, at inadequate freight rates, caused the use of several thousands of cars annually during the lake season in excess of actual needs, because of longer hauls. The petitioners are deprived of the natural advantages of their geographical location because of the alleged preference in rates granted more distant points, it was testified.

The position of the Southern operators is that the case is a "gigantic effort on the part of Pittsburgh and eastern Ohio coal interests to eliminate the competition of Southern coals, thereby monopolizing the Lake and Northwestern trade." James D. Francis, chairman of the joint committee representing the Southern operators, commented on the case as follows:

"Unionized coal fields in the Middle West for several decades are alleged and are believed to have attempted to create a monopoly for their coals by conspiracies with the United Mine Workers, but, having failed, they now attack the existence of Southern producing fields by asking the Interstate Commerce Commission to establish prohibitory freight rates on Southern coals to Lake ports for transshipment to the Northwest.

"Southern operators contend vigorously that existing freight rates already are too high and should be reduced. Coal consumers of the Northwest should have the choice of coals from all coal fields now serving the Northwest. The



Seward Button

Formerly head of the State Department of Mines of Pennsylvania, Mr. Button has just been appointed vice-president and general manager of the Temple Coal Co., Scranton, Pennsylvania.

public should not be denied the only real substitute for anthracite coal nor be compelled to pay the exorbitant freight increases requested in connection with the attempt of Pittsburgh to create a monopoly."

Hoover Hails Renewal Of Old Contract

Agreement by the subcommittees of bituminous coal operators of the Central Competitive Field and of the United Mine Workers to submit for ratification a three-year extension of the present wage agreement was characterized by Secretary of Commerce Hoover at a press conference Feb. 26 as "the most constructive step in the industry in many years."

The effect of the three-year agreement, in the opinion of Secretary Hoover, will be to stabilize the soft-coal industry as to operations and also to stabilize prices.

Instead of a difference of as much as a dollar in the price of soft coal, the Secretary ventured the opinion that the long-term wage contract will result in a spread of only about 15c. in prices at the mines, due to competition. The price of bituminous coal f.o.b. mines probably will settle around from \$2.20 to \$2.40 per ton, Mr. Hoover predicted. The Secretary was speaking only of the effects of the agreement upon unionized mines. He did not touch upon the subject of the possible closing of high-cost mines.

By doing away with periodical strikes and threats of strikes, the agreement also will have a beneficial effect upon the railroads, Secretary Hoover said, by giving the carriers an opportunity to adjust their car supply.

Says Industrial Court Has Not Had Fair Test

As the result of a year's study the National Industrial Conference Board states that the Kansas Industrial Relations Court has not had a fair test of its ability to establish regularity and continuous operation in the face of economic conditions. The Conference Board's findings are set forth in a statement just issued. Released on the eve of the expected decision of the U. S. Supreme Court in the Howat case, the statement points out that many factors associated with the court in the public mind cannot be considered as evidence for or against the court.

"The Kansas Court of Industrial Relations," says the report, "has been a novel experiment, suggestive as a guide for future effort to meet a complex and difficult problem. It demonstrated the ability of such an institution to settle minor differences between employers and workers on the basis of fact and common sense. It furthermore provided a machinery by which larger group conflicts in industry might be systematically adjusted in accord with principles of industrial justice gradually to be developed out of experience. It did not develop its full potentialities of adjustment because three major conditions necessary to the success of such an institution under present circumstances were not fulfilled in it. These conditions are:

(1) Acceptance by employers and labor unions in essential industries of the dominance of the public welfare and of the necessity for regulation of private action in the public interest. Such an institution as the Kansas court cannot effectively operate unless the public interest in and reasonable regulation of essential industries is sanctioned by public opinion.

(2) Development of principles of law and rules of practice which will lead to the recognition and utilization by such an institution of the structure and processes of group organization in industry. The conflicts with which it must deal are conflicts of group interest, not disputes between individuals. The work of such an institution as the Kansas court must, therefore, be based upon and built up out of the machinery and processes of voluntary private collective bargaining, developed through effective and representative group organizations.

(3) Complete removal of such an institution from the influence of partisan politics. Such an institution cannot successfully function as a commission dependent upon political appointment."

A NEWS ITEM appearing in *Coal Age* Feb. 7 bore the headline "Pittsburgh Coal Co. Takes Over Reiss Interests." To make the announcement perfectly clear to our readers perhaps it should be stated that the sale by the Reiss interests to the Pittsburgh Coal Co. consisted only of its mining property. No change in the control of the Reiss dock interest has taken place.

Shutdown Coming in Southwest

Operators Will Demand Wage Cut and Scale Conference Will Be So Delayed No Agreement Seems Possible by April 1—Operation Under Present Contract Pending Settlement Not Likely

A general shut down in the Kansas, Missouri and Oklahoma region is expected April 1 because the operators of the district are setting out to effect a reduction in miners' wages lest they all go broke before autumn. A wage-scale conference for the district is to be held, but probably not until March 25, because the last of the miners' delegates cannot be chosen until then, it developed last week after Charles F. Spencer, president of the Southwest Interstate Coal Operators' Association, and Commissioner W. L. A. Johnson had met Presidents William Bogartz, of the Kansas miners; Arch Helm, of Missouri, and Andrew McGary, of Oklahoma.

It is considered doubtful if, in the five days intervening between the ten-

tatively selected date of March 25 and April 1, when the present contract will expire, an agreement on wages will be reached. Operators declare they will demand such changes in the existing contract as will give substantial relief in the cost of production. They point to the number of mines of the district that were not opened this year, and say only a lessening of production cost can bring about full-time operation.

It is not likely that the two groups will get together in the few days allowed them before the termination of the existing contract. Neither is it considered likely that the mines will be permitted to operate under the present contract pending negotiations. Consequently the Southwest is expecting work to cease April 1.

Miners to Vote March 12 On New Agreement

Union coal miners in the Central Competitive Field will vote Wednesday, March 12, on the action of their International scale committee in regard to the new wage contract provided at the joint conference of miners and operators at Jacksonville, Fla., Feb. 19. Ballots for the referendum have been printed and will be distributed to approximately 5,000 local unions in Indiana, Ohio, Illinois and western Pennsylvania. Officers of the miners' organization believe that the three-year contract will be ratified by the miners by an overwhelming vote.

Annual N. C. A. Convention in Cincinnati May 14-16

Cincinnati has been chosen as the place at which this year's annual meeting of the National Coal Association will be held, May 14, 15 and 16 having been fixed as the dates for the meeting. Some of the committees will be called into session May 13. Arrangements have been made whereby the machinery exhibition of the American Mining Congress will be held in conjunction with this meeting.

The entertainment features of the program will include an evening barbecue on the nearby Kentucky farm where the American Bar Association was entertained recently in similar fashion. There will be a boat ride on the Ohio River during which a vaudeville program will be presented.

Census Data Indispensable to National Betterment

In a statement intended to justify expenditures for census purposes the British Government points out that the information as to the number and composition of populations is not asked "to gratify curiosity or merely to add to the sum total of human knowledge." Continuing the statement says:

"The cost of census taking is far too great to be incurred solely to provide interesting facts. The real necessity for the census is that it provides the only possible method of ascertaining from time to time the true condition, social and economic, of the people. This knowledge is indispensable, not only to enable the people to govern themselves and to carry on their national work but also as a starting point and foundation for all efforts and plans for the betterment of social and national conditions."

Probe Coal Thefts from Federal Reserves

Alleged usurpation and infringement upon government coal reserves in northern Alabama is to be probed, the U. S. Government having begun an investigation at Jasper, Ala., March 1, through the Southern Division of the General Land Office at Jackson, Miss., according to James W. Neal, in charge of the land office at Jackson.

Mr. Neal, who will have supervision of the investigation, stated that the government would investigate charges that millions of dollars worth of coal had been mined and sold from government property by private mine owners during the last few years.

High Finance in Coal

The hopelessness of the strong, legitimate coal man against the general condition of things in the trade is shown in this advertisement by the Western Fuel Co., Salt Lake City, Utah, headed "Somebody Fell Out of Bed": "Because one soft-coal dealer got peeved at another soft coal dealer he cut the price of coal 50c. per ton. Then the second dealer got peeved at the first and cut the price \$1. How can they do it? It can't be done and make any money. The coal dealers, therefore, are in very much the same fix as the lady who bought 'hot dogs' at 5c. each and sold them six for a quarter. When one of her competitors asked her how she could do it, she replied: 'Look at the volume of business I'm getting.' If you want to break the coalmen, buy all the coal you can at these ridiculous prices, and please remember that KING COAL—the best coal mined in Utah—is being sold at these same ridiculous prices, or any other price that will be made."

Rail Coal Consumption Lower During November

Class 1 railroads of the United States consumed 9,080,000 net tons of coal during November, 1923, as charged to account 394, compared with 9,411,000 tons in the preceding month and 9,755,000 tons in November, 1922, according to a report by the Bureau of Statistics of the Interstate Commerce Commission covering 176 steam roads. During the first eleven months of 1923 these roads consumed 100,799,000 tons as compared with 85,915,000 tons in the corresponding period of 1922. The delivered cost per net ton of coal consumed in road service in November last was \$3.27 as against \$3.30 in October and \$3.87 in November, 1922.

Consumption of fuel oil by the roads during November totaled 194,377,000 gallons compared with 198,760,000 gallons in the preceding month and 155,248,000 gallons in November, 1922. During the eleven months ended with November the roads consumed 1,795,283,000 gallons compared with 1,409,545,000 gallons in the corresponding period of 1922.



Entrance to Wilson Tunnel, Coalmont Collieries

The Coalmont Collieries, Ltd., is a British Columbia operation. The body of the mine car is lifted from the frame and carried up the tramway.

Coal Mine Accidents Took 234 Lives in January

Accidents at coal mines throughout the United States killed 234 employees during January, 1924, according to a report by the Bureau of Mines. Included in the fatalities are 68 victims of two explosions during the month at Johnson City, Ill., which caused 32 deaths, and at Shanktown, Pa., which caused 36 deaths. The fatality rate for the month was 3.94 per million tons, based on a production of 59,435,000 tons of coal. In January, 1923, the fatality rate was 3.52, based on 206 deaths and an output of 58,458,000 tons.

Bituminous-coal mines in all states reported 202 fatal accidents, the production being 51,470,000 tons, and the fatality rate being 3.92, as compared with 3.28 for January last year. For the anthracite mines in Pennsylvania, the reports covered 32 fatalities, which, on the month's output of 7,965,000 tons, indicated a fatality rate of 4.02 per million tons, as against 4.89 for January, 1923.

As compared with January, 1923, the reports for January of the present year indicated lower fatality rates per million tons for all of the main causes of accidents except explosions. For falls of roof and coal, the fatality rate per million tons declined from 1.85 in January, 1923, to 1.68 in January, 1924; for haulage accidents the rate declined from 0.62 to 0.42; for explosives, from 0.19 to 0.12; for electricity, from 0.12 to 0.07. The rate for explosions increased from 0.21 to 1.31 per million tons.

Coal Saves Fruit

Frost is one of the banes of the Northwestern fruit grower's life. When the word comes from the weather bureau that a touch of zippy temperature is due Tuesday night, the orchardists put in a busy Tuesday afternoon firing up the smudge pots under the trees. All sorts of fuels have been used with oil prominent among them. Just now a campaign is on in Washington State to induce fruit growers to use Washington coal briquets for the purpose. Thus the market for Northwestern coal is increased and the rest of the country gets more fancy apples—at 15c. each.

Portland Cement Production Lower in January

Production of portland cement during January, according to a report by the U. S. Geological Survey, based partly on estimates, totaled 8,788,000 barrels, compared with nearly 10,000,000 barrels in the preceding month and 7,990,000 in January, 1923. Shipments for the month were 5,210,000 barrels compared with more than 6,000,000 barrels in December and 5,628,000 in January, 1923. Stocks at the end of January amounted to 14,153,000 barrels, compared with 10,575,000 at the close of the preceding month and 11,477,000 barrels at the end of January, 1923.

No Move to Prevent Issuance Of Trade Information

Apparently the Department of Justice has no intention of attempting to call to account any trade association whose only activity is the distribution of unidentified statistical information. It has been suggested that a judicial determination of a case involving such statistics only would be extremely valuable in clearing up existing uncertainty as to the legality of such activities. The Department of Justice, however, never has taken steps against an association engaged in what always has been considered thoroughly proper statistical activities. For that reason there has been no judicial decision covering the legality of such activities. The only way a judicial clarification of the situation can be obtained is through some process initiated by the Attorney General. This he seems disinclined to do, even with the idea of bringing a test case.

E. N. Zern, Invalid, Rescued When Home Burns

E. N. Zern, editor of the *Coal Catalog*, was rescued with difficulty when a \$20,000 fire destroyed his home, at Crafton, Pa., last week. Mr. Zern, who is 65 years old and an invalid, having been confined to his bed for three years, was carried to safety only after four attempts to rescue him had been unsuccessful. Frozen hydrants near the Zern home greatly hampered the firemen in fighting the flames.

