COAL AGE

McGRAW-HILL COMPANY, INC.
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Negative Minds

PROGRESS in industry has in all branches and at all times been held back by conservative minds. Many men resent "being shown," and as a result no new method of operation is successful till enough have so tried it, proved it and profited by it that the men with negative minds find its adoption the only possible means of defense against their more aggressive and less negative rivals. A generation that has learned to fly, that has superseded the horse, that talks with wires and by wireless, that does nearly everything by machinery has no occasion to be negative. With everything changing and being changed there is no reason to take the attitude that the way of the past is the wise way, that something cannot be done because, forsooth, hitherto it has not been done.

After Waiting Six Thousand Years

IN THE year 4000 B.C. clay pipe was used in Babylonia. It may have been used even earlier. Yet it is only in the last few years that we have been able to attain the jointless pipe. Many operating men still remember the pneumatic undercutter. It was a hard machine to handle and its capacity was limited. It doubtless deserved to die, but that demise was greatly hastened by power loss on the line. Where we have low voltage today we had low pressure then. If only we had been able to establish good joints from mine to face the compressed-air puncher would have fallen into disuse less rapidly. If oxy-acetylene welding had come just a little earlier the air puncher would have stayed a decade longer. There are still many compressed-air lines in mines and it would seem that those who have them should weld them with oxy-acetylene. Thus most air would not be lost in transmission, the machine receiving the pressure of air with which it is designed to operate.

Conveyor in Stripping

GOING over the past history of stripping as printed in this week's issue we have an opportunity to review the various methods by which stripping may be accomplished and are led to question whether the full revolving steam or electric shovel is the last word in stripping. Is it certain that the dragline and conveyor do not have their place where stripping to greater depths than 40 ft. is justified by greater thickness of coal or even in shallower strippings?

That these projects gave way to the present-day large capacity shovel is no evidence perhaps that it was the only practical machine in the then existing state of the art. We are constantly getting new materials of construction and perhaps what was impossible then may be possible now. Just as the airplane was a failure till we developed the internal-combustion engine, so today we may have advanced to such an extent in the art of dirt removal, in the materials of construction and in mechanical control that some of the equipment with which success was impossible in the nineties and in the first decade of the present century might be made feasible today. The suggestion awakened by Grant Holmes' reminiscences published this week and last is worthy of thought. Surely stripping has not reached its limit as to depth and operating methods. A slight increase in depth would greatly widen the field of its applicability for large areas lie under cover too deep for present equipment, and the deeper the coal the better its quality.

An Excess of Technical Men

MUCH has been said of the excess of workers in the coal industry and what has been stated cannot well be controverted, though most sections would like to have more men, for they have room for them in the mines. However, the men now employed can flood the railroads with coal and cannot find market enough to keep them continuously at work.

Of technical men, however, we really have a dearth, but they are so little appreciated by the operating forces that there are many of them without jobs. Operators cannot understand that only proper control of operations will produce cheap coal. The most expensive mine is one that is undermanned in its management, its safety, mining, mechanical and electrical forces. Without the needed officials, accidents hamper production, explosions destroy both human life and the mines themselves, machines fail to work steadily and efficiently and the repair bills are enormous. No one can leave the mines with economy and safety to the operation of blind chance and incompetent or insufficient direction. Anything that is worth doing is worth doing well.

Keep Goodwill with Your Neighbor

NO INDUSTRY can afford to neglect its public relations. It is a losing game that is played against a combination of players. No industry knows just when it will have an important message for the public, some condition in its operation it desires to establish for its own well-being. When that time comes it will be well if it has the ear of the public rather than its boot. If the public is convinced of the disinterestedness of the industry much success will be attained in meeting its just ends. A poor way indeed it is to show no interest in a neighbor till you desire to borrow something or to ask for a favor.

Much can be imposed on any one or on the public, we can hold ourselves proud and unapproachable, so long as others must accept our conditions but when a favor is desired that perhaps will hurt no one, we have no friends who are willing to bestow it and the service is withheld. The coal industry should beware of this.

When the sun shines and everything is going well between ourselves and our neighbors it is good time to establish friendly relations. Today, prices are low, labor troubles are temporarily at an end, coal is plentiful, no one ventures to ship poor coal, the miners are compelled to keep the coal clean, the snowbirds have disappeared, now is the time to cultivate good relations and to plan some way by which those friendly relations may be maintained.

Simplification of Sizes

SOME have contended that the reason why anthracite is sold in so many sizes is because an unhappy necessity in the cleaning of coal made meticulous sizing essential. Perhaps the real cause was a desire to make an even and therefore a handsome product; but whatever was the reason the fact remains that more sizes are being made than the public really needs.

A few would have served just as well had not the operators, by putting them on the market, developed the desire for every one of the many sizes and made it difficult to amalgamate any without evoking public clamor. Some companies have found it necessary in the jigging of coal to prepare two sizes of chestnut but they had sense enough to mix the sizes after they were made. The lesson had been learned, but too late unfortunately for the elimination of other unnecessary sizes.

One method of washing is based on the flotation of coal in a medium of a given specific gravity. It works equally well on coals of any size, eliminating the necessity for careful sizing. But as coal is sold in many different sizes, that extremely valuable characteristic is left almost entirely unutilized. The operator with the mixed product must go to the expense of preparing his coal so as to afford the many sizes which an uninstructed public now demands.

The Illinois region also has developed a demand for close sizing. It makes several sizes and many mixtures of sizes and all to no purpose. This misfortune the operators of Illinois have called down on their own heads. They are utterly without justification.

A new coal-cleaning machine recently has been developed and introduced into West Virginia. It requires the most careful sizing. It would be deplorable folly if this size making resulted in educating the public, burning West Virginia coal, to demand a closely sized product. Rather than allow this habit to grow the operators who may install and use this machine should mix the product so as to obtain only those sizes which the public is accustomed to receive, thus doing their part to prevent demands for excessive sizing. The marketing of many sizes inevitably results in an inequality between their production and sale. This is harmful to the man who does not have the particular proportion of sizes that his trade is demanding, for he wants to move all his coal and not merely a part. Many sizes also involve a multiplicity of bins and loading tracks and all manner of trouble in loading.

A campaign of education is what we need. Simplification in sizes in certain cleaning operations may not be possible, but a simplification in selling is within reach. Here is an opportunity for an active coal-trade body or for the big father of all—the National Coal Association. Why let an unhealthful condition be perpetuated.

More Power to Him—And Less

FRANK FARRINGTON is no fool. Neither is he short of nerve. This president of the Illinois miners has proved those two facts before and he proved them again at his state convention the other day. He rose before his thundering thousand—some of them red-necked radicals ready to fight him at the drop of the hat—and stated some plain and unpleasant truths. He told his men that the industry is in a mighty bad way, and why. He told them some things they can and must do about it, and what he said was not all a pæan of praise for the domination of the industry by the United Mine Workers.

"I do not expect any outburst of applause," said he, and he got none. But he sent his men home thinking. Thus he performed a real service to the industry even though his schemes for curing coal's ills were not all sound.

Of course, Mr. Farrington's plan to provide work for workless miners by creating a great power-producing system in the coal fields of Illinois, burning Illinois coal to make electricity for the Midwest, is unsound. Not even Mr. Farrington himself can regard it seriously in his heart. If the miners, producers, consumers and state of Illinois were to build co-operatively enough power plants on the Mississippi and Ohio rivers adjacent to the state's coal fields to provide mining work for the 100,000 Illinois miners, enough power would be generated to supply practically the whole of the United States. How could it be sold within the 200-mile transmission district? Who would finance so vast an enterprise? And how many years would elapse before it could operate?

If the Illinois miners were to cling to their present rate of wages, which is assumed, does Mr. Farrington think Illinois coal could be used exclusively in his proposed power zone? It isn't so used now. Approximately 30 per cent of the total power consumption of the nation is within the range of Mr. Farrington's dream-power system, yet cheap non-union coal is hauled in to generate a great part of that 30 per cent. Does Mr. Farrington imagine his public-owned plants could run so much more economically than the great private plants of the Midwest that the spread between union and non-union fuel costs would be counterbalanced?

Farrington is no fool. He knows the truth of these things. He knows that the labor costs of Illinois coal must be reduced. Being the miners' leader he knows he cannot suggest it. He would be committing political suicide. The demand for reduction must come from the rank and file. So the best that the Illinois leader can do is to make his men realize the impossibility of their present position by giving them the cold facts of non-union competition, as he did, and then propose some such fantastic thing as his co-operative power plan as the only alternative to a wage cut.

The miners will soon perceive the futility of the power plan. Mr. Farrington hopes they will also perceive that he has done everything he can to save them. Then they will be ready to talk wages. More power to Farrington's wage plan and less to his power plan. Central power stations should be erected at mines but in moderation and as opportunity is presented. We must generate power for the present market as determined by a careful survey. Wild hopes that discount the future can help neither operator nor mine worker.

Freezing Process Enables Lessees to Sink Shafts in Deep Marsh Land of North Belgium

Forty-Six Beds Aggregating Over One Hundred Feet of Coal Made Almost Unapproachable by Bogs Thousands of Feet Deep—Shafts Sunk With a Protecting Ice Wall.

By Maurice Biquet
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UNUSUALLY rich is a coal basin recently discovered in the northern part of Belgium. The entire thickness of the coal formation is probably not less than 2,000 m. (6,560 ft.) and will possibly attain 3,000 m. (9,840 ft), but authorities are not yet agreed on these figures.

Forty-six beds are actually known. Their total thickness, in coal, is about 36m. (118 ft.), the average proportion of coal to the measures which contain it being from 2 to 4.1 per cent.

The average thickness of the layers is about 0.80 m. (2.62 ft.). The volatile matter in the coal varies from 6 to 42 per cent. Unfortunately, the rich portions are found to be covered by stagnant marshes, the thickness of which varies from 460 m. (1,509 ft.) in the eastern part of Belgium to 690 m. (2,263 ft.) in the actually prospected western portion. This makes it difficult to develop this coal basin, for any shaft that may be sunk must penetrate these great thicknesses of marshland, which consist for the most part of sand and wet marl. It has been possible, however, to overcome these difficulties by means of the freezing process, which consists in isolating a portion of the strata from the mass of surrounding marsh by means of an ice wall of approximately cylindrical form. In the center of this cylinder a shaft protected by the wall of ice is excavated.

Solidify Running Bogs by Refrigeration

To form this wall a number of bore holes about 1 m. (39⅜ in.) apart are drilled on the circumference of a circle concentric with, and of larger diameter than, the shaft to be dug. In each of these holes is lowered a vertical pipe sealed at the lower end. In this an extremely cold solution of salt is circulated. Around each pipe a frozen zone is formed that continues to widen until it unites with the frozen zones of the two adjoining pipes.

Preliminary to the initiation of the freezing process a careful study is made of the strata to be penetrated: (1) With regard to their nature because the freezing is transmitted differently in different strata, (2) in respect to the water in the strata encountered, which may be standing or gushing, and either fresh or of varying degrees of salinity, and (3) with regard to the permeability of the surface layers. From this last consideration it is possible to determine whether a foreshaft should be excavated. A foreshaft presents certain advantages: (1) A reduction in drilling, (2) a diminution of the cold necessary, for that part of the shaft that is driven without freezing, (3) a saving resulting from the greater facility of work at the surface, the distributing equipment for the brine being placed in this foreshaft. It presents at times some great inconveniences, for the inflow of surface water interferes with the work.

The number of borings depends on several factors, notably on the depth to be frozen. These factors influence the size of the circle along the circumference of which the holes are to be drilled. The number of holes also depends on the ease with which the earth can be frozen, for if the ground does not freeze readily the distance between the holes must be decreased.

The holes should be made as vertical as possible, so that the frozen area shall be throughout of a predetermined thickness, otherwise there will be places where the shaft protection is inadequate. Different devices have been designed for the purpose of determining any deviation in the borings. The one that, at the present time, has given the best results is a teleclinometer invented by M. Denis, of Paris.

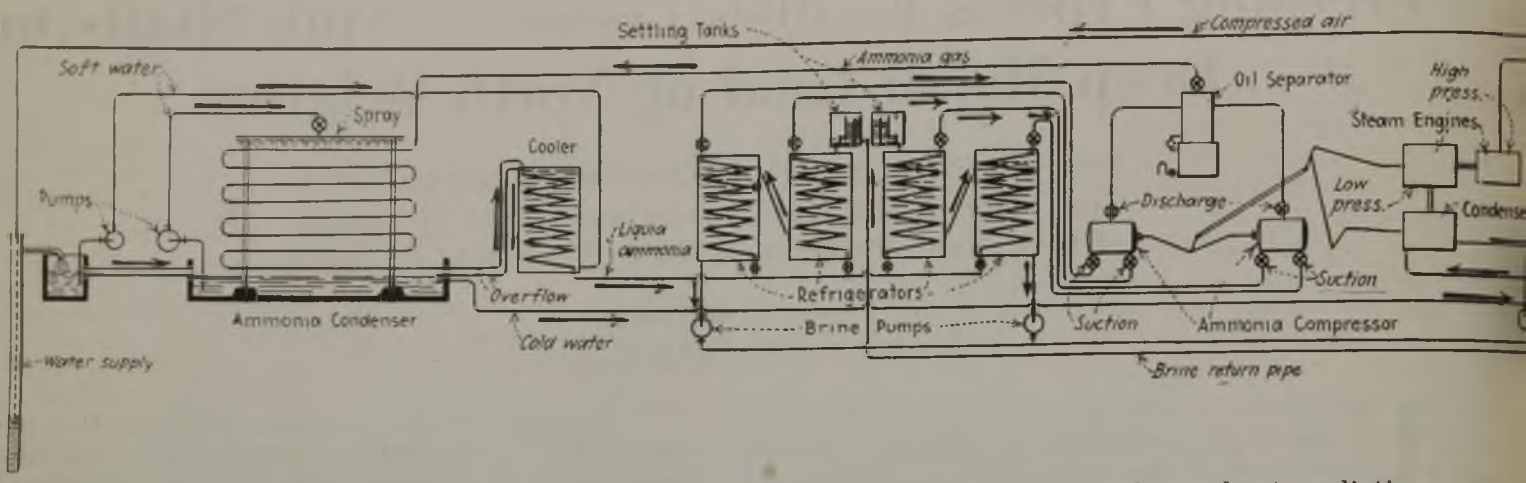
Through the indications given by these instruments it is possible to determine the horizontal section of the drilled area at all points in its depth. One can learn from these sections where, in order to prevent breaks in the protecting wall, it is necessary to make additional borings.

The freezing pipes must be made of a metal capable of resisting the changes in temperature to which they are subjected. Care must be taken to provide the pipe with tight joints.

In calculating the necessary thickness of the ice wall, the nature of the strata must be carefully considered, as it may be sand and moving gravel, or a chalk formation with extensive fissures. In such strata as these the ice plays the *rôle* of the mortar in concrete. As the ice in this instance receives the full compressive stress the wall should not be submitted to a pressure exceed-

WHEN WATER AND SAND CONSPIRE

MANY of our shafts have to be sunk in river bottoms where water and sand make caissons advisable. However, the depth of the shifting strata may be so great that the air pressure will exceed human endurance. In that event the caisson method cannot be adopted, and solidification of the ground is the only alternative. Cement has been used but in stubborn cases refrigeration is "indicated" as the doctors would express it. Mr. Biquet in this article describes the sinking of two shafts by refrigeration nearly a mile deep.



ing 20 kg. per sq.cm. (280 lb. per sq.in.). On the other hand in compact formations, the ice serves only to calk the fissures and the rock itself must support all the weight. This explains why with rock the thickness of the frozen ground may be reduced considerably.

The freezing is not transmitted uniformly along the freezing tubes. The theory of M. Lebreton proves that, other things being equal, the cross-section of the ice wall formed around the pipe will assume the shape of an erect cone, of a cylinder or of an inverted cone, according as the depth to be frozen is equal to, less, or greater than the theoretical depth, which depends on the following elements: The thickness of the inner pipes, their diameters, the conductivity of the metal, the quantity of salt solution in circulation at any time, and finally, the specific heat of the brine. Inversely, the depth being given, the form of the ice wall will depend on the elements that have just been enumerated.

With the aid of Lebreton's theory, the shape of the ice wall may be calculated. Consequently, knowing the quantity of water contained in the ground (or assuming it approximately) the number of necessary units of freezing for the formation of this ice wall can be deduced; but it is necessary to remember that all the cooling does not result in the formation of ice. At each level the temperature decreases progressively from that of the natural ground to that of the brine returning in the freezing pipe.

Taking into account, also, the losses due to radiation in the brine pipe, between the central refrigeration plant and the shaft to be frozen, the total units of freezing that must be employed can easily be deduced. On ascertaining the length of time required to form the ice wall, we find the degree of refrigeration per hour that is required.

To ascertain whether the area to be excavated is completely enveloped by an ice wall a borehole is drilled in the center of the shaft. In this hole no freezing pipe is inserted. The variations in the level of the water in this borehole determines the progress of the refrigeration. Where water is found at several levels, the adequacy of the wall may be tested by using several concentric pipes, each reaching one of these levels, the interior one reaching to the lowest level of all. Each of these pipes, because of the watertight bottom at the bottom of the hole, manifests the tightness of the wall at the water level to which it extends.

The brine used is a simple solution of calcium chloride ($CaCl_2$), or of magnesium chloride ($MgCl_2$), having a density such that the saline solution without itself freezing will afford the degree of cold desired.

The refrigerating machines most commonly used are those that are based on the evaporation of a liquefiable gas, such as ammonia, carbon anhydride, sulphuric anhydride, or a methyl chloride, ammonia and carbon dioxide being those most generally used. The gases

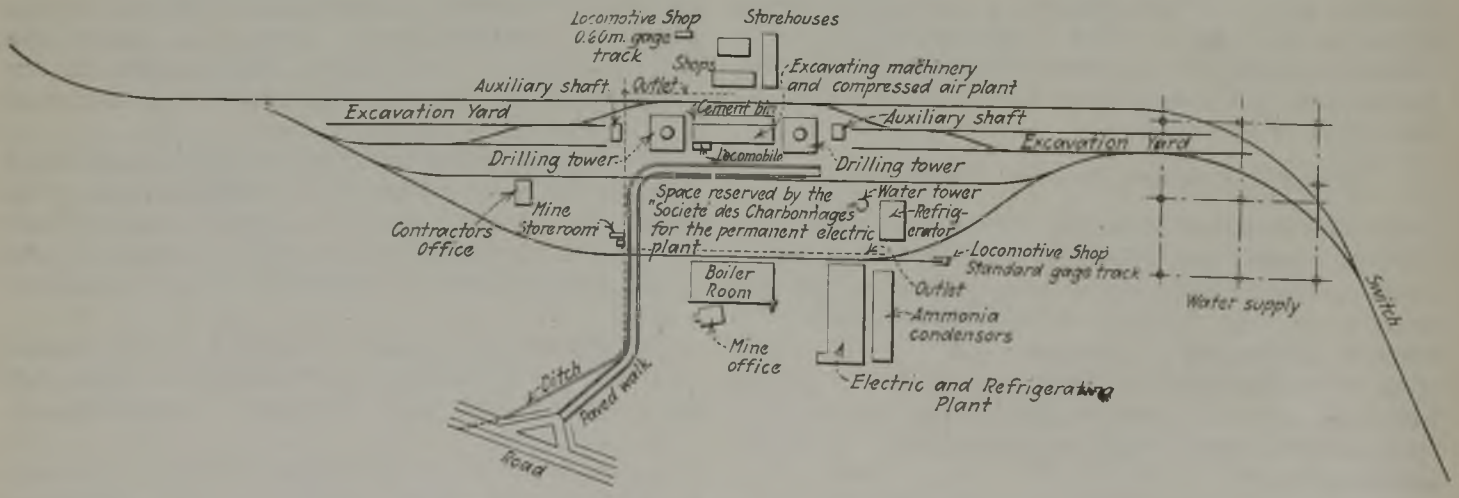


Fig. 2—Plant for the Sinking of Shafts by Refrigeration

The difficulty of putting down two shafts 2,034 ft. through ground artificially frozen, to say nothing of its further extension of 457 ft. through solider ground makes it necessary to build a plant merely for shaft sinking such as we, in America, would regard as quite elaborate if erected for the final extraction of the coal. Belgian mine concessionnaires face expenditures that in America would be appalling, but the richness of the coal deposits in northern Belgium is high enough to justify the cost; besides it must be considered that each concession contains about twenty square miles and as each shaft is of large diameter it can accommodate a big output. It is evident that these unusual expenditures are required where the freezing must be carried to such extreme depths. Where the depths are less the expense is naturally less also.