Coal-Mine Fatalities During January, 1924, by Causes and States

(Compiled by Bureau of Mines and Published by *Coal Age*)

State	Underground										Shaft				Surface				Total by States							
	Falls of roof (coal, rock, etc.).	Falls of face or pillar coal.	Mine cars and locomotives.	Gas explosions and burning gas.	Coal-dust explosions (including gas and dust combined).	Explosives.	Suffocation from mine gases.	Electricity.	Animal.	Mining machines.	Mine fires (burned, suffocated, etc.).	Other causes.	Total.	Falling down shafts or slopes.	Objects falling down shafts or slopes.	Cage, skip, or bucket.	Other causes.	Total.	Mine cars and mine locomotives.	Electricity.	Machinery.	Boiler explosions or bursting steam pipes.	Railway cars and locomotives.	Other causes.	Total.	1924
Alabama	1		1									4													4	13
Alaska								2																	0	0
Arkansas	1											1													1	0
Colorado					1							2													2	7
Illinois	19		4	34						1		58	1												59	19
Indiana	5		1		2							8	1												9	4
Iowa	2											2													2	3
Kansas	2											2													2	3
Kentucky	8		1							1		11													11	9
Maryland																									0	2
Michigan														1											0	0
Missouri	2											2													2	0
Montana	4											5													5	3
New Mexico	1											1													1	2
North Dakota																									0	0
Ohio	5		1									8													8	14
Oklahoma																									0	0
Pennsylvania (bituminous)	13	1	4	36		2				1		57										1		2	59	39
South Dakota																									0	0
Tennessee																									0	2
Texas																									0	0
Utah																									0	3
Virginia	2											2													2	4
Washington																									0	0
West Virginia	14	2	6					1				23											2	3	7	30
Wyoming	3		1									4													4	1
Total (bituminous)	83	3	20	70	3	4		4		3		190	2									3	9	2	202	162
Pennsylvania (anthracite)	10	4	5	5		3		4		3		27	1	1								2	1	3	32	44
Total, January, 1924	93	7	25	75	3	7		4		3		217	3	2								4	12	4	234	
Total, January, 1923	100	8	36	8	4	11		7	2	3		182	4									3	8	20		206



Practical Pointers For Electrical And Mechanical Men



Composition and Corrosive Effect of Mine Water

The U. S. Bureau of Mines, in cooperation with the Carnegie Institute of Technology and officials of the coal mining industry, has been studying the problem of corrosion of metals in the mines and many interesting results have been obtained.

In its broadest sense corrosion has been defined as that process which will cause a metal to revert to a state of more stable chemical equilibrium. This is accomplished by the interaction of the metal with a corroding medium, which may be a gas, a liquid, or a combination of both. The products of such a reaction are salts, hydroxides, or oxides of the metal.

Corrosion is evidenced by the formation of decomposition products such as coatings or precipitates, by a gradual wearing away of the surface, by the formation of pits, or by any or all of these in combination.

VARIATION IN THE COMPOSITION OF TYPICAL MINE WATER FROM COAL MINES IN PARTS PER MILLION

Constituent	Low Value	High Value
SiO ₂	16	160
Fe ++	Trace	1,216
Fe +++	11	1,303
Al	Trace	1,434
Ca	79	436
Mg	9	197
K	0	373
Na	21	2,286
Cl	0	625
SO ₄	790	12,115
Suspended matter (on unfiltered water) dried at 150 deg. C.	6	91
Acidity due to free sulphuric acid	Trace	3,662
Acidity due to free sulphuric acid plus sulphates of iron and aluminum	2,180	17,200

The composition of mine waters varies according to the locality of the mine. The water from any particular mine will vary according to the season of the year, the age of the mine and other factors. Water which has been allowed to flow through old workings usually is more acid than water from a new opening.

The acidity of mine water is due to the presence of free sulphuric acid. The mine water also will usually contain considerable amounts of sulphates of iron and aluminum, and smaller amounts of sulphates of calcium, magnesium, sodium and potassium. Silica and chlorides usually are present. In some mines the chloride content of the mine water is sufficiently high to be a serious factor. In the table are given

figures showing the range in composition for acid water from bituminous coal-mines.

Many factors influence the corrosive action of mine water, principal among them are the following:

- (1) Chemical composition of the metal or alloy.
- (2) Physical condition of the metal or alloy.
- (3) Chemical composition and concentration of the mine water.
- (4) Velocity of flow.
- (5) Temperature of the medium.
- (6) Time period of exposure.
- (7) Solution pressure of the metal or alloy which depends on 1, 2 and 3.
- (8) Electrical conditions of immersion.
- (9) Effect of light.

It is hoped that further study will bring about results that will help materially in the proper selection and care of metals used in mining machinery and equipment. Records of corrosion on rails, pumps, pipes and boilers will be thoroughly covered to ascertain the best means of reducing the present high depreciation.

Mine Truck for Oxyacetylene Welding Outfit

Wide and varied use of oxyacetylene blowpipes at various mines for the duties of cutting and welding steel and

iron involves many movements of great and small distances during the working day. The two tanks holding the gases, which form the mixture for the production of the high-temperature flame, are heavy and unwieldy, and for that reason a conveyance of some kind must be provided to give portability to the outfit. In many mine shops a two-wheel truck is used for this purpose, but this contrivance cannot be moved any great distance over the rough ground upon which the mine plant is very often built.

LEWIS MINE HAS TANK TRUCK

The Hudson Coal Co., at its Lewis mine, Wolf Summit, W. Va., rigged up a tank truck of lightly fabricated flanged wheels and seamless tubing, the latter being so cut and joined by welding to form a rack for the gas tanks. To two vertical post tubes is attached one stationary iron band which is curved to fit halfway around each tank and another band similarly curved that is hinged to one post and pinned to the other post. These bands form a clamp that may be closed to hold the tanks securely, or opened to permit replacement. The bottoms of the tanks fit in shallow recesses in the floor of the truck, which also is made up of tubes.

A pushbar is attached to the two post tubes furnishing a convenient means for moving the truck by hand wherever mine track is laid.



Truck for Making Welding Outfit Portable

This light truck can be easily moved around the mine yard or in the mines to any place where the track has been laid; thus the welding equipment is taken to the job and made more serviceable.

Dynamos and Failure to Excite

When a direct-current dynamo is brought up to speed it should in a few moments commence to build up voltage or, in other words, excite. Failure to do so may be attributable to a variety of causes, the principal ones being broken shunt field circuit, weak residual magnetism, insufficient speed, the brushes not making contact with the commutator and wrong direction of rotation.

The shunt winding of the dynamo being wound with comparatively fine wire must be carefully handled, especially the ends that are brought out for connection to the armature. A break in the shunt winding obviously will rob the machine of its magnetic field and it would be unable to build up any voltage except that due to residual magnetism, which would be of very small value. It sometimes happens that the residual magnetism of a new machine is weak, and great difficulty is experienced in getting the generator to build up voltage. This is not likely to happen with a machine after being in service a short time, but it does occasionally happen with machines when first received from the manufacturer. The difficulty, however, is easily overcome by disconnecting the shunt field from the brushes and connecting it to a number of dry cells, or accumulators, supplying a pressure of from 10 to 12 volts. The machine should then be run up to speed, but the connections of the cells to the shunt field may have to be reversed so as to send the current through in the proper direction.

When the voltage has been built up sufficiently to indicate that the current is passing around the field in the same direction as that which would be supplied from the armature itself when running under ordinary conditions, the dynamo may be stopped, and with the cells still connected to the field the magnet iron may be given a few gentle blows with a hammer, as this assists the set of the magnetic poles. After the cells have been disconnected and the proper connections made to the armature there should be no further trouble in getting the voltage to build up as soon as full speed is reached.

Some machines retain more residual magnetism in their poles than others and will commence to build up voltage before the armature reaches its maximum speed, while on the other hand should the residual magnetism be weak it may be necessary to run the generator for a few moments slightly above full speed, in order to give the field a start in building up. These cases are seldom encountered, but their possibility in actual practice should be borne in mind.

Failure to excite owing to brushes not making contact with the commutator is not common, though it may easily occur on a machine having an eccentric commutator. This causes the brushes to slide to and fro in the brush boxes and when the brush gear is allowed to get dirty and considerable quantities of carbon find their way into the brush boxes, the brushes become stiff and do not readily slide. Thus there is the possibility of their sticking

as the machine slows down, the high part of the commutator lifting the brushes, which then stick up, so that only the high part of the commutator comes in contact with them. To avoid this trouble, brush-holders should always be kept free from carbon dust and other matter, so that the brushes can slide freely in their holders, and follow up any wear which takes place.

Wrong direction of rotation will prevent the building up of a field of a direct-current dynamo because immediately the armature begins to generate current due to residual magnetism. The direction of the E. M. F. generated is such as to send the current round the field coils in the opposite direction to that necessary to increase the residual magnetism, and consequently the one neutralizes the other, and the magnetic field cannot build up.

If the direction of rotation cannot be changed, the shunt-field connections to the armature should be reversed.

ENGINEER.

Proposed Specifications For Trolley Wire

Recent tentative specifications drawn up by the American Society of Testing Materials to cover round and grooved trolley wire may be abstracted as follows:

The material shall be electrolytic or low-resistance lake copper conforming in quality and purity to the requirements of either the specifications for electrolytic copper or lake copper of the society.

Round Wire.—(a) Shall be so drawn that its tensile strength and elongation shall not be less than the following:

VALUES FOR TENSILE STRENGTH AND ELONGATION

Diameter, In.	Area, Circular Nils	Tensile Strength, Lb. per Sq. In.	Elongation in 10 in., Per Cent
0.548	300,000	47,000	4.50
0.460	211,600	49,000	3.75
0.410	168,100	51,000	3.25
0.365	133,225	52,800	2.80
0.325	105,625	54,500	2.40

The elongation shall be determined as the permanent increase in length due to the breaking of the wire in tension measured between bench marks placed upon the wire originally 10 in. apart. The fracture shall be between the bench marks and not closer than 1 in. to either bench mark.

(b) Tests upon a section of wire containing a braze shall show at least 95 per cent of the tensile strength of the unbrazed wire.

(c) Electric resistivity shall be determined upon fair samples by resistance measurements at a temperature of 20 deg. C. (68 deg. F.). The wire shall not exceed in resistivity 900.77 lb. per mile-ohm.

Grooved Wire.—(a) The physical tests shall be made in the same manner as those upon the round wire. The tensile strength of grooved wire shall be at least 95 per cent of that required for round wire of the same cross-sectional area; the elongation shall be the same as that required for round wire of the same cross-sectional area. The twist test shall be omitted.

(b) Tests upon a section of wire containing a braze shall show at least 95

per cent of the tensile strength of the unbrazed wire. Elongation tests shall not be made on test sections including brazes.

(c) The requirements for resistivity shall be the same as those for round wire of the same cross-sectional area.

For the purpose of calculating weights, cross-sections, etc., the specific gravity of the copper shall be taken as 8.89 at 20 deg. C. (68 deg. F.).

Round Wire.—(a) The size shall be expressed as the diameter of the wire in decimal fractions of an inch, using not more than three places of decimals, expressed in mils.

(b) Wire is expected to be accurate in diameter. Variations of 1 per cent over or under the nominal diameter shall be permitted.

Grooved Wire.—Standard sections of grooved trolley wire shall be those known as the "American Standard Grooved Trolley Wire Sections."

(a) Size shall be expressed as the area of cross-section in circular mils, the standard sizes being as follows:

300,000 cir. mils weighing 4,795 lb. per mile
211,600 cir. mils weighing 3,382 lb. per mile
168,100 cir. mils weighing 2,687 lb. per mile
133,200 cir. mils weighing 2,129 lb. per mile

(b) Grooved trolley wire may vary 4 per cent over and under in weight per unit length from the standard as determined from the nominal cross-section.

Finish.—(a) The wire shall be of uniform size, shape and quality throughout, and shall be free from all scale, flaws, splits and scratches not consistent with the best commercial practice.

(b) Necessary brazes in trolley wire shall be made in accordance with the best commercial practice.

Packing.—All wire shall be shipped on substantial reels, suitable for the weight of the wire handled, and shall be well protected from injury. The length or weight of wire to be wound upon reels shall be agreed upon in placing individual orders.

Inspection and Rejection.—(a) All tests governing the acceptance or rejection of the wire, unless otherwise specified, shall be made at the place of manufacture with apparatus furnished by the manufacturer and in the presence of the purchaser or his representative, who shall be furnished a copy of the tests.

(b) For the purpose of determining and developing defects which may be prejudicial to the life of trolley wire, owing to its peculiar service as compared to that of copper wire for other purposes, the wire shall be subjected to the following twisting test: Three twist tests shall be made upon samples 10 in. in length between the holders of the machine. The twisting machine shall be so constructed that there is a linear motion of the tail stock with respect to the head. The twist shall be applied not faster than 10 turns per minute. All three samples shall be twisted to destruction and shall not reveal under test any seams, pits, slivers or surface imperfections not consistent with the best commercial practice. At the time of fracture the wire shall be twisting with reasonable uniformity. Wire shall not be considered satisfactory which does not withstand at least nine turns before breaking.



Problems In Underground Management



What Should We Do to Cope with the Ever-Present Dangers of Coal Dust?

Spraying Necessary to Supplement Humidification—Coal Handling
Especially Dumping of Coal in Mine Dangerous—Alabama
Has Many Mining Machines Equipped with Sprays

BY JOHN WALLS, SR
Bayview, Ensley, Ala.

HUMIDIFYING mine air by the use of steam has been strongly advocated as a means of rendering coal dust harmless and reducing the danger of a dust explosion in mines. I remember an article that appeared some time ago in *Coal Age*, setting forth in considerable detail a method of humidifying the intake current of a mine that was operated on the exhaust system of ventilation.

Recent disasters in coal mines and our knowledge of the explosive conditions arising from the mining, loading, hauling and sometimes the dumping of coal in mines surely should convince us that these conditions cannot be overcome simply by maintaining a saturated mine atmosphere. In other words, humidification is not all that is necessary to prevent the occurrence of dust explosions in dry and dusty mines.

It is not my desire to discourage the use of steam in the intake current entering a mine but rather to emphasize that this should not be done to the exclusion of other means for the same purpose. In my opinion, the use of steam will not compare economically with a good spraying system installed in the mine and is not as effective in reducing the dust danger.