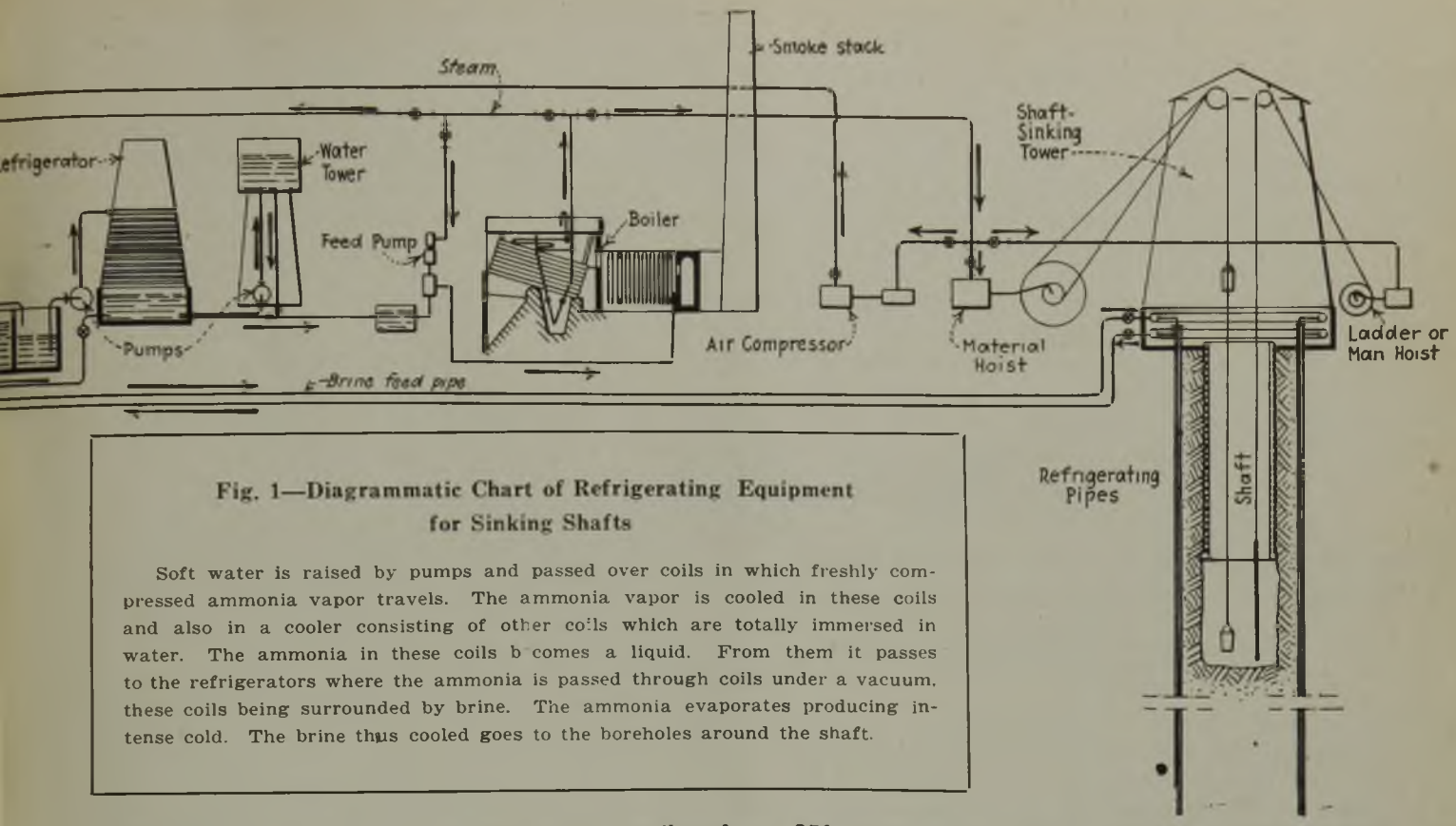


Fig. 1—Diagrammatic Chart of Refrigerating Equipment for Sinking Shafts

Soft water is raised by pumps and passed over coils in which freshly compressed ammonia vapor travels. The ammonia vapor is cooled in these coils and also in a cooler consisting of other coils which are totally immersed in water. The ammonia in these coils b comes a liquid. From them it passes to the refrigerators where the ammonia is passed through coils under a vacuum. these coils being surrounded by brine. The ammonia evaporates producing intense cold. The brine thus cooled goes to the boreholes around the shaft.

are compressed and then liquefied in the coils of a condenser which removes the heat of compression. These coils are kept cool by passing water over them continuously. The liquefied gases then pass through refrigerating coils over which the freezing liquids are circulated. The liquefied gases are vaporized in a vacuum maintained by the gas compressor. As they evaporate they create intense cold, lowering the temperature of the freezing liquids to the required degree. These liquids are used over and over again, so that all the heat they receive is that observed in passing through the boreholes which gradually reach their low temperature and cease to impart heat to them.

The Société de Fonçage de Puits Franco-Belge, of Brussels, is sinking two shafts in the coal-mining district of Helchteren & Zolder, each shaft being 790 m. (2,591 ft.) deep, of which 620 m. (2,034 ft.) is being frozen by a single current of refrigerating liquid. Fig. 1, shows the general arrangement; and Fig. 2 a plan of the installation.

It has been necessary to sink, for each shaft, 50 tubes arranged on the circumference of a circle, the diameter of which is 12.25 m. (40.2 ft.). Each of these tubes reaches down 620 m. (2,034 ft.). This, therefore, represents more than 60,000 m. (37.28 miles) of tubes, which means 60,000 m. (37.28 miles) of outside pipe of 113 to 128 mm. (4.4 to 5 in.) and an equal length of inside pipe of 50 to 60 mm. (2 to 2.4 in.) diameter.

The central freezing plant has seven units, each having two double-acting compressors driven by a compound condensing steam engine of 250 hp. The solution contains calcium chloride ($CaCl_2$) and has a density of 1.25. Nine electric pumps circulate the brine in the pipes, five of these pumps having a capacity of 150 cu.m. per hr. (660 gal. per min.), and four of 60 cu.m. per hr. (264 gal. per min.) at a pressure of 12 kg. (26.46 lb.), making a total of 990 cu.m. per hr. (4,356 gal. per min.). Each shaft requires a circulation of about 350 cu.m. per hr. (1,540 gal. per min.) so that some of the pumps can be held in reserve. The circulation pipes are combined in an ingenious fashion, in such a way that, by manipulating certain valves, the flow can be directed toward one shaft or the other.

Besides the seven refrigerating units, the central plant has two tandem compound condensing engines of 300 hp., each driving an alternator and a steam turbine, Zoelly system, of 500 kw. In another part of the plant is another engine driving an alternator of 100 kw. This represents a total electrical energy of 1,100 kw. Part of this serves to drive the electric pumps for the brine circulation, part is expended in circulating soft water for the condensers and part drives the warm water of condensation back to the Balke refrigerating plant. All this requires about 650 kw. The remainder is held in reserve. The boiler room contains eight boilers of the Bailly-Mathot type of 300 sq.m. (3,229 sq.ft.) heating surface, each. Five of these are generally in service, one is usually in process of cleaning, and two are held in reserve. The daily coal consumption when operating at full load varies from 66 to 72 short tons. Water is supplied by nine pipes sunk to a depth of 60 m. (328 ft.) from which the water is pumped. These are located 300 m. (984 ft.) from the plant.

The central air compression plant has two electric compressors of 100 hp., and four air compressors driven by steam engines and having capacity of 200 hp. The compressed air is used not only for the purpose of actuating the pumps but also to drive the pneumatic picks and drills for sinking the shaft. Each shaft has a compartment for hoisting excavated material, one for raising men, a service compartment and a compartment in which safety rope ladders are suspended. The hoist which handles the excavated material and shaft lining is a horizontal, duplex, non-condensing type of engine, controlled by a regulator, of American type. The principal dimensions are as follows: Diameter of

the steam cylinder 700 mm. (27½ in.); piston stroke 1,400 mm. (55 in.); diameter of brake flywheel 3,750 mm. (12 ft. 3½ in.); outside diameter of drums 6,800 mm. (22 ft. 3¾ in.).

One shaft was to be finished a year after the other. The freezing of the first shaft required seven months. The sinking and the insertion of lining took 21½ months or 567 working days. The average advance of the finished shaft per working day was thus 1.118 m. (3 ft. 8 in.), which is a veritable record for such a depth. The work goes forward rapidly after the ice wall is formed.

The freezing of the second shaft also took seven months. On April 10, 1924, of this year, after 401 working days, 451 m. (1,479 ft.) had been completed. The average advance of finished shaft per working day to this depth, was therefore 1.124 m. (3 ft. 8¼ in.).

The Société de Fonçage de Puits Franco-Belge, at Brussels, undertook to sink these two shafts to a depth of 790 m. (2,591 ft.) and of a diameter of 6 m. (19.68 ft.) as measured on the inside of the tubbing. The cost per meter, not counting the coal consumed in the boilers nor the price of the cast-iron tubbing, but including all other items, as for example, the boring of the refrigeration holes, the installation of the pipes, the freezing of the ground, the sinking of the shaft and the insertion of the tubbing, etc., is about 20,000 francs ($1,177 par exchange) per foot. The weight of the tubbing of a shaft of 6 m. (19.68 ft.) in diameter and 620 m. (2,034 ft.) deep is about 20,000 tons. It may be added that these shafts are believed to be the deepest that have been sunk by freezing anywhere in the world.

Mine Management Should Furnish Data When New Tipple Is to Be Designed

By Alphonse F. Brosky
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COAL companies should regard the design and construction of tipples and the equipment they are to contain of sufficient importance to warrant them in providing operating data for their proper construction. Observation has shown, however, that a mine owner generally confines his activities to informing the manufacturers of tipples that he desires a certain type of structure and equipment. He almost never suggests their proper proportions. It would seem that by no means enough attention is given by the coal company to the future capacity of a new mine as measused by its tipple. In this statement I am not discrediting the ability of the tipple manufacturer who, as a rule, unquestionably knows his business and has the interest of his client at heart. I maintain, however, that the mine manager or his engineers should keep in closer touch with the builder and take a more active part in the actual design of the tipple and equipment than is usually customary.

The manufacturer and erector should have a knowledge of the coal to be prepared in order to properly design a proposed tipple. In order to determine the percentages of the sizes that the tipple is expected to handle—slack, nut, egg and lump—the coal is, in many cases, tested by hand methods. The conditions under which the coal is thus screened are not even similar to those existing in the tipple where shaker or other screens are employed. The person making such hand tests chooses coal from mine cars taken at random and screens it to obtain the percentages of the different grades. Who shall say that the samples chosen are representative of the mine output? In many cases they are not. If they come from near the outcrop, they, of course, will not be representative, and no matter how accurately the tests may be made the results will not represent the real mine output so far as the percentages of the various sizes are concerned.

In the dumping from the cars also, be they of either the endgate or solid-body type, the coal necessarily is broken and therefore the sizes of the coal in the car are not representative of those which the tipple will have to screen. In chuting coal, as well as in passing it through conveyors, the coal is broken more or less and the effect of this action in the aggregate may be appreciable. Coal screened in hand testing is not broken up as much as when passed over tipple screens. For these and other reasons great care should be exercised in using or interpreting the results of hand tests.

When a tipple designer is called upon to draw plans suited to any particular operating condition or coal bed he may not possess absolutely accurate data. The mine may be opened in a new field upon which no basic figures are available. Even adjoining mines in a field already developed may furnish misleading data; perhaps the methods by which the coal is loosened at the face may cause an excess of fines. Another fact that the builder lacks is the percentage of refuse to be expected in the mine run. An assumed average is not a sufficient basis upon which to establish specifications for picking tables, which must be so designed as to handle the maximum quantity of refuse from capacity tonnage.

The correct width of screens may be easily ascertained, but it is more difficult to determine their proper length. The former dimension governs the tonnage capacity, while the latter regulates the thoroughness of size separation.

It is preferable to have a screen too long rather than too short. Fortunately, the builder usually arranges to avoid the latter. If the screen is too long, part of it may be veiled. An attempt should be made to obtain a screening area that will prepare the coal to the best advantage. When a new tipple is erected to replace an old one the company should be able to furnish many valuable suggestions to the builder as to the arrangement best suited to prepare the coal to be handled. It knows from its established trade what sizes are in greatest demand, and from the behavior of the old tipple it is able to advocate which unsatisfactory details in the first tipple should be eliminated and to suggest others which would be beneficial. Most important of all, it is familiar with the action of its coal in passing over screens; how long the screens should be and whether the openings should be oblong or round, also whether the screens should be plane or stepped, horizontal or inclined. The company officials should be in excellent position to specify the feeding arrangements best suited to the product handled.

This question should be subjected to detailed discussion. Certainly, the procedure to be followed by coal companies when planning and specifying a new tipple is important enough to warrant an exchange of ideas in an open forum. Only by such discussion is our sum total of knowledge increased.

Early Coal Stripping Full of Heartbreak—II

At Close of Last Century Butler Bros. Constructed Their Super Dragline—Experiments Were Made Later With Excavator and Conveyor—Finally, Revolving Shovel Establishes Stripping Industry on Firm Basis

By Grant Holmes
Danville, Ill.

THE fair success attending the first machines used in light stripping led Butler Bros. to believe that a larger excavator would be a huge success. Financed by the Consolidated Coal Co., they began the erection of a monster dragline which would handle deep stripping, shale, soapstone and the coal. In 1900 the great machine was completed at a cost of $30,000. Its massiveness required that it be supported on three 10-in. axles, each 22 ft. long. The center axle was geared to the engines, and the end axles were tied to the center one by side rods in locomotive style, giving traction to all six wheels.

One-hundred-and-thirty-five feet of horizontal boom supported by 60 ft. of vertical gantry frame made it necessary to weight the rear end of the machine with 25 tons of iron. Later on, after a fire, 20 ft. was amputated from the horizontal boom. Then it was difficult to keep the "giant" from tipping backward. Three drag buckets were used, each designed for handling one of the three materials encountered—dirt, rock and coal. The capacity of each was about 2 cu.yd.

Equipped with the new and supposedly capable machine, Butler Bros. started to clean off the remainder of the Missionfield coal. The first trouble encountered was the immense weight of the stripper causing both rails and ties to be buried deeply in the ground, especially, those near the edge of the bank. This situation caused constant fear that the machine would slide down into the pit, and also was a cause of constant expense.

As soon as soapstone was reached, it was seen that the rock bucket was a rank failure, and a knife or sort of plow to cut into the hard material was attached to this "drag," but without success, as there was no way to hold it into the cutting. Drilling and blasting the work at a heavy expense were necessary if coal was to be obtained.

Coal loading with the machine was successful—twenty-five railroad "gondolas" could easily be filled in a day. But after two years of hard fighting to keep up their part of the contract with the coal company, Butler Bros. gave up the unprofitable business for a second time. This ended their efforts in Missionfield, and, discouraged, they left for other fields of endeavor.

Confidence in Butlers' machine to do the work was by no means shaken. Sixteen of their employees leased the dragline and accompanying equipment. This new concern, called The Salt Fork Coal Co., was a co-operative venture. For two years it operated with fair success, getting such coal as was not covered with hard material, but in 1904 the enterprise failed, a case of too many bosses spoiling the job.

While the co-operative Salt Fork Coal Co. was working, another firm was engaged in dragline stripping in a neighboring river valley. In 1903 a Mr. Donovan and

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Note—First article appeared in the issue of May 29, pp. 797-800. Headpiece shows Butler Bros.' dragline drowned out. One of the frequent troubles in stripping is that it has to be done on flat land where the dangers of inundation are always imminent. Perched upon a weak bank with the water lapping it below and weakening the foundations such a heavy machine might conceivably pitch over the brink. At best, flooding impedes operations and muddies the coal.

Butler Bros. Last Dragline

In an effort to overcome the troubles caused by rock and thickness of overburden, this machine was built at a cost of $30,000. It was supported on three 10-in. axles each 22 ft. long. The boom at first was 135 ft. in length. Its length made 25 tons of counter-weight necessary on the back of the machine frame to prevent upsetting.

some associates purchased a Schenable dragline and some stripping property in the Middlefork bottom near Missionfield. This dragline although much smaller than Butlers', had the advantage of being able to revolve in a complete circle. For nine months, these men attempted to strip coal, but river water constantly filled their cuts, and the wastebanks slid down so badly that no coal was taken out. Edward Gray then organized the Gray Coal Co., which bought the machine and property, but after five months of useless operation, gave it up in despair.

The "co-operatives" now made Mr. Gray manager and president of their company. Operations were carried on less than a year under the new management. Heavily in debt, the "co-operatives" again took hold of the work themselves, and for another two years they fought soapstone, repair bills and river water without success. Thus the financial rocks were struck for the third and last time. After nine years' work, only seven or eight acres of coal had been stripped at a cost approximating $100,000.

The year 1907 saw the start of another strip mine the history of which somewhat resembles that of Missionfield up to this point. This was near Lily, Ky., in the Robinson Creek bottom, where a bed of coal 28 in. thick, lies under 6 ft. to 12 ft. of overburden. The seam is known as the Jellico. The first two companies to work at this pit had two steam shovels, one for stripping, the other for mining—built by the now defunct Vulcan Steam Shovel Co., of Toledo, Ohio.

A 2½-yd. dipper, 28-ft. boom and the mounting or railroad-car trucks, were the points of note on the stripper. The mining machine designated as the Vulcan "Little Giant" had a 1¼-yd. dipper, a 22-ft. boom, and was mounted on traction wheels. Another interesting feature of this work was the use of an immense centrifugal pump to wash off the coal after it had been stripped. A few months' time convinced the operators that there was no money to be made with these shovels, so they discontinued the work.

A Monighan dragline was placed in this field in 1912, by the Ideal Block Coal Co. No better success attended this machine than the others, so the company was forced out of business after two-and-one-half years' work.

In both Missionfield and Robinson Creek Bottom, steam shovels were first used, then draglines. A job in which both were operated in association, will be described. The Danville Brick Co. of Danville, Ill., owned a field adjacent to its brickyards, containing about four acres of coal under 25 ft. of cover. To strip off this much overburden, a small Vulcan steam shovel worked on top of the bed, dumping the spoil at one side. Moving parallel with the shovel, a small revolving dragline mounted on top of the nearest wastebank, picked up this spoil and deposited it in front of the machine. The dragline laid its own track, and did what the shovel could not do; it built wastebanks.

The coal from this mine was used in the company's plant, therefore, the question of whether reasonable profit could be realized on the strip pit did not enter so long as the cost of stripping and mining was below the market price for delivered coal. The Fall and Winter of 1912 and 1913 were occupied in uncovering this piece of coal.

To the southeast of Missionfield, about six miles, the same bed of coal lies within an average of 35 ft. of the surface. This shallow area contains about 70 acres, and the overburden consists of sand, gravel, loam and a heavy bed of shale. Here was a task for an extraordinary stripping machine, owing to the depth and composition of the covering. The dragline could have made short work of the soft materials, but shale was too much for it as was proven by the experiences of the Butlers at Missionfield.

The Consumers Coal Co. of Danville, purchased this field in 1904, and persuaded George W. Prutsman, an excavation contractor, to take the contract for stripping. The machine to do the work was built by the Bellefontaine Foundry & Machine Co. of Bellefontaine, Ohio, according to some of Mr. Prutsman's ideas, but the design and inventions were the work of George E. Turner. They had seen the failures of the dragline. Consequently they pinned their faith in the steam shovel, and instead of trying to use a long-boom shovel

as Wright & Wallace had done, Mr. Turner incorporated a belt conveyor with a shovel having a short-boom.

The advantage of this arrangement was that the shovel thus equipped with a short boom could dig rapidly, depositing the waste into a hopper that emptied on the conveyor, which operated at right angles to the digging, and carried the spoil to the dump. Four two-cylinder engines were required to operate this shovel, one for hoisting the 2-yd. dipper, a second for "crowding" it, a third for swinging the 35-ft. boom, the fourth running the conveyor which was 105 ft. long.

As with the old dredges in Missionfield, wood construction was used throughout. Four four-wheeled trucks supported the machine, giving a four-point suspension without attempt at keeping a level frame. The means of propulsion was by block and tackle. Like other steam shovels of its day, this could only dig forward, which meant that the circular plan of operation had to be adopted.