Who is there that has not noticed the dangerous condition of the atmosphere in a place being mined by an electric chain machine? I have often been unable to recognize the machine runner at a distance of 20 ft., so dense would be the dust floating in the air. There is no question but that such a condition is extremely dangerous owing to the possible short-circuiting of the current at some unprotected point.

The distribution of dust on the haulage road by coal falling from the cars and by the dust being blown from the coal in transportation, particularly in the use of cars that are not dustproof, presents another grave danger. Then, worst of all, arrangements sometimes are made to dump the mine cars into skips at the foot of the slope or a revolving dump is installed and the coal dumped into a hopper to be hoisted from the mine. In many cases an electric motor is in operation at the foot of the slope or shaft, where the danger is in-

creased owing to the high velocity of the air current.

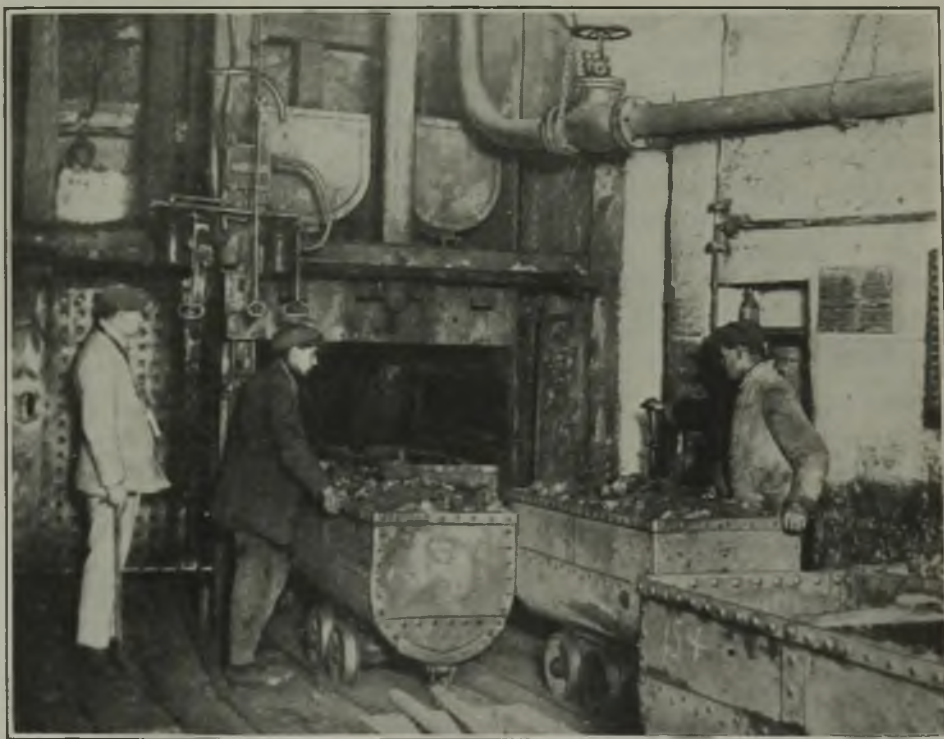
For these reasons a good sprinkling system carried throughout the mine workings is by far the safest plan of reducing the danger from dust. But when all is said it is safer to concentrate our minds and energies on means of preventing dust than on rendering it harmless and non-explosive when it has been formed. The recent recurrence of explosions warns us that this is the reason of greatest danger and calls for the exercise of every possible precaution.

Mention was made some time ago in *Coal Age* of the application of water to the electric chain cutting machine. The device has been successfully used in

several of our Alabama mines. The plan involves the installation of a 1½-in. pipe line on the entries and the carrying of a ½-in. pipe into each working place.

The cutting machine is equipped with a half-inch copper pipe laid in a groove or slot cut in the right-hand rail of the cutter bar and extended so that the end of the pipe is close to the cutting bits. A 50-ft. length of hose is used to connect the machine with the pipe line at the face. The machine is thus enabled to travel easily the length of a 35-ft. breast.

By this arrangement the water is projected into the cut made by the machine and the dust thoroughly wet down by the spray. The water is under a pressure of about 100 lb. per square inch. The use of this device has wholly eliminated all traces of coal dust produced in the cutting of the coal. Moreover, by spraying the loose coal and the face after blasting, the coal can be loaded, hauled and dumped without a perceptible sign of dust floating in the air. Wherever coal-cutting machines are in use this plan of applying the water to the cutting machine when in operation should be adopted with a view to obtaining a maximum degree of safety and avoiding the dust danger.



Wide World Photos

Caging Mine Cars at the Wilhelmina Coal Mine, Holland

It will be noted that the cage is at least a two-decker. Two cars in an upper deck can be seen in the upper part of the illustration, apparently loaded from the other side of the stage. It will be seen that the cars are what we would term "baldies," the coal not being heaped above the sides of the car, doubtless to prevent coal waste and the sprinkling of the roadways with broken coal and coal dust. Coal is hoisted at a speed of 36 ft. per second, or 24½ miles per hour.



Production And the Market



Caution Dominates Bituminous-Coal Market; Consumers Lack Incentive to Purchase

Caution prevails throughout the coal trade. Producers, dealers and consumers seem to be playing a waiting game—the objective not being clearly evident. The government report of reserve stocks having revealed a goodly total sufficient for more than immediate needs in most quarters and the Jacksonville agreement having given an assurance of peace in the Central Competitive Field for three years, the incentive to buy has been removed for most consumers.

Even the trimming of prices here and there has failed to quicken the markets, most consumers being content to rely on their stockpiles where possible, making only necessary purchases from time to time, hopeful perhaps that further cuts will be forthcoming. A spell of mild weather also has played its part in the prevailing condition of inactivity.

Coal Age Index dropped 1 point to 183, as of March 3, the corresponding average price being 2.21. This compares with \$2.23 on Feb. 25.

Mild Weather a Handicap in Midwest

In the Middle West the market became more disheartened with the appearance of moderate temperatures, the melting rays of sunshine bringing to light cancellations and hold-up orders from all directions. Price trimming on coarse coals ensued among some operators, a number of others shutting down their mines and drawing their fires. Conditions are unusually bad in the Duquoin and Jackson County field. A slight improvement is observable in the Mt. Olive situation. Mines in the Standard district are working two and three days a week. Demand for Kentucky is rather dull, many of the larger markets being well supplied for immediate needs. It is considered not unlikely

that there will be a strike over renewal of an expiring wage contract in western Kentucky in April. Kanawha operators and miners' representatives held a two-day session at Cincinnati last week, but failed to reach an agreement. Negotiations were broken off and no date was set for another meeting.

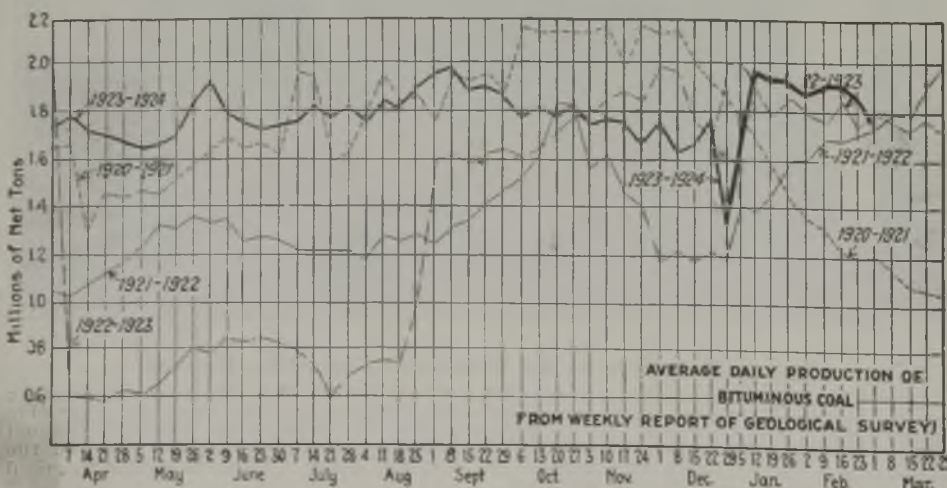
Utilities Buying in Northwest

Most of the coal moving off the Head-of-the-Lakes docks is going to utilities and railroads. Some companies in the Northwest are putting the larger sizes of anthracite through breakers in order to obtain nut and stove sizes to fill contracts. Stocks of free bituminous on the Duluth-Superior docks are estimated at between 1,600,000 and 1,700,000 tons. In the Southwest the surplus of lump is still growing, though screenings move readily. Few "no bills" on industrial coal have come to light. Conditions in the Ohio markets are spotty.

Pittsburgh operators, fully tied up by the Jacksonville agreement, evince considerable interest in the wage situation in non-union Somerset County, where further cuts are said to be contemplated. Demand throughout New England continues weak. Similar conditions obtain in Atlantic seaboard markets.

Output of bituminous coal during the week ended Feb. 23 was 10,337,000 net tons, according to the Geological Survey, a decline of 802,000 tons compared with the previous week. Anthracite production also declined, the output being 1,655,000 net tons, a falling off of 245,000 tons when compared with the preceding week.

The anthracite market has become strictly a weather proposition, consumers showing little disposition to fill



Estimates of Production

(Net Tons)

BITUMINOUS

	1922-1923	1923-1924
Feb. 9	10,725,000	11,501,000
Feb. 16 (a)	10,431,000	11,139,000
Feb. 23 (b)	10,324,000	10,337,000
Daily average	1,735,000	1,792,000
Coal year	374,742,000	492,731,000
Daily average coal year	1,356,000	1,770,000

ANTHRACITE

Feb. 9	2,023,000	1,906,000
Feb. 16 (a)	1,828,000	1,900,000
Feb. 23 (b)	1,838,000	1,655,000
Coal year	46,138,000	83,625,000

COKE

Feb. 16	378,000	293,000
Feb. 23	371,000	278,000
Calendar year	2,708,000	2,099,000

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

their bins with spring just around the corner. Dealers show a disposition to be cautious also, most of them trying to so regulate stocks as not to be caught with large tonnages on hand when April rolls around.

Midwest Screenings Strengthen

All over the Middle West the coal market continued to sag during the past week. Domestic trade softened under the warming rays of the sun and cancellations and hold-up orders from buyers came in from all points of the compass. The result is that every group of operators began to trim here and there on coarse-coal prices although new circulars were not issued until the beginning of this week, and these touched little but Indiana coals, which go off from 25 to 50c. on the big sizes. A new southern Illinois list will be out by March 15.

Meantime mines shut down and draw their fires, thus further reducing the production of the Midwest states. Simultaneously screenings strengthen in price as the supply dwindles. The painful thing about this is that a good many screenings contracts are being filled with coal bought by the operator on the open market at 25 or 50c. above the contract price. Central Illinois is particularly afflicted.

Free steam coal is strong at \$1.75 with a good many \$1.20 contracts running to April 1. Southern Illinois screenings are pushing hard against a \$2 price and will ascend soon.

Eastern coals coming into the Midwest do poorly. Good eastern Kentucky lump does well to bring \$3.25 and is on its way down. Pocahontas lump and egg move in small quantities at \$3.50@\$3.75 and mine-run is sinking from \$2.50 to \$2.25.

Field Activity Dwindles

In the Duquoin and Jackson County field conditions are unusually bad. Operators there are trying to get the prices that the independents are asking in the Carterville field, which range from \$3 up for lump and egg and from \$2.50 up for nut. The association Franklin County operators are still asking their circular but cut when necessary.

The Mt. Olive situation shows a little improvement. There has been a steady demand for the cheaper grades of coal and this domestic tonnage is moving freely and enough steam business is available for the nut and screenings.

In the Standard district cold weather has kept an even flow of tonnage, but some mines have unbilled coal of all sizes on track. Weather does not make any price change now. Everything is sold at about cost of production or less and mines are working two and three days a week.

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

Low-Volatile, Eastern					Midwest								
Market Quoted	Mar. 5 1923	Feb. 18 1924	Feb. 25 1924	Mar. 3 1924†	Market Quoted	Mar. 5 1923	Feb. 18 1924	Feb. 25 1924	Mar. 3 1924†				
Smokeless lump.....	Columbus....	\$7.00	\$3.60	\$4.10	\$4.00@	\$4.25	Franklin, Ill. lump.....	Chicago.....	\$4.60	\$3.50	\$3.50	\$3.00@	\$3.75
Smokeless mine run.....	Columbus....	4.50	2.10	2.10	2.00@	2.25	Franklin, Ill. mine run....	Chicago.....	3.35	2.35	2.35	2.25@	2.50
Smokeless screenings.....	Columbus....	4.45	1.55	1.55	1.45@	1.70	Franklin, Ill. screenings...	Chicago.....	2.35	1.95	1.95	1.90@	2.00
Smokeless lump.....	Chicago.....	7.00	3.60	3.60	3.50@	3.75	Central, Ill. lump.....	Chicago.....	3.35	3.10	3.10	2.75@	3.00
Smokeless mine run.....	Chicago.....	4.50	2.50	2.50	2.25@	2.50	Central, Ill. mine run....	Chicago.....	2.60	2.10	2.10	2.00@	2.25
Smokeless lump.....	Cincinnati..	7.00	3.75	3.75	3.50		Central, Ill. screenings...	Chicago.....	1.30	1.50	1.50	1.65@	1.80
Smokeless mine run.....	Cincinnati..	4.75	2.60	2.60	2.50		Ind. 4th Vein lump.....	Chicago.....	4.35	3.10	3.10	2.75@	3.00
Smokeless screenings.....	Cincinnati..	4.75	1.85	1.85	1.50@	2.00	Ind. 4th Vein mine run....	Chicago.....	3.10	2.60	2.60	2.25@	2.50
*Smokeless mine run.....	Boston.....	6.15	4.75	4.70	4.60@	4.80	Ind. 4th Vein screenings...	Chicago.....	2.10	1.70	1.70	1.75@	2.00
Clearfield mine run.....	Boston.....	3.50	1.95	1.95	1.50@	2.40	Ind. 5th Vein lump.....	Chicago.....	3.60	2.60	2.60	2.50@	2.75
Cambria mine run.....	Boston.....	4.10	2.50	2.60	2.25@	3.00	Ind. 5th Vein mine run....	Chicago.....	2.60	2.10	2.10	2.00@	2.25
Somerset mine run.....	Boston.....	3.75	2.25	2.30	2.00@	2.60	Ind. 5th Vein screenings...	Chicago.....	1.80	1.45	1.45	1.50@	1.75
Pool 1 (Navy Standard)..	New York....	4.75	3.00	3.00	2.75@	3.25	Mt. Olive lump.....	St. Louis....		3.10	3.10	3.00@	3.25
Pool 1 (Navy Standard)..	Philadelphia..	4.65	3.00	3.00	2.75@	3.25	Mt. Olive mine run....	St. Louis....		2.50	2.50	2.50	
Pool 1 (Navy Standard)..	Baltimore....						Mt. Olive screenings...	St. Louis....		1.35	1.35	1.25@	1.50
Pool 9 (Super. Low Vol.)..	New York....	3.85	2.25	2.25	2.00@	2.50	Standard lump.....	St. Louis....	3.10	2.75	2.75	2.65@	2.90
Pool 9 (Super. Low Vol.)..	Philadelphia..	3.80	2.30	2.30	2.10@	2.50	Standard mine run....	St. Louis....	2.25	1.95	1.95	1.90@	2.00
Pool 9 (Super. Low Vol.)..	Baltimore....	4.00	1.85	1.85	2.00@	2.15	Standard screenings...	St. Louis....	1.35	80	1.15	1.15	
Pool 10 (H.Gr.Low Vol.)..	New York....	3.35	1.95	2.00	1.75@	2.25	West Ky. lump.....	Louisville..	3.35	2.85	2.85	2.75@	3.00
Pool 10 (H.Gr.Low Vol.)..	Philadelphia..	3.45	1.85	1.85	1.70@	2.00	West Ky. mine run....	Louisville..	2.05	1.70	1.70	1.50@	1.90
Pool 10 (H.Gr.Low Vol.)..	Baltimore....	3.00	1.70	1.70	1.75@	1.85	West Ky. screenings...	Louisville..	1.85	1.20	1.30	1.10@	1.50
Pool 11 (Low Vol.).....	New York....	2.45	1.60	1.60	1.40@	1.85	West Ky. lump.....	Chicago.....	3.60	2.85	2.85	2.50@	2.75
Pool 11 (Low Vol.).....	Philadelphia..	2.90	1.65	1.65	1.55@	1.75	West Ky. mine run....	Chicago.....	1.80	1.60	1.60	1.50@	1.75
Pool 11 (Low Vol.).....	Baltimore....	2.25	1.55	1.55	1.60@	1.70							

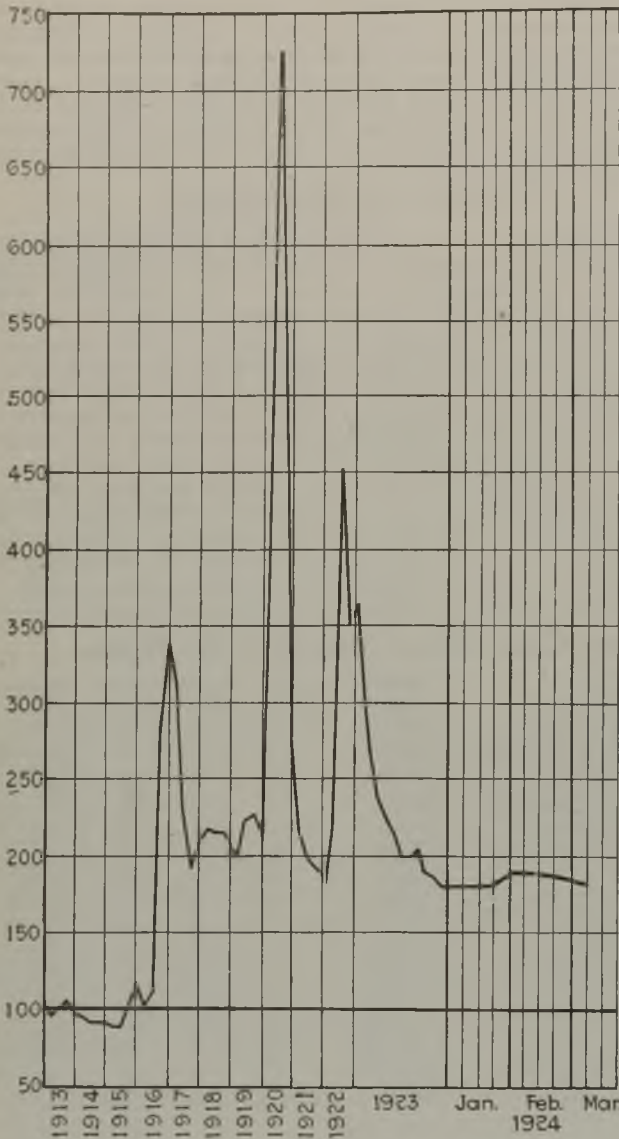
High-Volatile, Eastern					South and Southwest								
Market Quoted	Mar. 5 1923	Feb. 18 1924	Feb. 25 1924	Mar. 3 1924†	Market Quoted	Mar. 5 1923	Feb. 18 1924	Feb. 25 1924	Mar. 3 1924†				
Pool 54-64 (Gas and St.)..	New York....	2.30	1.60	1.60	1.50@	1.75	Big Seam lump.....	Birmingham..	3.85	3.85	3.75@	4.00	
Pool 54-64 (Gas and St.)..	Philadelphia..		1.70	1.70	1.50@	1.75	Big Seam mine run....	Birmingham..	2.10	1.75	1.80	1.75@	1.85
Pool 54-64 (Gas and St.)..	Baltimore....	2.25	1.50	1.50	1.55@	1.70	Big Seam (washed).....	Birmingham..	2.60	2.10	2.10	2.00@	2.25
Pittsburgh so'd gas.....	Pittsburgh..	4.10	2.55	2.55	2.50@	2.65	S. E. Ky. lump.....	Chicago.....	4.60	3.10	3.10	3.00@	3.25
Pittsburgh gas mine run..	Pittsburgh..		2.35	2.30	2.25@	2.40	S. E. Ky. mine run....	Chicago.....	2.85	1.85	1.85	1.75@	2.00
Pittsburgh mine run (St.)..	Pittsburgh..	2.75	2.10	2.10	2.00@	2.25	S. E. Ky. lump.....	Louisville..	5.00	3.25	3.25	3.00@	3.50
Pittsburgh slack (Gas)...	Pittsburgh..	2.85	1.55	1.50	1.45@	1.55	S. E. Ky. mine run....	Louisville..	2.60	1.80	1.80	1.50@	2.00
Kanawha lump.....	Columbus....	4.50	2.70	2.60	2.50@	2.75	S. E. Ky. screenings...	Louisville..	2.20	1.40	1.30	1.15@	1.50
Kanawha mine run.....	Columbus....	2.85	1.60	1.60	1.50@	1.75	S. E. Ky. lump.....	Cincinnati..	3.75	3.05	2.85	2.75@	3.25
Kanawha screenings.....	Columbus....	2.50	1.15	1.15	1.05@	1.15	S. E. Ky. mine run....	Cincinnati..	2.50	1.75	1.75	1.60@	1.75
W. Va. lump.....	Cincinnati..	4.00	3.10	3.00	2.75@	3.00	S. E. Ky. screenings...	Cincinnati..	2.15	1.25	1.10	1.00	
W. Va. gas mine run.....	Cincinnati..	2.75	1.75	1.60	1.50@	1.65	Kansas lump.....	Kansas City..	5.00	5.00	5.00	5.00	
W. Va. steam mine run....	Cincinnati..	2.75	1.75	1.60	1.50@	1.65	Kansas mine run....	Kansas City..	3.50	3.50	3.50	3.50	
W. Va. screenings.....	Cincinnati..	2.35	1.25	1.20	1.00@	1.15	Kansas screenings...	Kansas City..	2.60	2.25	2.25	2.25	
Hooking lump.....	Columbus....	4.15	2.75	2.60	2.50@	2.75							
Hooking mine run.....	Columbus....	2.60	1.85	1.85	1.75@	2.00							
Hooking screenings.....	Columbus....	2.15	1.15	1.10	1.05@	1.15							
Pitta. No. 8 lump.....	Cleveland....	4.05	2.40	2.10	2.00@	2.75							
Pitta. No. 8 mine run....	Cleveland....	3.00	1.80	1.80	1.80@	1.85							
Pitta. No. 8 screenings...	Cleveland....	2.90	1.45	1.35	1.30@	1.40							

* Gross tons, f.o.b. vessel, Hampton Roads.
 † Advances over previous week shown in heavy type, declines in italics

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

	Market Quoted	Freight Rates	Mar. 5, 1923		Feb. 25, 1924		March 3, 1924†		
			Independent	Company	Independent	Company	Independent	Company	
Broken.....	New York....	\$2.34	\$9.00	\$7.75@	\$8.25	\$8.00@	\$8.50	\$8.00@	\$9.25
Broken.....	Philadelphia..	2.39		7.90@	8.10				
Egg.....	New York....	2.34	9.25@	12.00	8.00@	8.75	8.75@	8.00@	8.50
Egg.....	Philadelphia..	2.39	9.25@	11.00	8.10@	8.35	8.50@	8.50@	10.00
Egg.....	Chicago.....	5.06	12.00@	12.50	7.20@	8.25	7.50@	8.00@	8.35
Stove.....	New York....	2.34	9.25@	12.00	8.00@	8.35	9.25@	9.25@	10.00
Stove.....	Philadelphia..	2.39	9.25@	11.00	8.15@	8.35	9.85@	9.25@	11.00
Stove.....	Chicago.....	5.06	12.00@	12.50	7.35@	8.25	7.95@	8.00@	8.35
Chestnut.....	New York....	2.34	9.25@	12.00	8.00@	8.35	9.25@	9.25@	10.00
Chestnut.....	Philadelphia..	2.39	9.25@	11.00	8.15@	8.35	9.85@	9.25@	11.00
Chestnut.....	Chicago.....	5.06	12.00@	12.50	7.35@	8.35	7.95@	8.00@	8.35
Range.....	New York....	2.34		8.25			9.00		9.00
Pea.....	New York....	2.22	7.50@	11.00	6.15@	6.30	4.50@	6.65	6.15@
Pea.....	Philadelphia..	2.14	7.00@	9.00	6.15@	6.20	4.75@	6.50	6.35@
Pea.....	Chicago.....	4.79	7.00@	8.00	5.49@	6.03	4.50@	5.60	5.40@
Buckwheat No. 1.....	New York....	2.22	4.50@	5.00	4.00@	4.10	2.25@	3.50	3.50
Buckwheat No. 1.....	Philadelphia..	2.14	4.00@	5.00	4.00		2.25@	3.50	3.50
Rice.....	New York....	2.22	2.50@	3.00	2.75@	3.00	1.75@	2.50	2.50
Rice.....	Philadelphia..	2.14	2.75@	3.00	2.75@	3.00	1.75@	2.50	2.50
Barley.....	New York....	2.22	1.50@	2.00	1.50@	2.00	1.50@	1.75	1.50
Barley.....	Philadelphia..	2.14	1.40@	2.00	2.00		1.25@	1.50	1.50
Birdseye.....	New York....	2.22			2.10		1.60		1.60

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



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

	1924		1923	
	March 3	Feb. 25	Feb. 18	March 5
Index	183	184	186	279
Weighted average price.....	\$2.21	\$2.23	\$2.25	\$3.38

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.

St. Louis Is Still Alive

While cold weather continued dealers found an active market for small quantities of the middle and cheaper priced coals. The local trade is fairly well satisfied as to the domestic movement on cheaper coals. There is a good supply of anthracite, smokeless and coke, with just a small demand. Wagonload steam continues good. The demand locally for screenings is fair, but the outside demand is better, especially from Chicago and the Northwest. Adjacent territory on steam is slow. Country domestic shows a little activity, but in minimum amounts.

Kentucky Does Little

With many of the larger markets well supplied with Kentucky coal for immediate use, and no special need of stocking far in advance, the coal jobbers and brokers are finding things dull. Mines are offering coal more freely, as short bookings have been fairly well filled, and many companies haven't much business. Car supply is good, labor in good supply, and loadings are really a question of sales and nothing else. Prices at the mines are being well maintained, as they are so low as to leave little chance for reduction.

Things are slow in western Kentucky, demand for prepared sizes having slumped somewhat, resulting in smaller production of screenings and slightly stiffer prices on pea and slack. Many mines are expected to shut down soon. There probably will be a strike in one section of the western Kentucky field in April over renewal of an expiring wage scale agreement. Indications are that there will be more mines welcoming contract business this year than usual, especially mine-run tonnage. Prices show practically no change, starting at around \$1@\$.10 for the cheapest of screenings and going to \$3 for best block coal.

Northwest Trade Lulls

Throughout the Northwest, markets quieted down during the past week. Coal continues to move off the docks, but the softness of the weather will surely cut down buying, especially since water power will begin coming back into its own and steam plants will let down. Most of the coal moving off the Head-of-the-Lakes docks goes to public utilities, which must keep their bins full, and to railroads. The only change in prices during the past week was a slight stiffening of Pocahontas screenings.

The situation for anthracite stove and nut has become serious. Some of the companies are putting egg through breakers to make it smaller, so as to fill out contracts. It is still possible to find stove in isolated cases, but others than "steady customers" must content themselves with egg, pea and buckwheat. It is hoped that the breaking will help. The weather is very mild at present and many have let their fires go out. Surveys made by two of the dock companies show that sales of anthracite this year were only one-third those of 1922.