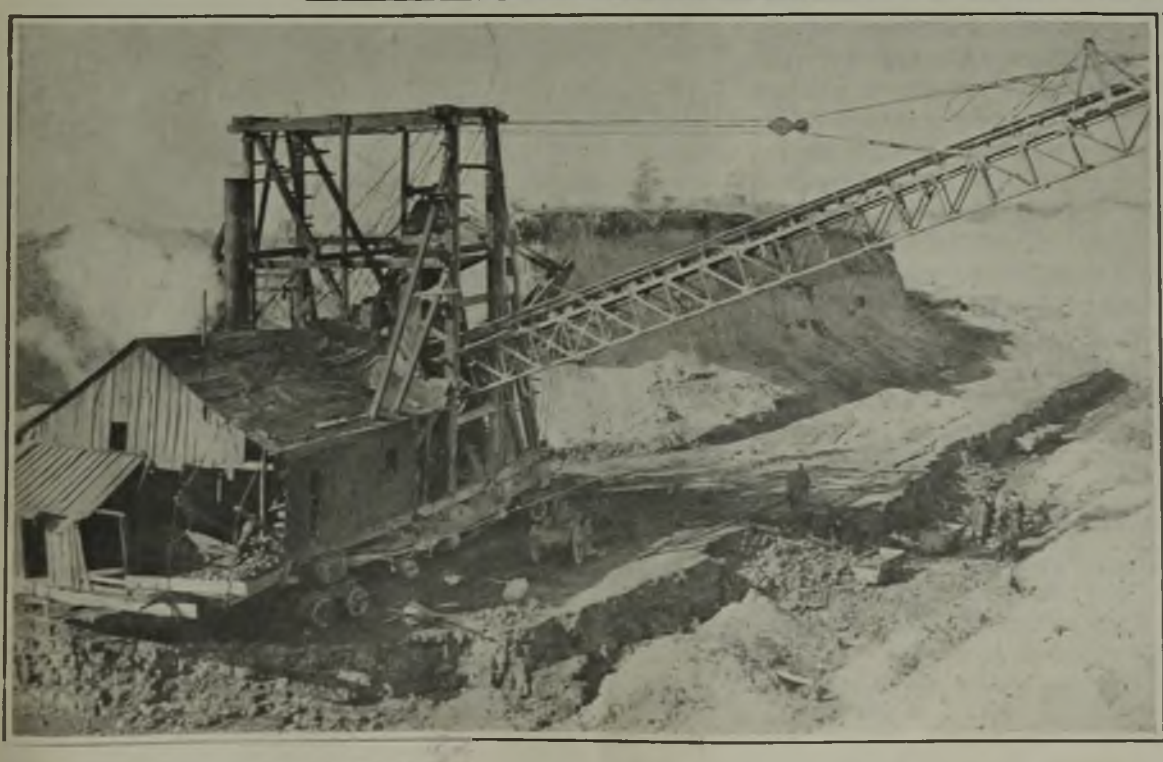
Work began in 1904—the stripping to be carried on in the summer, the coal loading in the winter. After several attempts at getting the field in shape for circular operation, the plan had to be abandoned because of the irregularity of the coal area and the excessive depth of overburden that had to be removed in places.

The usable stripping consequently had to be opened in parallel cuts. This necessitated leaving the coal in the cut until the excavator could be moved back to the far end, ready to start on the next cut. "Moving back" usually occupied about two weeks' time. These parallel cuts were not straight, but contained many "inside" turns, that is, turns in which the dumping arc is smaller than the digging arc.

Where such turns occurred the immovability and length of the conveyor boom made its dumping end practically the center, the machine traveling around it for the length of the turn. Therefore, on such a turn the wastebank became so high as to clog the conveyor. Lengthening their stacker to 147 ft. did not aid conditions much, and only hastened the wearing out of the

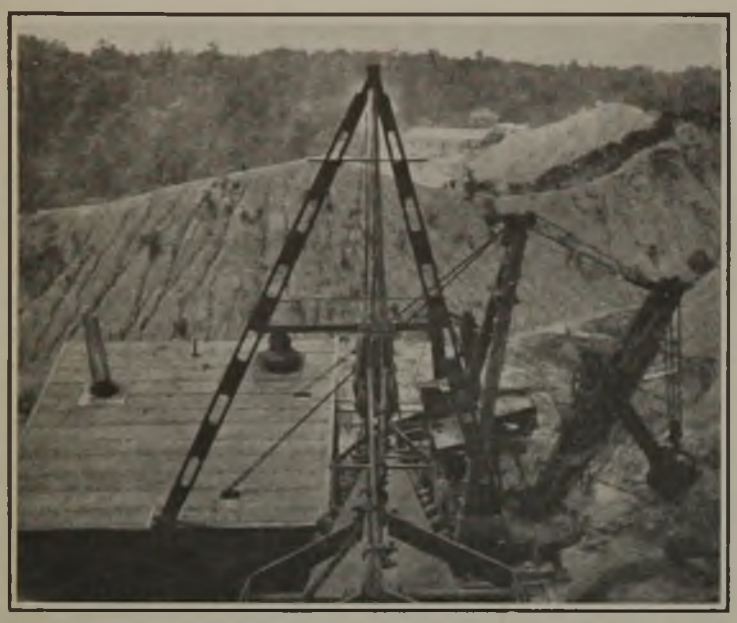
Steam Shovel And Conveyor

George W. Prutsman and George E. Truner, in an effort to overcome the the obstacles that had defeated all previous stripping machines, combined, on a single base frame, a short-boom shovel for fast digging, and a belt conveyor 105 ft. long to dispose of the spoil. Various changes were made in it, but it wore out parts at an alarming rate and finally the idea was abandoned as a "thereotical success but a practical failure."



Close-up of Machine

Possibly a modification of this machine with the conveyor placed on a separate truck and supported by a tall tower may be able to give the shovel a range it does not now have, both as to depth and width of excavation, thus enabling it to proceed without risk of shutting itself in. In that case the shovel need have only capacity and not excessive reach, the material to be moved being tumbled down to it by explosives.



Combination Shovel and Conveyor Was Rebuilt

The Consumers Coal Co., instead of letting out its stripping, then a common practice but since that time less usual, decided to do its own work. Thereupon it rebuilt the Prutsman shovel.

whole machine. Heavy repair bills, especially, the frequent purchase of new conveyor belts, was a third disadvantage. In two years, Mr. Prutsman had made no gain from his contract, so he stopped work.

Backed by men calling themselves "The Coal Production Co.," Mr. Prutsman tackled the contract a second time, but in a few months the operations stopped again for want of funds.

The Consumers Coal Co. now decided to do its own stripping. The first move was to rebuild the shovel completely, the notable change being the substitution of steel construction for wood. The chances for fairly successful work were thus greatly enhanced. However, in spite of this reconstruction and its careful management, the company quit business in 1913 without having made any profit. The machine was abandoned as a theoretical success, but a practical failure.

Other men than Mr. Prutsman and Mr. Turner have spent their time and money designing and experimenting with such stripping machines. Morton E. Pugh, who spent a fortune and a lifetime with conveying belt strippers, took out his first patents on a machine that moved and dug sideways, the conveyor dumping behind. Later patents show that he separated the excavator and the conveyor into two independent machines, a steam shovel being substituted for his own excavator, and a crusher being added to the conveyor for sizing the waste before dropping it on the belt. The two machines operated on parallel tracks. Mr. Pugh also had planned to use a revolving steam shovel so that the conveyor could be on the same track just behind the shovel, and thus save the work of double tracking. Several attempts at operation were made in Iowa, but without success.

Meanwhile, stripping in Missionfield had not been idle, for there were people who still believed that the Butlers' big dragline would do the work in spite of all the failures made. In 1909, the Missionfield Coal Co. was organized with W. G. Hartshorn as president. It leased the stripping machine and other equipment from the Consolidated Coal Co., on a royalty basis. After two months of operation, the new company bought the property and machine. Easy stripping and the absence of floods and labor trouble enabled these men to make a good profit with the dragline for about sixteen months, then repair bills began to overbalance the gains; the boilers gave out completely, and rather than replace them and risk future failure with the whole machine, the company abandoned the dragline.

These men, like Turner and Prutsman, saw that the principle of dragline stripping was wrong, because the machine would not operate on the soft bank. They also saw the faults in Prutsman's combined shovel and conveyor. The ultimate stripper, in their minds, had to combine the dumping range and digging power of the conveyor steam shovel with the ability to dig and dump in any direction. The propelling gear used by Butler Bros. was another desirable feature.

A long-boomed, self-propelled, steam shovel which could revolve in as complete a circle as Donovan's dragline, should solve the problem. All of the stripping machines up to this time were unable to stand the hard work and required constant repairs until they wore out, which did not take long. Therefore, the required stripper must necessarily be a giant in strength as well as size.

Several steam-shovel manufacturers were making small steam shovels and locomotive cranes which possessed the revolving feature, but none of the builders was willing to undertake the construction of a large revolving shovel, as they firmly believed it to be impossible.

In 1910 the Vulcan Co. constructed two revolving shovels for stripping purposes, having 1½-yd. dippers and about 50-ft. booms. Patrick Durkee and Joseph Stephenson each purchased one of these machines, putting them at work near Pittsburg, Kan. These revolving strippers were badly proportioned in the swinging parts, which caused constant breakdowns. Various men besides the original owners, have tried operating these machines, and are still attempting it today, but without making any money.

Next, the Browning Co. of Cleveland, Ohio, built a locomotive crane modified into a revolving steam shovel with 2-yd. dipper and 50-ft. boom. This stripper started work in Missionfield in the Fall of 1910, and in about six months, the factory received the "remains." The too-lightly constructed machine had torn itself to pieces, but here was a start in the right direction.

Another View of Preceding Machine as Rebuilt

The clumsy wooden construction which marked the first machine and which had been characteristic of all the earlier stripping machines, was replaced by a lighter, stronger steel construction but even this could not stand the gaff. For one thing the machine could not revolve and, for another, the four-point suspension made no provision for keeping the frame level.

The First "250"

The first revolving steam shovel in strip mining. This illustration from a photograph, taken in 1911 when the shovel was proving itself, shows the best practice of that year. The coal was drilled by hand. Where it was hard the coal was drilled as in the foreground, where it was soft rotary hand drills were used as in the centerground. "Pop" shots loosened the coal, which was loaded into mine cars by hand.

Two years of persuasion finally moved the Marion Steam Shovel Co. of Marion, Ohio, to begin the construction of a revolving shovel according to the dimensions and ideas of Grant Holmes and W. G. Hartshorn of Danville. One of their ideas was the hydraulic compensating trucks by which this immense shovel could keep a level frame on irregular tracks. This corrected one of the greatest faults of all previous machines—the twisting and breaking of the frame. The 3½-yd. dipper, 40-ft. handle, 65-ft. boom and 150 ton weight made this machine the largest in the world at that time.

In the spring of 1911, the big shovel, known as Model 250 began work in Missionfield. Old "Missionfielders" having seen the failure of so many machines, knowingly timed the downfall of this latest stripper. But this time they erred. The shovel saw years of service under conditions that had ruined its predecessors.

This first successful stripping machine had not been at work long before the news spread world-wide. Men from Kansas, Indiana, in fact from wherever there was coal to strip, came to investigate.

The Bucyrus Steam Shovel Co., of South Milwaukee, Wis., was also aroused to action, and, following a visit of its engineers to Missionfield, built its first big, revolving shovel in 1912. Later it developed a complete line of successful stripping and mining machines. To keep the base level on these shovels, one of the axles was pivoted to the middle of the frame, giving three-point suspension when moving over irregular tracks. When the machine was at work, jacks near the ends of the axle kept the base righted.

Thus the heavy, revolving steam shovel made its entry into coal stripping and won the place it has held ever since. The development of light coal-loading shovels and various other types of equipment in recent years has brought stripping up to the point it now has attained. But the end is not yet. Stripping of coal is an art that still is advancing.