Coal men estimate that stocks on Duluth-Superior docks March 1 will total between 1,600,000 tons and 1,700,000 tons of free bituminous. The larger figure is set as the possible maximum if many of those who have made contracts endeavor to backslide.

In Milwaukee heavy users of coal are holding off in expectation of a shading of prices in the near future. It is said that reductions in the cheaper bituminous grades are being secretly made now in an effort to reduce stocks before spring sets in. Stocks on the docks are heavy and a large tonnage undoubtedly will be carried over into next season. Several cargoes remain afloat. These will have to be unloaded soon in order to permit vessels to make necessary repairs.

Western Business Dull

Mines through the Southwest are working only three or four days a week, while the surplus of lump continues to grow. Screenings are moving readily. Few "no bills" of industrial coal are reported. As the demand falls off, price shading increases, but there has been no change in circular prices. Kansas coal still is quoted at \$5 for lump; \$4.25 for nut; \$3.50 for mine-run and \$2.25 for screenings.

Operators and dealers in Utah describe business as rotten. Production for the state is down to less than two days a week. Nothing seems to be moving but slack, and that is getting very scarce. Prices are unchanged.

The Colorado coal market has again slowed down slightly as compared with the past few weeks. The mines worked only on a three day average last week. This is attributed to the warm weather throughout the regions where Colorado coal is marketed. This being the case, it is expected that business will be stimulated considerably by the seasonable weather now prevailing for the past few days throughout Kansas and Nebraska. Prices are unchanged except on Colorado nut, which has been lowered to \$4.

Business Spotty in Ohio

Business in the Ohio markets is spotty. The course of the market at Cincinnati during the past week showed a downward tendency, production having risen to the point where the market finds trouble in digesting and absorbing what the brokers and wholesalers have to offer. Slack was the main point of attack during the week. The makers of prepared coal again misjudged the amount that could be taken by the retailers, who came in howling for coal during the cold snaps to the north. With everybody and his brother, seemingly, in southeastern Kentucky and southern West Virginia turning fuel over the screens, the residue had to be moved at concessions. There was no change in the price of specialized coals except that one or two of the

top-notch grades were being offered at \$3.75 for the block.

The Cleveland market is in the doldrums. Operators and jobbers say that inquiries are lacking, but despite the lack of demand, spot prices have held pretty firm and no reductions are noted. As a matter of fact, "distress" coal has practically disappeared from the market. Steam buyers generally are now resting on reserves accumulated in anticipation of possible labor difficulties, and these will no doubt have to be depleted before they enter the market to any significant extent. Public utilities are doing likewise.

Domestic buying at Columbus has fallen off because of higher temperatures and the steam trade is dull. Buying is for immediate needs mostly, as there now is no disposition to stock up for the future, since the wage scale has been settled. Reserves in the hands of steam users are still large, although they have not been increased recently. Buying is slow along certain lines, especially public utilities, where reserves are extra heavy. Railroad demand is quiet, as roads are not doing much contracting at present. A good demand for smokeless is apparent on all sides.

The Southern Ohio Coal Exchange reported for the week ending Feb. 16 from 440 mines an output of 195,920 tons out of a full-time capacity of 570,459 tons, leaving a loss of 374,539 tons. In the eastern Ohio field during the same week 12,218 cars were ordered, of which 12,170 were placed and 9,228 cars were loaded.

Pittsburgh reports that demand for coal in the spot market, which had been extremely light for about three weeks, has shown a further decrease since the Jacksonville conference. The light demand has not affected prices to any appreciable extent, operators holding onto former prices with considerable tenacity. The only competition seems to be in the non-union districts, where further wage reductions are said to be contemplated. In the past few months about half of Somerset County has been at lower wages than the other half, and the latter is now beginning to come down. Additional wage reductions are not unlikely in the Connells-ville region. Thus far the coal produced for coking has been at the full scale, reductions being by producers of coal for steam purposes.

Central Pennsylvania operators probably will hold a conference with the miners March 15, at the conclusion of the miners' convention which will begin at Altoona March 11. The Jacksonville agreement is expected to have a strong influence on the conference.

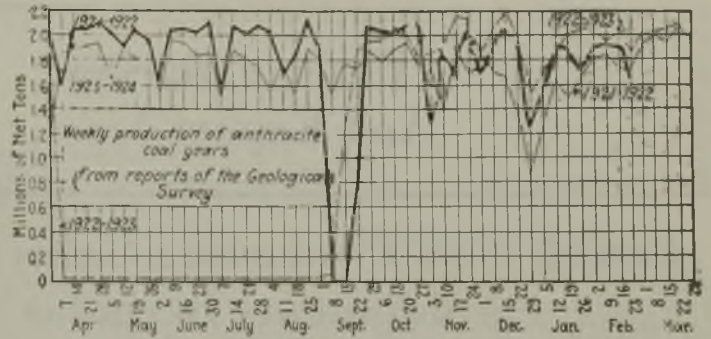
Trade at Buffalo is as dull as ever. Operators and jobbers alike are grumbling.

New England in Grip of Doldrums

In New England the market continues dull with no relieving feature. Buying is only for scattering amounts and is pretty much restricted to Southern coals. Practically all the larger consumers are eating into their reserves for current consumption, there being no inducement now to add to present stocks. In no direction is there any demand for spot coal, and the trade as a whole looks forward to a long druggy season.

In spite of light demand the Southern agencies are able to hold prices with reasonable firmness at about \$4.75 per gross ton f.o.b. vessel. There is enough Western business at around \$2 per net ton at the mines to hold the tidewater basis, but it is possible that a reduction in wages in certain districts will at any time lead to naming lower figures. Coastwise there is a fair amount of tonnage moving on contract, but offshore cargoes are few and far between.

At this end prices are rather demoralized. Not only is Pocahontas and New River an easy purchase at \$6 per



gross ton cars Boston or Providence but retail prices are on an equally low plane. The open price is \$7.50 per net ton delivered by truck, but it is freely said that \$6.50 is the actual figure on close business.

All-rail there is next to no new business. Most of the central Pennsylvania operators realize that there is little opening for their product in New England under present conditions and that the Hampton Roads shippers are to have the call.

Seaboard Markets Show Little Change

Activity still is of low visibility in the Atlantic seaboard markets. New York dealers are glum. Coal shipped to New York without order is kept moving, but the tonnage is not large and prices are low. Contract coals are taken in good volume, but consumers with large reserves are beginning to hedge. Contracting is reported in some quarters as progressing favorably while other shippers say consumers are holding off, preferring to take chances in the open market. Philadelphia consumers keep buying to about the same degree as during the past two or three weeks. No heavy orders are recorded, but business seems to come along steadily, with just the least sign of increase in buying. The April contract business is growing more active, producers showing a desire to get tonnage under agreement.

The Baltimore market continues to mark time, as there is little real interest in the situation other than purchases for fill in necessities. A record for the number of export coal ships cleared during any single day of this year, as well as the largest amount loaded on foreign consignment, was made on Feb. 21, when cargoes amounting to 16,829 tons were loaded into four steamers at local piers. Baltimore dealers report selling a fair amount in small lots to householders who have not enough fuel to carry through the months of March and April, but the trend of the market is toward decreasing volume. Dealers here are waiting word as to conditions after April 1, and there will be little ordering in the meantime.

Anthracite Output Easily Absorbed

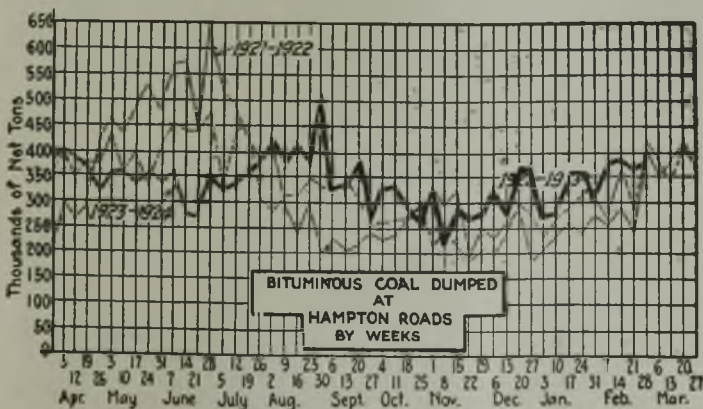
Weather conditions are affecting the anthracite situation at New York to such an extent that independent producers are having difficulty in placing their tonnage. There is a fair movement, however, and production is being easily absorbed. Egg and pea coals are the hardest to move while the demand for stove and chestnut is such that the best grades of independent product are quoted at from 50c. to 75c. above company circular. Some of the companies continue to store pea coal. The steam coals are in fair shape. Buckwheat No. 1 is the easiest, with rice a close second. Demand for barley and birdseye is strong, some shippers claiming a scarcity of both sizes.

It has been a good week at Philadelphia from the retailers' standpoint, as moderate winter weather has prevailed. The sizes in greatest demand continue to be stove and nut, with a leaning toward stove.

Car Loadings, Surpluses and Shortages

	Cars Loaded	
	All Cars	Coal Cars
Week ended Feb. 16, 1924	935,109	194,295
Previous week	906,489	199,791
Same week in 1923	816,646	183,241

	Surplus Cars		Car Shortage
	All Cars	Coal Cars	
Feb. 14, 1924	127,415	46,293	7,397
Previous week	138,017	53,758	6,998
Same date in 1923	27,172	7,094	



Foreign Market And Export News

British Coal Production Gains Steadily; Shipments Irregular

Production by the collieries of Great Britain during the week ended Feb. 16, according to official reports, totaled 5,821,000 tons, a special cable to *Coal Age* states. This was an increase of 17,000 tons compared with the output for the previous week.

The Welsh steam-coal trade shows marked firmness, all the collieries being well booked for the first half of the month. In some cases, in fact, they are oversold. The possibility of a strike of coal miners in the spring, following in the wake of the recent railway and dock strikes, is tending to make prices hold firmly and no doubt plays a part in the brisk inquiry for early supplies. Prompt shipments are hampered by the scarcity of ready tonnage, but conditions are rapidly improving. Concessions are being allowed to buyers who are able to take immediate deliveries.

The demand from the Continent is steady and there is fair business with South America. The foreign demand for Welsh anthracite is slow, though domestic inquiry has improved.

The Newcastle market is still very active. The business in steams, smalls and gas coals is especially good. Inquiries are circulating from the United States and South America for April shipment. Gothenburg gas works has taken 10,000 tons of gas coals for shipment before the end of March, and various other European gas works have contracted for smaller amounts for around 30s. per ton c.i.f.

Outlook Bright at Hampton Roads

Business at Hampton Roads shows little change in volume, although several foreign contracts have been reported and overseas trade appears on the increase. Coastwise business has been deterred somewhat by bad weather, as has bunkers.

Prices remain about the same. Con-

tracts with dealers in South America and Italy were on the basis of about \$4.85 at the piers, and an increase in movement was regarded as temporary. The general outlook in the trade, however, is brighter, and the tone of the market firmer.

French Market Dull in Domestic Coal; Industrials Better

The French market shows little animation as far as house coals are concerned, the demand having slackened with the approach of spring. Trade in industrial coals is better, however. Output of French collieries is scarcely sufficient to fill requirements and some complaints are still being made of irregularity in supply of cars at the mines for every-day shipments.

The new tariff accepted agreed to by the French companies on Feb. 1 will be in full force by April, when contracts are renewed; some of the coal now coming to the Paris area takes the new reduction of 3 fr. per ton. As a result of the cut, French coals, formerly the most expensive in the world, will actually be the cheapest.

The Belgian Cabinet also has asked its collieries to reduce their prices 10 to 15 fr. per ton. The proposal has been accepted, but the companies are trying to effect a reduction of 8 per cent in miners' wages. Settlement of the matter is expected soon, and the outcome is awaited with considerable interest.

With the settlement of the railway and dock workers' strikes shipments from Great Britain have increased markedly.

The S. C. O. F. supplies from the Ruhr for the whole month of January were 283,076 tons of coke, a daily average of 9,130 tons. This represents the highest average reached since the Ruhr occupation.

United States Domestic Coal Exports During January

	(In Gross Tons)	
	1923	1924
Anthracite.....	356,016	272,005
Value.....	\$4,014,699	\$3,112,042
Bituminous.....	1,092,084	1,045,587
Value.....	\$6,906,672	\$5,465,269
Coke.....	77,759	53,117
Value.....	\$923,691	\$499,248

Export Clearances, Week Ended March 1, 1924

FROM BALTIMORE		Tons
For Italy		
Am. SS. El Mar.....	1,803	
Am. SS. Sherman.....	5,492	
For Argentina		
Br. SS. Kambale.....	5,532	
For France		
Br. SS. Lord Ormonde.....	4,002	
FROM HAMPTON ROADS		
For France		
Fr. SS. Alaska.....	3,297	
Amer. Schr. Rosa Ferlita, for St. Georges.....	977	
For Brazil		
Br. SS. Turkestan, for Rio de Janeiro	5,925	
Swed. SS. Luossa, for Rio de Janeiro	7,419	
Br. SS. Avonmede, for Rio de Janeiro	5,741	
Ital. SS. Emanuele Accame, for Porto Ferrajo.....	11,111	
Jap. SS. Portland Maru, for Porto Ferrajo.....	7,973	
Du. SS. Berk, for Pernambuco....	4,391	
For Canada		
Amer. Schr. Wyoming for St. John..	5,395	
Amer. Schr. Velma L. Hamlin, for Halifax.....	1,597	
Nor. SS. Bratland, for Bridgetown..	2,961	
For Cuba		
Br. SS. Penolver, for Havana.....	5,624	
Br. SS. Berwindvale for Havana....	1,542	
For Porto Rico		
Amer. Schr. Peter H. Crowell, for San Juan.....	4,208	
For Argentina		
Br. SS. Saint Andrew, for Buenos Aires.....	6,832	
Ital. SS. Ansaldo II, for Buenos Aires.....	6,082	
For Italy		
Ital. SS. Matanzas for Cagliari....	2,870	

Hampton Roads Pier Situation

N. & W. piers, Lamberts Pt.: Feb. 21		Feb. 28
Cars on hand.....	847	1,236
Tons on hand.....	55,982	80,705
Tons dumped for week.....	151,875	145,514
Tonnage waiting.....	10,000	20,000
Virginian Ry. piers, Sewalls Pt.:		
Cars on hand.....	865	1,006
Tons on hand.....	58,450	71,200
Tons dumped for week.....	105,017	95,587
Tonnage waiting.....	33,877	8,226
C. & O. piers, Newport News:		
Cars on hand.....	1,460	1,226
Tons on hand.....	72,940	69,200
Tons dumped for week.....	64,975	93,694
Tonnage waiting.....	5,800	9,400

Pier and Bunker Prices, Gross Tons

PIERS		Feb. 23	March 1†
Pool 9, New York.....	\$5.00@	\$5.25	\$5.00@
Pool 10, New York.....	4.75@	5.00	4.75@
Pool 11, New York.....	4.50@	4.75	4.50@
Pool 9, Philadelphia.....	4.90@	5.20	4.90@
Pool 10, Philadelphia.....	4.50@	4.90	4.50@
Pool 11, Philadelphia.....	4.25@	4.60	4.25@
Pool 1, Hamp. Roads.....	4.85@	4.90	4.75@
Pools 5-6-7 Hamp. Rds....	4.25@	4.35	4.25@
Pool 2, Hamp. Roads.....	4.60@	4.75	4.50@

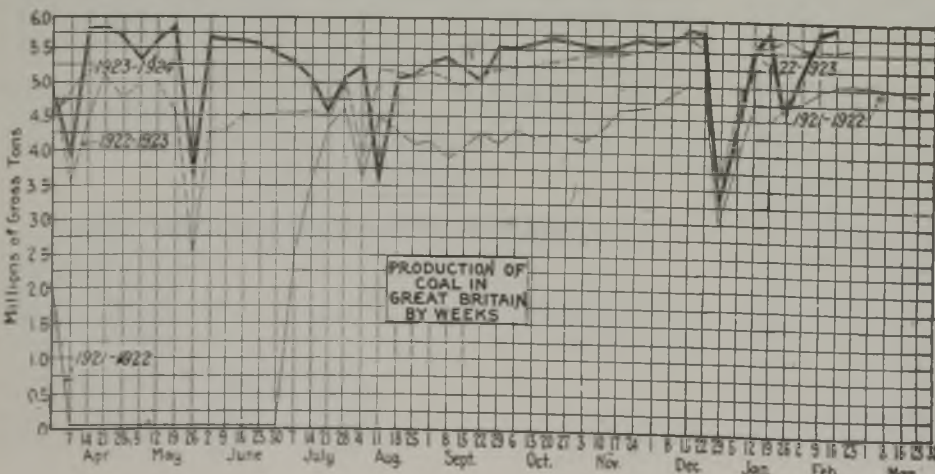
BUNKERS

Pool 9, New York.....	5.30@	5.55	5.30@
Pool 10, New York.....	5.05@	5.30	5.05@
Pool 11, New York.....	4.80@	5.05	4.80@
Pool 9, Philadelphia.....	5.15@	5.55	5.15@
Pool 10, Philadelphia.....	4.90@	5.20	4.90@
Pool 11, Philadelphia.....	4.65@	5.10	4.65@
Pool 1, Hamp. Roads.....	4.90		4.85
Pool 2, Hamp. Roads.....	4.75		4.60
Pools 5-6-7 Hamp. Rds....			4.35

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

Quotations by Cable to <i>Coal Age</i>		
Cardiff:	Feb. 23	March 1†
Admiralty, large	30s. @ 31s.	28s. 6d.
Steam smalls.....	22s. 6d.	20s.
Newcastle:		
Best steams.....	24s. 9d. @ 25s. 6d.	25s. 6d. @ 27s. 6d.
Best gas.....	25s.	25s. 6d.
Best bunkers.....	23s. 6d. @ 24s.	25s.

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



Traffic News

Lignite Rate Hearings Held

The hearings in the Dakotas on the proposed revision of the freight rates on lignite were held last week and the week before, in Aberdeen, S. D., and Bismarck, N. D. The Northern Pacific Ry. started the matter with a proposed revision of lignite rates to bring them into the same general distance schedule as those from the docks. The change is opposed by the lignite operators, the railroad commissions of Minnesota and both Dakotas and various other bodies. The railroads contend that the low rates, considerably lower than the rates on dock coal, were made during the war, to encourage the use of the nearest fuel and to save transportation. They seek to bring them into harmony with the other rates.

Larger Share of Through Rate Denied Sewell Valley R.R.

The effort on the part of the Sewell Valley R.R. to obtain a larger proportion of the through rate on coal moving over its line and that of the Chesapeake & Ohio has failed, as a result of a decision handed down by the Interstate Commerce Commission.

Eastern Rate Probe Ends

The Interstate Commerce Commission brought to a close on Feb. 29 its investigation of rates on anthracite and bituminous coal from points in Pennsylvania and other Eastern coal-producing states to New York and New England destinations. Briefs in the case must be filed not later than April 1, it was announced. Oral arguments probably will be made before the commission before the case is finally submitted for decision.

Attacks Coal Rates from Illinois To Indiana

The Old Ben Coal Corporation has filed complaint with the Interstate Commerce Commission, attacking rates of the C. C. C. & St. L. Ry., the C. & E. I. R.R. and the Illinois Central R.R. on bituminous coal from West Frankfort, West Frankfort Mine No. 18, Christopher, Christopher Mine No. 20, Johnson City and Buckner, all in Illinois and in the "Southern Illinois" rate group, to all points in Indiana, on the C. C. C. & St. L. on and north of the line of that road extending 110 mi. and including Sanford, via Terra Haute, Indianapolis, Greensburg and Shirley, Ind., to and including Crete, Ind.

The complaint alleges that rates from said points of origin to all points in Indiana on the line of said railway extending from and including Martinsville to and including Fairland, Ind., and extending from and including Columbus to and including Greensburg, Ind., are unjust, unreasonable and unduly discriminatory.

The complaint is based on the fact

that the rates complained of exceed the rates on bituminous coal contemporaneously maintained to said destinations on shipments from coal mines in the so-called Group No. 1 (Harrisburg, Ill.) district as defined in C. C. C. & St. L. Tariff L. C. 139 F, I. C. C. No. 7836.

Rate Cuts on Coal Held Up By Illinois Judge

An order of the Illinois Commerce Commission reducing rates on coal from Springfield, Ill., to Bloomington, Ill., and from Lincoln, Ill., to Bloomington, Ill., has been held up in a ruling by Judge E. S. Smith in the Circuit Court at Springfield, Ill. The Chicago & Aiton contested the rate reduction and obtained the stay pending an appeal from the order of the commission. The lower rates were obtained through the action of the Bloomington Association of Commerce. Under the new rate fixed by the commission the tariff on coal from Springfield to Bloomington is cut from \$1.42 to 80c. a ton.

Association Activities

Twenty-five wholesale coal dealers in Norfolk have begun the formation of the **Hampton Roads Coal Association**, to be composed of wholesalers and shippers exclusively, and organized for the purpose of creating a better spirit of co-operation among the members. The organization has in its membership the great majority of the leading coal dealers of the port. The organization is now being perfected.

W. E. Koeppler, of Bluefield, chairman of the Convention Committee of the National Coal Association; C. C. Crowe, assistant secretary of the National Coal Association, and E. C. Porter, in charge of the exhibition of the American Mining Congress, were guests of honor at the first meeting and luncheon of the **Cincinnati Coal Exchange** held this year. They accepted the invitation extended by the exchange to hold the convention and show at Cincinnati, May 14-18, subject to the usual ratification. Because of the fact that the meeting of the American Mining Congress is to be held on the Pacific coast it was felt that their exhibit would be far more advantageously held at the time of the coal convention. In addition it is proposed to hold a Fuel Economy show at the same time. Talks for the Exchange were made by President E. F. Bardin, Colonel Charles Moriarity, Jim Layne and A. A. Liggett.

The tenth annual meeting of the **Logan County Coal Operators Association**, held in Logan late in February, was attended by operators representing nearly every company in the region. In electing officers to serve during 1924, the association named as its head M. E. Kent, president of the Cleveland Cliffs Coal Co., with headquarters at Ethel; C. W. Jones, of the Merrill Coal Co., of Henlawson, as vice president, and H. A. McAllister, of the Logan Mining Co., as treasurer. Elected to membership on the executive committee were M. E. Kent, chairman; T. F. Downing, of the Monitor Coal & Coke Co.; J. A. Kelly, of the Main Island Creek Coal Co.; A. R. Beisel, of the Island Creek Coal Co.; W. R. Thurmond, of the Thurmond Coal Co.; A. J. King, of the Aracoma Coal Co.; R. R. Smith, of the R. R. Smith Coal Co., and C. H. Jenkins, of the Logan Mining Co. The bulk of the session was devoted to various phases of the lake freight-rate case. President Kent stated that "When recognition of the great importance of this issue is brought home to the people who buy coal, we believe that there will be widespread protest against action which would shut our coal out of

the markets of such a large section of the country as is served by Great Lake shipments from the lower lake ports. Widening of the differential as between West Virginia coal and that produced in the Pittsburgh and northern Ohio districts would bring ruinous consequences not only to the operators and miners of southern West Virginia but to the entire community, which depends so largely upon the coal industry for its prosperity."

Industrial Notes

The **Fort Smith Spadra Coal & Mining Co.**, of Clarksville, Ark., is installing new equipment at its mine near Hartman, Ark. This plant will have automatic weighing pan, breaker and steel pan conveyor to screens; is putting in two sets of shaker screens, which give exceptional preparation and also will have picking tables and loading booms. When completed the plant will have jig washers for the small sizes. The **United Iron Works, Inc.**, of Kansas City, Mo., is doing the engineering work and furnishing the equipment.

Howard MacNeal, formerly of the Philadelphia plant of the **Link-Belt Co.**, has been transferred to the Chicago works of that organization, where he will bend his efforts in the promotion of portable loaders, portable belt conveyors and electric hoists.

Edward F. Wickwire was elected a vice-president of the **Ohio Brass Co.**, of Mansfield, Ohio, at the annual election of officers held Feb. 15. He joined the company in 1903 and has been secretary for several years.

Directors of the **Sullivan Machinery Co.** have declared a dividend of \$1 a share, payable April 15 to stock of record March 31.

Obituary

Death removed one of the well-known coal men of southern West Virginia and eastern Kentucky when **E. E. Lane**, of Louisa, Ky., aged 48, president of the **Royal Pocahontas Coal Co.** succumbed to an attack of acute indigestion at the office of Dr. W. W. Mackey at Iaeger on Feb. 23. Mr. Lane was a native of Sagamore, Mich., but for a number of years had resided at Louisa, Ky., on the edge of the Pocahontas field of West Virginia. He became interested in southern West Virginia mining properties and spent much of his time in that section of the state.

Mr. Lane leaves a wife and three children. Funeral services were held early in the last week of February at Pennington Gap, Va.

Major General James B. Coryell, of Philadelphia, died in that city on Feb. 7, age 69 years. He was president of the **Fuel Corporation of America** and a well-known figure in the Pennsylvania National Guard.

Alex W. Patton, treasurer of the **Patton Coal Co.**, of Fairmont, died at a hospital there, Feb. 25, following an operation for a sinus affection. Blood poisoning developed. He leaves his wife, his mother, who resides in Parkersburg, and a brother, **F. J. Patton**, of Fairmont, head of the **Patton Coal Co.** His former home was in Grafton and later he resided in Newark, Ohio, coming from the latter city to Fairmont three years ago.

Coming Meetings

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

American Institute of Electrical Engineers. Spring convention, April 7-10, Birmingham, Ala. Secretary, **F. L. Hutchinson**, 29 West 39th St., New York City.

American Welding Society. Annual meeting, April 22-24. Engineering Societies Building, 33 West 39th St., New York City. Secretary, **W. M. Kelly**, 33 West 39th St., New York City.

International Railway Fuel Association. Sixteenth annual convention, May 26-29, Chicago, Ill. Secretary, **J. G. Crawford**, Chicago, Ill.

The American Society of Mechanical Engineers. Spring meeting May 26-29, Cleveland, Ohio. Secretary, **Calvin W. Rice**, 29 West 39th St., New York City.

News Items From Field and Trade

CALIFORNIA

The **Falk Corporation**, of Milwaukee, has appointed E. C. Myers its San Francisco representative at 320 Rialto Bldg., to handle Falk herringbone gears and Falk-Bibby couplings.

COLORADO

The local land office at Pueblo has been directed by the Secretary of the Interior to offer for lease a tract of public coal land in Colorado comprising 240 acres. The land is in Huerfane County, about 11 miles northwest of Walsenburg, in Townships 27 and 28 South, Range 68 W. Lease for this tract will be at a government royalty of 10c. per ton of coal mined, a minimum investment in mining operations of \$15,000 and a minimum production of \$7,000 tons of coal a year, beginning with the fourth year of the lease. It will be offered at auction to the highest bidder, the exact date for the sale to be announced later by the local land office at Pueblo.

The **Peerless Coal Mining Co.** has been incorporated in Denver, with a capital of \$200,000, by E. Corbett, S. R. Robinson and T. V. Spacy.