British Rules for Locating Magazines

Explosive stores in Great Britain are of four kinds, or, as the British law somewhat unfortunately terms them, "divisions." In magazines classed in division A, 300 lb. of gunpowder may be stored or half that quantity of other explosives, or, if both gunpowder and other explosives are kept, ½ lb. of other explosive is regarded as the equivalent of a pound of powder. With the same rule as to the equivalence of powder to the other explosives, Divisions B, C and D include storages containing 1,000, 2,000 and 4,000 lb. of gunpowder respectively.

The store must be licensed by the local authority in the name of the occupier, either for powder or mixed explosives. This license must be renewed annually. The magazine must not be situated below ground in any mine or quarry or in any tunnel or other underground place in which any work is being performed or any persons employed or in any place communicating with such mine quarry, tunnel or underground place.

The stores must be kept certain distances from houses and other buildings which for purposes of legislation are divided into two classes. Class 1 and 2 both include dwelling houses, shops, rooms or workshops of any kind, mineral or private railways whether or not worked by steam, furnaces or kilns, fires for boilers, machine or manufacturing purposes, magazines for explosives, stores for explosives and what are known as registered premises. But though the buildings specified are the same in both classes, Class 1 refers solely to such buildings as are in the occupation of the licensee or to those buildings the occupier of which has waived his rights in writing whereas Class 2 refers to the same class of buildings where not occupied either by the licensee or by a person who has surrendered his rights to the more generous protection.

In Class 1 other objects are grouped. The magazine must be kept at a distance from these objects, equal to that prescribed for those already enumerated. They are: highways, public footpaths or promenades, open places of resort of persons carrying on any trade or business, canal or navigable work, dock, river-wall or sea-wall, pier or reservoir. Class 2 includes in addition to those enumerated factories, public roadways, churches or chapels, universities or schools, hospitals or public institutions, town halls or courts of justice, theaters or covered markets, buildings where people are accustomed to assemble and government buildings.

Distance Magazines Must Be Kept From Buildings

Magazine	Distance from Class 1 Buildings in Feet	Distance from Class 2 Buildings in Feet
A	75	150
B	150	300
C	225	450
D	300	600

What to Avoid When Storing Soft Coal

Don't Pile Coal of Different Sizes, Ages or Localities Together — Keep Away Water and Wood — Once Well Warmed Coal Is Almost Sure to Break Into a Blaze

By A. J. Hoskin

Acting Head, Department of Mining Engineering, University of Illinois, Urbana, Ill.

Scene of University of Illinois Coal Storage Pile

THE University of Illinois purchases its fuel supply under specifications and usually maintains in storage a large reserve for emergencies. Following the long coal-miners' strike (1922), it became necessary to replenish this stock which was then completely exhausted. At that time, advantage was taken of the situation by the late Prof. H. H. Stoek, head of the mining department, who undertook a systematic investigation of the phenomena of the heating and firing of stored coal, a subject in which he had long been interested. Prof. Stoek assigned the problem to Otis G. Stewart, a graduate research scholar, who worked under his supervision up to the time of the professor's sudden death, March 1, 1923, after which it fell to me to direct Mr. Stewart's work.

The results of this investigation, which have never been published, are embodied in a report prepared by Mr. Stewart in fulfilling the requirements for scholastic credits. The report consists largely of tabulated data which are of no special interest, except in respect to the deductions they warrant.

However, a discussion of the phenomena observed, together with a few of the conclusions reached in the course of this research may prove interesting to any who find it necessary to store coal. Though no actual discoveries were made relative to the spontaneous firing of stored coal, some theories were confirmed and opportunities were afforded for the observation of firing phenomena.

Several Storage Conditions Observed

All the coal investigated had been mined in various Illinois districts. As it was to be burned in automatically stoked furnaces, each shipment as received, if not already of a grade that would pass a 2-in. screen, was crushed to this fineness. During the building of one pile, however, the crusher broke down and run-of-mine coal of all sizes up to 6-in. lump was stocked as received.

The coal was hauled in auto trucks from the powerhouse to the storage lot, a distance of two or three blocks. Each truck arriving at the lot backed up and dumped its load as close as possible against the pile, and laborers with shovels threw the coal up the bank, which was maintained at a height of about 9 or 10 ft. Some of the coal was piled by a portable bucket elevator, but the results were about the same as in hand shoveling.

Several carloads of coal would thus be stored at one time and work would then cease awaiting the receipt of more coal. The relays between shipments allowed the sloping bank of the storage pile to weather somewhat between storage periods, and this weathering accounts for some of the subsequent phenomena. The intervals varied at times, reaching a maximum of a month. Construction of the mine coal piles studied continued until the middle of November.

The manner of piling the coal was favorable to its gravity classification, the coarser pieces accumulating close to the ground. No attempt was made to spread the coal in a series of relatively thin strata. The ground which had been used previously for the same sort of storage, was of a clayey nature and muddy at rainy times.

No effort was made to prepare the ground for the storage. The coal was handled by contractors whose only object was to form the piles. Deep waterfilled ruts were often covered by the coal, and remnants of former piles, together with leaves and twigs from neighboring trees, were scattered about promiscuously. On two sides of the large area were common board fences against which the coal was stocked. The headpiece gives an idea of the average condition of the storage floor, and shows how the coal tended to classify according to size when being piled.

Iron Pipes Used for Observation

It was first planned to use potentiometer pyrometers or some sort of thermocouples that would automatically record variations in temperature. The expense involved, however, proved prohibitive, and instead, 10-ft. lengths of ordinary ¾-in. iron pipe were prepared for use as thermometer wells. The lower end of each pipe was drawn to a point, and the top fitted with a screw-cap for use in driving. These pipes were sunk into the coal piles at nearly equal intervals of about 20 ft.; but, owing to the irregular outlines of most of the piles, this distance was often varied.

Each forenoon Mr. Stewart went over these piles, taking observations with a number of accurate 10-in. thermometers whose range was from —10 to +212 deg. F. Each thermometer, being attached to a cord wound on a spool, was lowered in turn into a pipe to a depth of 5 ft. and left suspended. After making a complete round of the pipes in one pile and returning to the first pipe the observer would read the temperature and then lower the thermometer to the bottom of the pipe. Returning from his second round Mr. Stewart obtained the bottom readings and removed each thermometer before proceeding to another pile. Some-

times he would hang two thermometers simultaneously in a single well at the specified depths of 5 ft. and 10 ft. respectively. Occasionally, when unusual heating conditions were indicated, he has taken readings at one-foot intervals; but there appeared such uniform gradations between the readings at the 5-ft. intervals that he eventually dispensed with other readings.

When the work was well under way, the Federal Engineering Development Co. kindly donated twenty of its sentinel-type indicators, one three-dial and two single-dial sounding instruments. These instruments

Fig. 1—Pile of Coal Showing Size Segregation

As the coal is piled the fine material stays near the top of the pile, and the coarser material rolls down on the pile toward or to the bottom. If another pile is built on this the fine coal on the top of this pile is in contact with the coarse coal on the bottom of the other and the variation in size and in the age of the coal may cause a fire even if the coals in the two piles come from the same bed in the same mine.

carry the general name of "protectometers." They were promptly put into service and served to check the results obtained by the thermometers. They proved wholly dependable as sentinels over coal piles during long storage; but they were found less convenient for the research work than the simple pipe-and-thermometer units previously employed. The protectometers were more cumbersome than the light pipes. Throughout the entire investigation ample time was afforded each thermometer to register accurately. In Table I is shown the thermometer readings in two holes compared with those of contiguous protectometers.

Where Old and New Coals Mix, Fire Occurs

One pile was started with old, dried screenings from bins in the power house, and against this was stocked fresh screenings. After the completion of the pile the difference between the two halves was distinctly noticeable, the new coal being blacker and more brilliant, the appearance of the older coal being dull and dirty. Twelve days after storing, heating began to affect the thermometers along the plane of contact between these different coals. The following day the pile smoked vigorously, showing that such a contact between fresh and weathered lots of coal presents a condition favorable to spontaneous combustion.

The heating and subsequent fire spread rapidly till it reached the fence against which the pile was built. The fence quickly took fire and ignited the adjacent coal along its course, the large cracks between boards affording excellent drafts of air. Workmen tore down

Table I—Thermometer and Protectometer Readings, Contiguous Holes

	Degrees Fahrenheit			
	Pipe 608		Pipe 609	
Depth Feet	Thermometer	Protectometer Dial	Thermometer	Protectometer Dial
2	158	158	144	145
3	168	166	157	155
4	177	175	174	170
5	179	180	167	164
6	181	181	168	165
7	178	178	170	166
8	181	179	178	178
9	193	183	163	168

the fence and removed all coal showing any evidence of fire.

However, heating soon began further along the contact plane and increased so rapidly that the entire pile would have been ruined had it not been expeditiously moved to the power plant and immediately utilized. Temperatures rose from 78 deg. F. to 356 deg. F. during these observations. The portable elevator used in removing the fired coal is shown at work in Fig. 2 where it is loading a truck for transportation to the power-plant.

Dissimilar Coals Fire at Contact Surface

It was intended that a certain pile should consist exclusively of screenings from a single mine; but, after about 200 tons of this coal was stocked, receipts ceased for a time, and the pile was finished with coal from a mine in a different field. It chanced that the placing of the last few truckloads of the first kind of coal left a little level bench about 4 ft. above the ground. When the new coal was thrown upon the pile, there was a segregation of the coarser fragments on this bench the surface of which was naturally composed of the finest fragments of the first coal. This established a plane of contact between not only unlike coals but also unlike sizes. The second lot of coal contained much more pyrite than the first. This condition had not been previously noted but it was easily disclosed subsequently. Heating increased at the rate of from 4 to 5 deg. daily, and a lively combustion ensued.

When the fiery masses were subsequently excavated, coke was found mixed with half-burned coal, red ashes and a yellow, viscous substance that proved to be sulphur probably reduced from the pyrite. Iron oxide from the same pyrite was present as a fine, red dust. The conflicting reactions that occurred in this pile provide imagery for the chemist.

Before the fiery masses were removed their heat had radiated until both kinds of coal reached a temperature of 180 deg. F. This was not considered a critical or ignition temperature and yet, when the pile was opened, the spots at this temperature quickly caught fire. Here is a phenomenon deserving scientific study.

One pile was formed exclusively of coal from a single mine. However, the first few hundred tons of this coal consisted of screenings, the rest being the run-of-mine coal previously mentioned as being stocked because of a broken crusher. The plane of contact of the two sizes proved to be occupied by the coarser lumps, many of them 6 in. in diameter.

The temperature of the coal, as placed, averaged 80 deg. F., but rose rapidly, and various wells near the contact showed temperatures ranging from 125 to 150 deg. F. These temperatures were not, at that time,

Fig. 2—Portable Elevator Loading Fired Coal

When the coal fired it was loaded out and carried away to the boiler plant. Fire first started where well-weathered screenings, already dull with age, from the bins in the power house, were stocked with fresh screenings. Such coals if possible should never be stocked together.

regarded seriously, but excavation being made into the heated zone for inspection, energetic combustion started instantly.

A strip about 20 ft. wide extending through the pile along this plane of contact, was then removed and it was thought the rest of the pile was safe. Nevertheless, one of the sections of the pile burst into flames a few days later. Investigation showed that the spontaneous heating had occurred at a limited contact plane between a stratum of fine coal and the overlying stratum of coarser coal.

Water in Ruts Apparently Starts a Fire

A certain pile was formed on ground badly cut up with ruts made by the heavy coal trucks in wet weather. These ruts and other depressions in the floor were filled with rainwater. This pile heated early but the temperature failed to exceed 142 deg. F. A white cloud of vapor was often visible over the pile. When a cool thermometer was inserted in a well it promptly became clouded with moisture.

The pile was assumed to be safe against fire, and yet when the coal was subsequently hauled away there were numerous pockets showing the products of complete combustion. The water appears to have induced a quick heating of the bottom coal; but the vapor that permeated the mass must also have deterred the combustion to a considerable degree.

Wood Fence Appears to Have Fired Pile

Fire was discovered in one pile where it came into contact with a board fence. The thermometer nearest to this fire read only 106 deg. F. It is believed that spontaneous heating occurred because of the coal actually touching the wood. The crevices between the fence-boards permitted just the requisite supply of oxygen without sufficiently removing the heat by circulation. By tearing down the fence and flooding the coal with water from a fire hose, the bulk of this pile was saved. Similar phenomena were observed in another pile to which corrective measures were successfully applied.

A few piles remained comparatively low in temperature throughout. In one pile the temperature rose only along a limited horizontal stratum that was unintentionally produced about 4 ft. from the ground during the stocking of the coal.

Heating always occurred in the lower half of a pile, except in the instance of the fence fire mentioned. The reduced and molten sulphur frequently found in burned pockets often matted lumps of coal together. Removal of fiery coal alone did not prove adequate to prevent further combustion. The relief was but temporary. Heat from the fire usually permeated the pile, and it may be that combustible gas also from the fire was entrapped in the coal pile ready to aid in reestablishing combustion.

The heat of any fiery spot was strongly noticeable for about 5 ft. in every direction. Heat from an interior fire travels further along strata than in a direction transverse to them.

If coal is stored in the open, the piles should be relatively shallow because firing occurs in the lower zones, and because with high piling large quantities of coal must be handled to get at a fire. Contacts of coal with wooden structures or other inflammable substances should be avoided.

Keep different kinds and different sizes of coal separate. Keep old and fresh lots of coal apart. Sort out or otherwise remove as much pyrite as possible.

Use of Rock Dust More Dependable and Less Costly Than Sprinkling

EMPLOYMENT of rock dust in coal mines to prevent coal-dust explosions should not add to the cost of coal, according to George S. Rice, Chief Mining Engineer of the Bureau of Mines. In England, where some of the mines have been using rock dust for this purpose for more than ten years, and where its use in dry mines has been required by law since 1920, the direct cost is not over 1c. per ton and in many cases not more than half that, Mr. Rice points out. However, in the United States the costs probably will be higher on account of the higher wages in this country.

This is not really an added cost as far as the general public is concerned, even though the whole cost of mining is finally paid by the consumer of the coal. Two coal-mine explosions which have cost about a million dollars each in workmen's compensation, property damage and other costs have occurred in the United States since the first of the year. Averaging the cost of these two explosions over the approximately 500,000,000 tons of bituminous coal that will be produced this year represents an added cost of approximately 0.5c. per ton that in the last analysis must be paid by the consuming public. In other words, a sum of money equivalent to the damage done by the two mine explosions (which the use of rock dust undoubtedly would have prevented) probably would have sufficed to pay for the rock dusting of all the bituminous coal mines of the United States.

Many bituminous coal-mining companies in this country, in order to keep down the coal dust, are sprinkling their mines with water at a cost several times that of rock dusting. Sprinkling is not as dependable as rock dusting, for the water continually evaporates, and if sprinkling is neglected for a short time an explosion may result. How great is the difficulty of effectually wetting coal dust is evidenced by the fact that coal dust may float on the top of water in sufficient quantity to cause an explosion even in a mine that is so wet as to make work in it uncomfortable.

How to Keep Mining Equipment in Satisfactory Operating Condition at All Times

Electrical Apparatus Should be Supplied With Rated Voltage—Repair Worn Parts by Welding and Machining—Pumps and Fans Must Not Be Required to Deliver More Than Their Normal Capacity

By J. F. MacWilliams
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Cresson, Pa.

ALL electrical apparatus is designed either to generate a particular voltage or to operate when supplied with a certain quite definite electric pressure. It is, therefore, inportant that generating equipment deliver its rated voltage and all other apparatus receive at its terminals the pressure for which it is designed.

Burnouts, breakdowns and other failures of electrical equipment are generally the result of the low voltage it received. Excessive pressure will cause the insulation to fail; the liability of such a breakdown depending upon how great the over-voltage may be. However, too high an operating voltage is rare because of the nature of power supply systems. Consequently, electrical men and others responsible for the successful operation and maintenance of electrical apparatus need to guard mostly against low voltage.

Nearly all motors are designed with ventilation ducts. Should these passageways become only partly obstructed with oil, dust or dirt the circulation of air is reduced and the temperature of the motor is abnormally increased at all loads. If the dirt is composed of current-carrying material there is great danger of short-circuits and grounds. For these reasons electrical equipment should be cleaned at frequent intervals.

Keeping Rotating Parts in Position

The air gap between the revolving and stationary elements of all machines should be inspected frequently. Normal wear of bearings gradually decreases the clearance at the lower part of an armature or rotor. When the air gap is not uniform the unbalanced magnetic attraction causes the shaft and bearings to wear much more rapidly than when the revolving element is in a central position.

Commutators should be kept smooth and clean as dirt and roughness will cause them to deteriorate rapidly.

Motor and generator fields should be kept in good condition. A weak motor field increases the normal operating speed and usually strains the armature windings. Unbalanced fields cause cross currents to flow in the armature and result in excessive heat.

When a motor or generator is designed certain characteristics determine the grade and type of brush to be used. After the motor is completed the manufacturer makes a thorough test of the motor and much time and money is spent to ascertain whether the brush previously selected is satisfactory. For these reasons it is always advisable not to change the grade of brush supplied by the manufacturer without first making a careful investigation.

Particular attention should be given to the proper lubrication of electrical apparatus. Too little oil on motor bearings will cause excessive heat and wear, whereas too large a quantity will overflow and be sucked into the windings where it quickly rots the insulation.

Storage batteries should always be properly charged. The cells should be frequently examined to determine the level of the electrolyte in the jars. A proper charging current is essential to long life and efficient service. Each week the battery should be given an equalizing charge so as to be brought back into step with the ampere-hour meter.

Locomotives should never be run with broken frames or bumpers, as the bearings, gears, axles, etc., thereby are subjected to excessive wear and the motorman is exposed to great danger. Worn bearings, housings, and axles should be built up by welding and then machined so as to fit properly. If there is much lost motion in these parts, the power of the motors is partly absorbed in pushing the gear and pinion apart and clashing the teeth, instead of being used in useful work.

Operate Equipment Properly

Motor suspension springs should be maintained in good condition; they absorb the initial shock that the motor gets when the power is applied. If these springs do not take the shock the shafts and gears are almost sure to be broken.

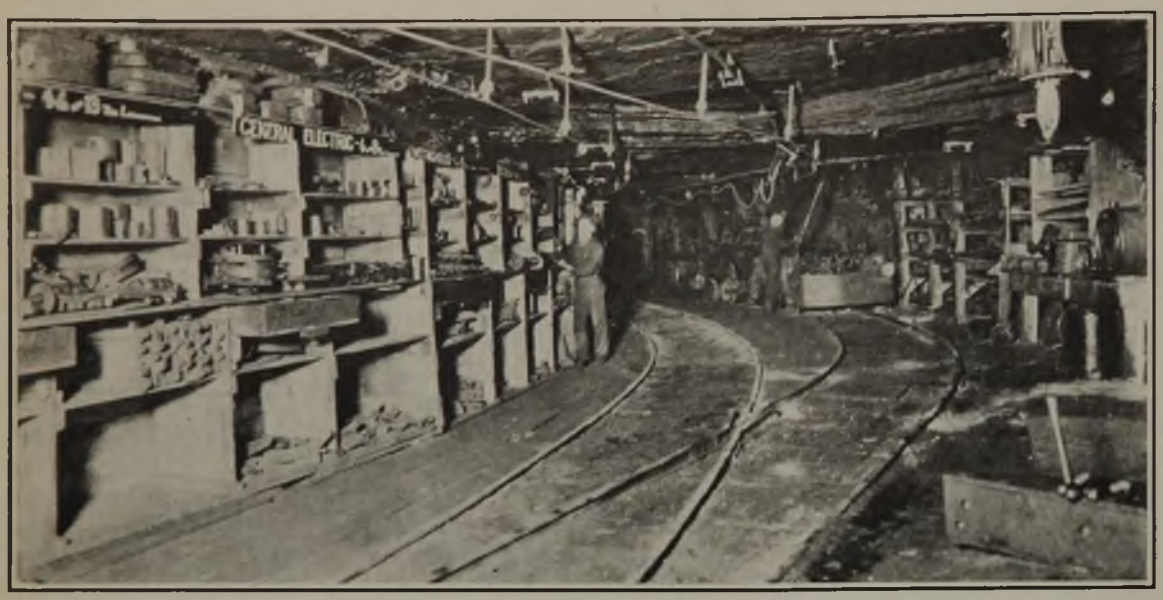
Starting locomotive motors in parallel is an all too prevalent practice around coal mines. When the motors are started in this manner the locomotive must accelerate twice as fast as it should. Smooth operation and greater starting torque can only be obtained by starting the motors in series and later changing them over into parallel.

No locomotive should be allowed to run on any mine track when the wheels have developed a false flange more than $\frac{1}{4}$ in. high. The delays and high maintenance costs of locomotives and track are excessive when the wheels have high false flanges. Turned-down locomotive wheels should be paired so that their diameters will not differ more than $\frac{1}{32}$ in.