A stiff wage cut is proposed at the **Sunshine mine** of the **Sunshine Coal Co.**, near Durango. The company has given notice of its intention to reduce on March 31 the wages of miners from \$1.14 to 90c. a ton and drivers from \$7.82 to \$6.50 per day. The Industrial Commission will notify the men of the proposed cut and when their protest comes in hearings will be held to determine whether the reductions are justifiable.

The **Colorado Fuel & Iron Co.**, reports surplus of \$732,029 after fixed charges, depreciation and taxes, for the year ended Dec. 31, 1923, which is equivalent to \$1.68 a share earned on \$14,235,500 of common stock outstanding, after allowing for preferred dividends, compared with a deficit of \$654,944 in 1922. Net earnings, after expenses, amounted to \$4,550,642, compared with \$3,361,327 in 1922.

ILLINOIS

Options on 3,000 acres of coal lands lying between Thompsonville and West End, Franklin County, have been acquired by the **W. P. McMillan Co.**, of Chicago, and it is said that the tract will be fully developed. W. P. McMillan put down the two famous mines of the Old Ben Coal Corporation known as the "Old North" and the "New North," selling them to the Old Ben Corporation later, and has been desirous of getting into the Franklin county fields again.

As a result of a long drawn out wrangle over a question of transfer of coal rights, the **Jay Coal Co.**, of Bethalto, has been placed into the hands of a receiver. Judge Gillham, of Edwardsville, named Harry Kelsey, cashier of the Bethalto State Bank, as receiver for the company.

A. M. Nelson, of Milwaukee, recently paid \$72,000 for the property and equipment of the **Illinois & Indiana Coal Co.**, located at Georgetown. The company owned 550 acres of land near that place and incorporated a holding company in 1920 for \$300,000, which amount was later doubled. Shortly after a \$150,000 bond issue had been authorized, the property went into the hands of a receiver, F. N. Cloyd being named receiver. According to announcements made public, bond holders will receive 50c. on the dollar invested.

The **Shed Coal Co.** of Marion, a large stripping operation, was thrown into receivership recently and F. D. Borah of Marion, was appointed receiver in the Federal court, to attempt to raise funds and operate the property.

KENTUCKY

Good news was received from Frankfort, Feb. 26, the **Kentucky House** having defeated the **Vaughan coal-tax bill**, which originally called for a tonnage tax of 2½ per cent of sales value of all coal produced in the state. This amount had been amended to 1 per cent, but even this figure

didn't attract, and the bill was killed, the House refusing to call it from committee for first reading, the vote having been 43-43, whereas a vote of 51 was needed to bring it out. There are a number of other coal tax bills, but defeat of this one probably will prevent any others from coming out, while the Senate bills are not considered as dangerous.

NEW YORK

The coal corporation of **Montgomery & Rodgers, Buffalo**, has changed hands. Wesley P. Montgomery will continue under his own name and Elbert Rodgers has opened a new office under the name of **Montgomery & Rodgers**, having bought the stock of that corporation.

W. H. Bowater, Inc., have removed from 66 Broadway and opened an office in the Cunard Building, 25 Broadway, New York City, the telephone numbers being unchanged.

Camp-Osgood-Sleppy, Inc., have opened an office in New York City. J. G. Allspach, Jr., is in charge as New York sales manager, and Howard W. Ticknor has been appointed New York State representative. Mr. Allspach was associated with the company in its Scranton (Pa.) office.

OHIO

W. E. McEvoy, of the M. A. Hanna Co., Fred Heitzman, of Castner, Curran & Bullitt, and William E. Donnelly, of the Logan & Kanawha Coal Co., have been appointed trustees to liquidate the affairs of the **Merrimac Coal Co.**, of the Dixie Terminal Building, Cincinnati. This company was started over a year ago by M. P. McDermott and his associates with a branch office in Cleveland, which later was closed and McDermott's associates left him one by one. Some lawsuits and other forms of assets are hoped to reduce the total indebtedness which McDermott intends to secure to the creditors through notes, thus taking the burden of the company's losses himself.

Eaton Rhodes & Co., who purpose the erection of large coke ovens and retorts in the Riverside section of Cincinnati, have been brought to a temporary halt in their plans through the interference of the City Planning Commission, which has summoned various members of the firm and others to discover just how much of a "nuisance" can be expected and what plans are made for safeguarding other property adjacent.

The **J. P. Burton Coal Co.**, Cleveland, has opened a new stripping operation at Magnolia, on the Baltimore & Ohio R.R. New equipment has been installed and production will be ten cars a day.

With the resignation of F. A. Binder and F. U. Fisher from the **Three States Coal Co.** the election of officers has changed its personnel to C. A. Clyborn, president; Frank T. Beazley, vice-president, and J. Coy Pearce, secretary. Its headquarters is in Bluefield with main selling offices in Cincinnati.

PENNSYLVANIA

A state charter has been issued to the **Kohut Coal Co.**, of Homestead, with a capital stock of \$20,000. John Kohut, Homestead, is treasurer, and with J. M. Hense, and Paul Kohut, Homestead, incorporated the company. The purpose of the company is mining, producing, buying and selling coal and its byproducts.

Seward E. Button, former head of the Pennsylvania State Department of Mines, has been made vice president and general manager of the **Temple Coal Co.**, with offices in the Board of Trade Building, Scranton. He was a district superintendent with the Temple company when Governor Martin G. Brumbaugh, in seeking a capable man to head the state bureau of mines in 1918, selected Mr. Button, who was reappointed by Governor William Sproul. He retired from the state position a year ago and returned to the Temple company as general superintendent. For several years he was president of the Pittston Mining Institute. He is also a member of the Engineers' Club of northeastern Pennsylvania.

The sum of \$125,000 will be paid the widows, orphans and other dependents of the thirty-six miners who lost their lives in the explosion of the **Barnes and Tucker mines** at Shanktown, Jan. 26. The dependents of each of the miners will receive on the average a payment of \$4,096, according to reports filed with the Workmen's Compensation Board by the insurance company with which the mine company carried its protection.

A preliminary report on bituminous coal production in the 2,500 soft coal operations in Pennsylvania in 1923, just issued by the State Department of Mines, shows that approximately 135,000,000 tons was mined as compared with 108,310,000 in 1922. The production averaged 342,000 tons per fatality reported, 405 lives being lost last year as compared with 424 in 1922. None of the fatalities was caused by gas or dust explosions, a record unequalled in the past quarter of a century, according to Joseph J. Walsh, State Secretary of Mines. Fayette county led in production with Westmoreland second, Washington third and Cambria fourth. Three hundred and sixty-eight of the deaths were classed as inside and 37 outside fatalities, rock causing the majority of the inside fatalities. The days worked in more than one-half of the mines were below 180 while the days worked in all of the mines ranged from 115 to 276. Secretary Walsh says that the comparatively few number of days the miners worked was due to over-production not only in Pennsylvania but in all the bituminous states. Only 1912 approaches the record of 1923 in the matter of deaths from gas explosions, for in that year but one miner died from gas. The largest number of deaths caused from gas since 1899 was in 1907, when 277 men were killed or fatally injured by gas explosions. In 1919 there were eight fatalities from explosions; in 1920, nineteen; in 1921, two, and in 1922, 108.

Several distinguished foreign industrial observers and engineers were personally conducted to the **Gould Mine**, of the **Bertha-Consumers Co.**, near Finleyville, while on a recent inspection tour of Pittsburgh industries, by Marshall J. H. Jones, mining engineer and vice-president of the company. One party consisted of five Chinese industrial observers—T. C. Hsi, secretary of the Chinese Chamber of Commerce; Alexander Lee, W. Chang, C. F. Hsu and Dr. Chang Chien, Jr., the last named being the son of the greatest industrialist of China. Another visitor was Leon Rucquol, a mining engineer of Belgium and a nephew of General Rucquol. The visitors were much impressed with the simplicity and thoroughness of American mining methods as exemplified at the Gould Mine.

State charters have been issued at Harrisburg to the following: **Redstone Limestone & Coal Co.**, Star Junction, mining and preparing for the market coal and limestone; capital, \$80,000; incorporators, John Branick, treasurer; John Fick and Mike Branick, all of Star Junction; **Westmont Coal & Sand Co.**, Johnstown, mining, digging and selling coal and sand; capital, \$25,000; incorporators, G. W. Griffith, 109 Barron Avenue, Johnstown, treasurer; L. L. Faust, Windber, and J. B. Huckins, Johnstown.

Bids were opened at the U. S. Engineer Office, Philadelphia, Feb. 27, for furnishing and delivering 15,000 tons of semi-bituminous coal, approximately 12,000 tons to be delivered directly to vessels at coal piers and approximately 3,000 tons to be bunkered into vessels in midstream. For delivery at piers the bids varied from \$4.81 to \$6.23 per ton, and for bunkering into vessels in midstream the prices quoted were from \$5.31 to \$6.58.

In the Sixth Anthracite district 4,372,726 tons of coal was produced in 1923, compared with 2,172,992 tons in 1922, according to the report of Mine Inspector David T. Williams. The services of 7,859 men and boys were required to accomplish the task. There were an even hundred non-fatal accidents and twenty-four fatal accidents.

The **Lehigh Coal & Navigation Co.**, in its annual report for 1923 just issued, showed an increase in revenues of more than \$8,000 over 1922, while operating expenses increased by a shade less than \$6,000,000. Net income for the year was reported at \$3,473,507, after charges and taxes, against \$1,587,024 the year before, or equivalent in 1923 to \$5.93 a share on stock of \$50 par value, against \$2.71 the year before. Revenues in 1923 amounted to \$27,098,022, against \$18,786,431 the year before; expenses \$18,540,690, against \$13,554,734; net revenue after depreciation, depletion and other reserves, \$6,327,707, against \$3,788,207; general expenses, \$221,456, against \$201,887. After dividends,

which in both years amounted to \$2,339,472, there was left in 1923 a surplus of \$1,134,035, against a deficit the year before of \$752,448.

W. W. Gillett having resigned as purchasing agent of the company to engage in other business, J. E. Nieser has been appointed purchasing agent of the Hillman Coal & Coke Co. and its subsidiary and affiliated companies, effective March 1, 1924.

The Peabody Coal Co., of Chicago, has completed 100 new miners' houses in the village it is building at its mines near Cramer, and is expected to build as many more during the present year.

Coal companies of Scranton who have announced their intentions of fighting the new valuation of \$800 per foot acre placed on coal for 1924, may have to pay a penalty unless their city taxes, or at least some portion of them, is forthcoming before the appeal is decided in court. It was announced that the coal companies can be penalized under the law if they fail to pay their taxes before the penalty date is reached. City authorities, it is said, are preparing to enforce the law in this respect and regardless of the outcome of the court cases, intend to have the coal companies make a substantial payment on their taxes. According to John H. Jordan, chairman of the Board of City Assessors, there will be no appeals from the coal companies heard by the Board of Assessors. The courts will have to dispose of whatever claims are to be put up by the coal men against the \$800 valuation.

SOUTH DAKOTA

The Scranton Coal Mining Co. has been incorporated for \$150,000 by T. Finsners and F. E. Oelkera of Scranton, Edward K. Mather of Mitchell, S. D., David Hanna, of Wood Lake, Nebr., Frank Schrimpton of Ainsworth, J. F. Schmidt of Scotland, and James Richards of Scranton.

VIRGINIA

The Virginia Iron, Coal & Coke Co., for 1923 reports gross earnings of \$7,918,766 against \$4,354,846 in 1922, and net income, after all expenses and charges for interest and taxes, of \$456,664 against \$575,393. After allowing for regular dividends on the preferred stock, the company last year reported a balance equal to \$2.06 a share on the \$10,000,000 common capital stock outstanding against \$3.25 a share earned on the common stock outstanding at the close of 1922. After payment of dividends last year there was reported a deficit of \$143,146 against a surplus after dividends of \$325,583 in 1922. The balance sheet on Dec. 31, 1923, showed a profit and loss surplus of \$628,890 against \$772,012 in 1922. Inventories were valued at \$1,416,854 against \$1,636,161, cash of \$150,693 against \$194,511, and bills and accounts receivable of \$508,882 against \$196,455. Accounts payable totaled \$8,696, against \$10,278, and unpaid payrolls \$288,801, against \$300,934.

WASHINGTON STATE

The Church Mountain Coal Co. has been incorporated for \$450,000, at Bellingham, by M. T. Hurst, James J. Brady and Charles B. Sampley. The company holds coal lands which may be developed later.

The Cedar River Coal Co., a co-operative concern, has started operating at Landsburg, near Ravensdale.

The 1923 output of coal in Washington totaled 2,946,000 tons, according to the annual report of William R. Reese, chief mine inspector. More than 4,000 men were employed in the industry, producing an average of 3.18 tons per man. The value of the coal at the mine ranged from \$1.41 to \$5.44 per ton. Kittitas County, containing the Roslyn and Cle Elum fields and employing about half the state's total number of miners, produced 1,358,350 tons. King County was second with 663,000 tons, followed by Pierce County, 355,715 tons; Thurston County, 268,000 tons; Whatcom County, 187,000 tons; Lewis County, 113,000. Pierce County produced the only coke of the state—37,600 tons at Wilkeson and Fairfax.

WEST VIRGINIA

In connection with the session of heads of the U. S. Bureau of Mines at Pittsburgh lasting a week, beginning Feb. 28, attended by British mining experts, R. M. Lambie, chief of the Department of Mines of West Virginia, has extended an invitation to the visitors to make an inspection of the mines

of West Virginia during their stay in the United States. The British experts include Henry Walker, C. B. E., chief inspector of mines of Great Britain; Prof. R. V. Wheeler, D. Sc., and W. R. Chapman, M. S. They were sent by the British Government for a conference on mining conditions with mining men in the United States and for the purpose of discussing additional safety measures.

Demonstration of mine-rescue equipment of the Mine Safety Appliance Co., of Pittsburgh, Pa., was held for the benefit of a number of employees of the Pocahontas Fuel Co. at Pocahontas late in February and at the same time employees were instructed in the use of the equipment by Henry Theas, special representative of the company, and by officials of the fuel company. A large number of the men from the different plants of the company went through the gas chamber and put the apparatus to a test. A number of officials of the company were present for the test.

The Sullivan Pocahontas Coal Co. has issued \$1,200,000 first mortgage and collateral trust 6½ per cent serial gold bonds, dated Jan. 1 last, and due serially on Jan. 1, 1925, to 1944 inclusive. The company was organized to consolidate the properties and operations of seven producing companies in the Pocahontas-New River fields. The company owns approximately 2,640 acres of land and its subsidiaries hold leaseholds covering an additional 6,150 acres.

The Gulf Smokeless Coal Co., of which W. P. Tams, of Tams, is president and general manager, has completed the work of installing a complete plant for the removal of slate and dirt from coal by air at the Wyco mine of the company in Wyoming County.

Construction work has been completed on one of the largest tipples in the New River district, to be operated by the Maryland-New River Coal Co. It was placed in operation late in February and will be used in lieu of the two old tipples used by the company at its Rothwell and Smokeless mines the output of both mines being dumped over the one tippie, which is of wood construction and which cost with all equipment for the loading and preparation of coal about \$100,000. The company estimates that it will effect a saving of about \$100 a day through the use of the new tippie.

W. Clark Robbie, general superintendent of the Jamison Coal & Coke Co., in the Fairmont field, will be able to return to his headquarters at Fairmont soon, following an operation at a Baltimore hospital about the middle of February.

The Circuit Court of Monongalia County has granted the application of the Chaplin Collieries Co. for an injunction to restrain the Pursglove Mining Co. from mining and removing Pittsburgh coal from the seam underlying the Sewickley vein, owned by the plaintiff "in such a manner and in such a way as to unnecessarily injure the plaintiff and destroy its mine and endanger the lives of employees." Under the terms of the injunction the defendant company is required to "so mine and remove coal underlying the coal and mine of the plaintiff as will not deprive the plaintiff of any adjacent support to which it is entitled and not endanger the workings of the plaintiff's mine and the safety and lives of its employees." The injunction will not have the effect of forcing the defendant to suspend its mining activities but it will require the defendant to leave all supports, props and posts standing instead of drawing them, as is usually done when a section of a mine has been worked out.

In changing its name to the Nuriva Smokeless Coal Co., the Trace Fork Coal Co. also announces a change in the name of the post office and railroad station, which will hereafter be known as Nuriva. Officers of the company are H. R. Tribout, president, Tams; W. H. Rubv, vice-president and general manager, Mullens, W. Va.; George A. Butman, secretary and treasurer and R. F. Wildey, assistant secretary and treasurer, Nuriva W. Va.

In order to remove any doubt as to its title to coal lands recently acquired from the Lasher estate in Wyoming and McDowell Counties, the Fordson Coal Co. brought suit in the Circuit Court of McDowell County and that Court has confirmed in a decree the sale of 5,532 acres of the estate to the coal company, the purchase price of \$511,710 to be divided among the heirs.

Adopting the recommendations of the West Virginia Department of Mines, made by R. M. Lambie, chief of the department, after an inspection of the property, the A. L. Black Coal Co., operating in the vicinity of Madsville, in Monongalia

County, will take steps to flood its mine, cork all means of air entrance and cut out a path behind the mine fire, which threatens to destroy all the coal company acreage, in meeting of representatives of the company, officials of the Department of Mines and representatives of the Warner Collieries Co., of Cleveland, which owns the coal property adjacent to the Black holdings. Water will be pumped from the river through a 6-in. line, the pump to be used having been delivered at the mine. It also is proposed to cut away the earth from the surface down through the Sewickley vein to the Pittsburgh vein with a view to stopping the spread of the fire, even though such a method will destroy considerable coal. In other words it is proposed to strip the coal for some distance in the rear of the burning area. The mine will be closed down entirely until the fire is under control. This fire has been raging since November, 1920.

The Comfort Coal Co. has reduced its total authorized capital stock from \$50,000 to \$5,000. The Westmoreland Coal Company of the State of Pennsylvania and with headquarters at 223 South Third Street, Philadelphia, has been authorized to transact business in West Virginia.

WASHINGTON, D. C.

The U. S. Supreme Court March 3 refused a writ of certiorari which would have caused it to review the suit of the Braddock Coal Co., of Maryland, against David J. Sheehan, of Massachusetts. The verdict of the lower courts awarding \$6,112 to the coal company therefore stands. The suit involved alleged breach of contract for the purchase of 1,000 tons of coal by Sheehan from the coal company.

Official instructions have been issued by the acting director of the Bureau of Mines to all members of its technical staff calling attention to the necessity of exercising great care to confine work to those problems which do not encroach on the field of the professional engineer.

The U. S. Supreme Court on Feb. 18 denied a writ of certiorari sought by the Piedmont Coal Co., of Pennsylvania, and the Ayrshire Corporation to appeal from decisions of the lower courts which had dismissed injunction proceedings to restrain certain creditors of the bankrupt estate of Josiah Van Kirk Thompson from prosecuting suits and exercising liens on several thousands of acres of coal lands in Marshall and Ohio counties, West Virginia. The decision of the lower courts, so far as the injunction is concerned, stands. The Piedmont company, through the Ayrshire Corporation, bought the coal lands from the trustees of the Thompson estate. They contended that the sale was free from liens. When various litigation involving the estate was renewed they sought an injunction to separate the land they had bought from the suits.

A new petition for abolishment of the Government Fuel Yard and turning over of all government coal business to local retail dealers will be presented to Secretary of the Interior Work soon. Dissatisfied with rejection of their original petition, presented to the Secretary of the Interior on Dec. 14, local dealers have prepared a new proposal, replying to various questions brought up by Secretary Work's advisers, which they hope will result in securing the government business.

CANADA

Representatives of a number of municipalities of Western Ontario held a conference at London on Feb. 26 to consider the coal situation. A resolution was adopted calling on the Dominion government and the Railway Board to take action without delay to provide cheaper freight rates on coal shipped from Alberta into the Province. Attention was directed to the fact that wheat is hauled at \$7 per ton and it was contended that coal should receive equally favorable rates.

The coal production of British Columbia for January totaled 243,018 tons, an increase of 34,590 tons over that of the previous month. The output of every district was better than that of December, Vancouver Island advancing by 19,653 tons, Nicola-Princeton by 5,174 tons and the Crows Nest Pass district by 9,763 tons. Colliery managers do not pretend to explain the improvement but put it down to vagaries of the trade which cannot always be traced to their precise cause.

William Hart, electrical engineer of the Valier Coal Co., at Valier, has resigned effective Feb. 1. No successor has been appointed.

New Equipment

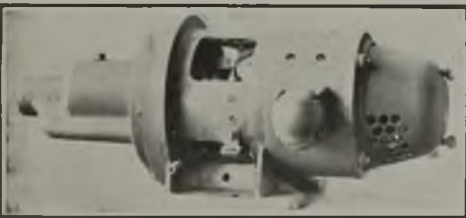
Steam Turbine-Generator Lighting Unit

A small non-condensing, steam turbine-generator lighting set of unusual simplicity and ruggedness has been developed recently by the Westinghouse Electric & Manufacturing Company for use in oil well rigs, steam shovels, isolated pumping plants, and general outdoor construction work. It is equally applicable for service around the mines, for the generator coils are specially impregnated and parts needing protection are heavily sherardized.

The unit, which is capable of generating 1,500 watts at 115 volts direct current, consists of a single wheel, of the Westinghouse impulse re-entry type, and a specially designed direct-current generator. It is unusually simple in design and substantial in construction, with only five castings and five moving parts. The moving parts are the shaft carrying the generator armature and turbine rotor, two governor weights, the governor spindle, and the valve stem.

NO BEDPLATE IS REQUIRED

The outfit requires no bedplate or foundations, the whole unit being sup-



Small Steam-Driven Generator

Automatic speed control makes this outfit particularly suitable for lighting service around coal mines.

ported by feet on the middle casting, which contains the generator inboard bearing. These feet can be secured to any substantial horizontal support with four small bolts, studs, or lag screws. This construction prevents distortion from bolting down or from the expansion of the parts due to heating.

The generator consists of a forged steel frame ring, two cast iron brackets and the usual internal construction as to field, armature and brush rigging. The commutator end is provided with a protective drip-proof pressed-steel cover, which is held in place by two wing screws. The field windings of the generator have the shunt and series windings wound together as one coil, but inside the coil itself, the two windings are entirely separate and thoroughly insulated from each other.

A ventilating fan is mounted on the shaft outside of the rear bearing between the turbine and generator. The air is drawn in through the front cover, through the generator and out through a number of openings in the rear bracket. This fan is guarded to prevent injury to the fan or the operator.

The unit complete is 32 $\frac{5}{8}$ in. long, 14 $\frac{1}{4}$ in. wide, and 12 $\frac{5}{8}$ in. high. Its net weight is 250 lb.

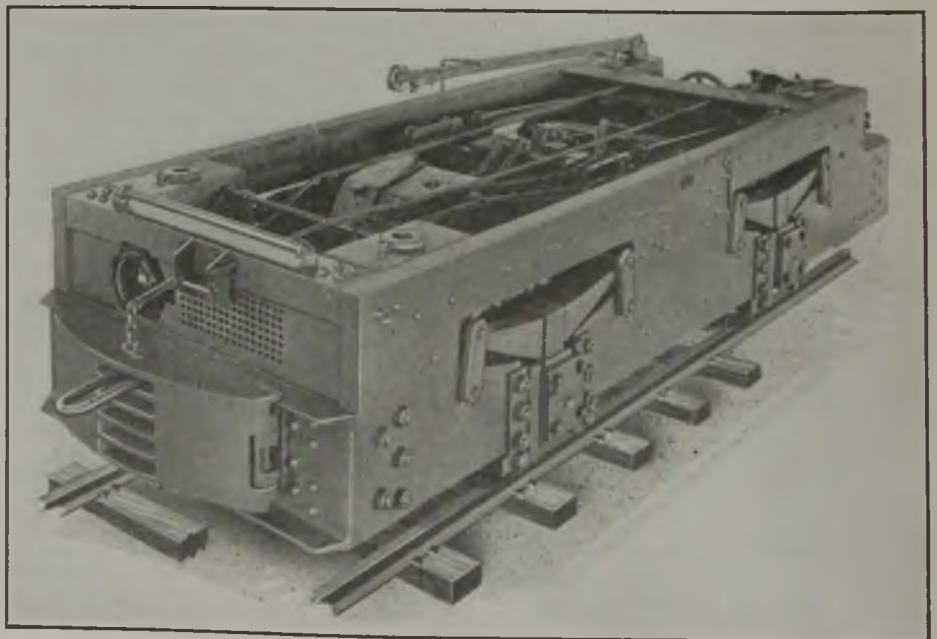
Newly Designed Trolley Locomotive

The Morgan-Gardner Electric Co., of Chicago, Ill., has recently announced its new type trolley locomotive for mining service. The motors in this locomotive are equipped with roller-bearings with heavy overload capacity permitting the slippage of the wheels under all conditions of load. Interpole construction insures sparkless commutation with low brush and commutator maintenance.

The reduction gears are of the single unit type, accurately machined and heat-treated, and possessing the "Wisdom" tooth designed by the Cincinnati Tool Steel Gear & Pinion Co. These gears and pinions are inclosed in a close-fitting gear case and run in transmission oil. The main journal springs are of the semi-elliptical leaf spring type, which gives the locomotive easy-riding and good tracking characteristics. The spring arrangement is also such that all the wheels rest solidly on the track and distribute the weight of the locomotive uniformly.

The brakes are of unusually rugged construction in every detail, overcoming much of the difficulty experienced with the ordinary type of brake. Angle guides hold the shoes in place on the wheels and cause a uniform pressure of the whole shoe upon the tire.

The clearance under the locomotive is unusually large, making operation possible where the track conditions are poor.



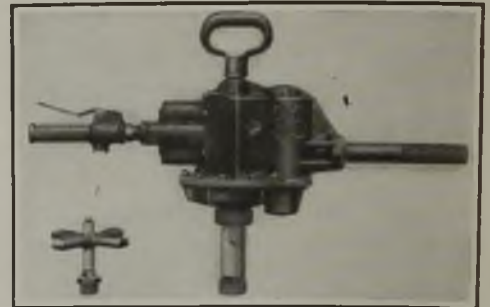
A Modern Trolley Locomotive

The designer of this machine has endeavored to incorporate every worth-while feature into the equipment. A detailed

Air Drill and Reamer

The Chicago Pneumatic Tool Company, of Chicago, has lately developed a new portable air drill and reamer. While the design of the drill is not revolutionary, it is, nevertheless, unique, and possesses all the points of advantage incident to stability, reliability, low maintenance and ease of operation for reaming or drilling purposes. This new drill weighs thirty-five pounds and, therefore, is light enough to be classified as a one-man machine for either down or side hole reaming. The balance is claimed to be perfect and consequently is easy to handle or control.

The valves are of the balance piston type, balanced in all directions and re-



No. 36 Red Giant Drill

This little air drill can be handled by one man for down or side hole reaming and drilling.

quire no pressure to hold them in their seats. Moving but 1/20 of their length and not requiring rocker arms or gears, they take no appreciable power to operate them. The valves are located between the cylinders with very short ports, thus providing air control as close to the cylinders as possible.

It is claimed that the lubrication system is quite economical, the motor being double acting and provided with packing glands, which prevent leakage of air into the crank case. Splash lubrication is used.

survey of the locomotive shows how successfully this has been accomplished without disturbing the balance.