Soldered cable and wire joints are always to be preferred, soldered feeder ears and connectors are better than mechanical connectors. The size of current-carrying conductors should never be less than that specified by the National Board of Underwriters. It must be remembered that these recommendations are based upon safe heating capacity and consequently larger conductors must frequently be used where the lines are long. Otherwise the loss of voltage in the small conductor may be quite large.

Electric generators are designed to deliver a certain current at a definite pressure. This is also true of fans and pumps. We would not expect to drive a

Note—Paper delivered before Mining Institute at Barnesboro, Pa., May 24.



Storeroom and Repair Shop

In the mine machine shop large savings can be effected by prompt repair service. Partly worn equipment can be easily welded and placed in the stock bins instead of being lost in the mines or put in the scrap pile.

generator built for 250 volts at a speed necessary to develop 500 volts, so why should we expect a fan or pump to operate satisfactorily at greater capacity than that for which it was designed? An electric generator if short-circuited may burn up; likewise, a pump or fan is subjected to strains if the head is reduced or the flow is short-circuited.

Usually plunger pumps are purchased because they can be operated at high efficiency, therefore special care should be taken so as not to defeat the purpose of the management. It is possible by not removing old packing or by pulling up new packing too tightly to decrease the efficiency of a plunger pump 30 per cent. Loose packing and a little leakage of water at the glands is much better than tight packing.

Some types of centrifugal pumps are designed so that the bearings are water-cooled. Pump operators, especially those who have been accustomed to maintaining plunger pumps, should be careful not to pack the glands so tightly as to score the rotor shaft or shut off the cooling water. Water-seal rings in centrifugal pumps should never be removed or placed in a position on the shaft where the sealing water cannot properly enter them.

Peabody Picture Film Shows Mine Explosion

"WHEN a Man's a Miner: a Story of Safety in the Coal Mines" is the title of the latest addition to the series of industrial motion picture films prepared by the Bureau of Mines in memory of Francis S. Peabody, and at expense of his son, Stuyvesant Peabody.

In this film, which is four reels long, the principle of "Safety First" is woven into the story of "Lucky" Burns, a carefree young coal miner who is inclined to laugh at danger and to take big chances in order to increase his daily output of coal. "Lucky," however, learns the lesson of "Safety First," as shown in a realistic scene where his neglect to pull down a block of loose coal results in his leg being crushed. His life is saved by a "buddy" whose knowledge of first aid enables him to apply promptly the proper emergency measures. "Lucky," after his accident, concludes to take the first aid and mine rescue training offered by the United States Bureau of Mines, a knowledge which is of immense practical aid later in the story.

Following the arrival of the Bureau of Mines rescue car in Tippleville, the typical midwestern coal mining town in which the story is laid, the gathering of several hundred coal miners at the mine mouth for their day's labor is shown. The miners obtain their "life checks," descend the shaft, and proceed in long trains of mine cars through the shadowy underground depths to their daily work. As "Lucky" and his "buddy" are engaged in loading coal the sound of a mine explosion is heard. They rush toward an entry, only to sense that deadly mine gases lie in that direction. "Lucky," utilizing his new knowledge, retreats to a safer part of the mine, gathers about him a number of his comrades, and instructs them in the method of building a barricade to protect themselves against the deadly afterdamp.

Meantime, in a series of vivid pictures, the power-plant whistle gives the disaster signal; the frenzied women and children of the town rush to the mine entrance; and the rescue men trained by the Bureau of Mines, wearing oxygen breathing apparatus, hasten to the aid of the imperiled miners.

Behind his hastily improvised barricade, hundreds of feet below the surface, "Lucky" Burns instructs his "buddies" how to conserve their limited supply of oxygen. He puts out crudely written signs to guide the rescuing party, and details men to rap on the rib as a signal to the rescuers.

Vivid glimpses of the rescue crew making their way through the dark mine passages are given, and finally the rescue of the entire party, made possible by the conversion of "Lucky" Burns to "Safety First" principles is depicted. "Lucky" has his reward in winning the hand of pretty Mary Kincaid, the girl of his choice. He is awarded the Joseph A. Holmes safety medal for heroism in time of mine disaster and is appointed mine safety inspector for the Tippleville district.

The film will be available, after June 15, for exhibition purposes by educational, civic, commercial and similar institutions and may be obtained from the Bureau of Mines, Pittsburgh, Pa.

IT'S FUNNY ABOUT COAL FIRES. The Astoria Light, Heat & Power Co., of New York, is proud because its fire has burned one hundred years. The Alden Coal Co. is proud because its fire has finally been put out.

Mechanical Loading Problems and Their Relation To Room-and-Pillar and Longwall Workings

Ayrshire Coal Co's Experiences with Cars of 3200-Lb. Capacity—Forty-Eight Cars Loaded per Day—Wagons Placed with Less Than One-Minute Waits—Control of Roof the Problem with Longwall

Mechanical Coal Loading in Room-and-Pillar Mine

David Ingle, president of the Ayrshire Coal Co., in the closing session, May 15, of the meeting "On Correlation of Mechanical Loading with Haulage and Mining Systems" of the American Mining Congress, gave a description of the conditions under which his machine loaders operated and detailed the results obtained. Last week on p. 811 is contained his description of the mine. In detailing the method of shooting down and loading the coal Mr. Ingle said:

All the coal is undercut before being shot. Three holes usually are drilled and in general black powder is used although experiments have been made with other kinds of explosive. Mules are used to gather the coal and to furnish cars to the loading machine. An endeavor is made to have a switch in each working place, set as near the face of the coal as possible so that the minimum time will be lost in shifting cars. The purpose is not to allow any working face to get more than 200 yards from the gathering place.

No More Hand Loading

The mine has been operating since December, 1922, and since that time not a single car has been loaded out by hand. Seven Joy (4 B. U. type) machine loaders have been used. A record has been kept of these machines. Several months ago a man with watch, pencil and note book began keeping a record of just exactly what each machine did in an eight-hour day. Twenty-five different records were made.

The results obtained in the last eight days are set forth in Table I.

Some coal hangs up refusing to fall and the loader had to be stopped while the operative broke the coal down so that the loading machine could get at it. The coal could be shot hard enough to overcome this loss of time, but if this were done the coal would be broken up unduly.

The delay in cleaning up the corners with a hand shovel was due to the fact that the Joy machine has a wide and straight loading end and as the corners of the room are square all the coal could not be loaded by the machine. The machine is kept at right angles to the face so that only a little coal is left in the corners. This is something peculiar to this machine loader which is the smaller of the types manufactured.

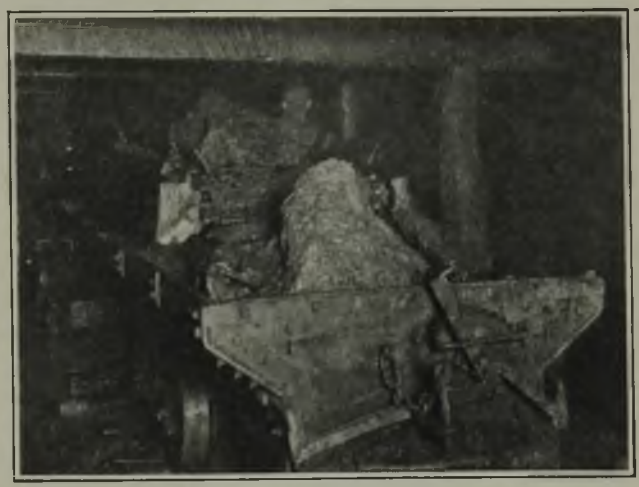
Breakages do not now cause as much waste of time as they did in the first months of operation. Still too much time is lost, and the new machines are expected to do better. The loading tracks are of 16-lb. steel and are laid on steel ties. They are easy to shift. Mr. Ingle said he thought the short time consumed in shifting track was quite creditable. For the time lost for lack of power there could be no excuse, for it could be avoided entirely by keeping the power lines in good condition.

Table 1—Detail of Operation of Mechanical Loader for One Day

Operation	Min.
Loading coal	181
Shifting loader to get in favorable position to load	28
Moving loader (sometimes four or five moves per day)	33
Switching cars	43
Delay in bringing cars to switch	27
Waiting while coal is broken down	35
Cleaning up corner with hand shovel	34
Oiling and tightening up machine and replacing broken material	56
Shifting tracks	14
Cars off track	7
Loss of power	15
Cleaning away fallen slate	2
Miscellaneous delays	6
	481

NOTE—Part of discussion on "Correlation of Mechanical Loading with Haulage and Mining Systems" at the Cincinnati Conference and Exposition of the American Mining Congress.

Each loading machine is given six places, though it is really unnecessary to provide so many. As there are seven machine loaders there are 42 places, whereas with hand shoveling there would probably be 75 places, for, under the agreements, with hand shoveling three places have to be allotted for every two men. With 50 men loading by hand 75 places would be needed instead of 42. This shows how greatly the work can be concentrated. In the hand-loading mines of the Ayrshire Coal Co., the production averaged 5½ tons per day per man for a period of three months. To some that may not appear to be a large production, said Mr. Ingle, but that is what the figures showed including every man on the payroll. With the machines the output is 7 tons per day per man or a gain of 1½ tons. It is costing 85 per cent as much to produce coal by machines as by hand loading.



Loading Mine Cars

The loading boom has to be placed above the top of the car so that in low places it is necessary to use a low car. This illustration proves that large material can be loaded by machine—*Courtesy, Myers Whaley Co.*

Questioned by Howard N. Eavenson, the chairman, Mr. Ingle said that 43 min. were lost in shifting 48 cars from the nearest switch point to the machine. That is more than one car per minute. Mr. Ingle said that no objections were raised by the union to the introduction of the machines. The district leaders set the scale for their operation at $12 per day, the rate paid for operating a different type of machine at a mine ten miles away.

Upkeep Cost 7-8c. per Ton

With these machines 48 cars each containing 3,200 lb. a total of 75 tons were loaded daily per machine. The cost of upkeep for four months has averaged between 7 and 8c. per ton. That cost includes the upkeep on the cutting machines which is, of course, only a small part of the charge. The cost for explosives is 3c. per ton. As the work is done by the day all the explosives are furnished by the company which also does all the drilling and shooting. The cost for gathering with mules does not seem to be any more than for gathering with machines in hand-loading mines, because the territory to be served is smaller.

Operator and Helper Split Pay

Since that time the sum that was paid the operator and his helper has been divided equally between them. As the helper was getting $8 per day the new rate is $10 for each of them. That is good pay, but said Mr. Ingle, skilled men were needed on the job. Men who operate cutting machines are making $15 and $20 a day on tonnage rates. If the machine loader would not be profitable at those rates it could not hope to succeed.

Making Cars Large and Low For Machine Loading

Mr. Eavenson in discussing Mr. Ingle's address on the operation of the Ayrshire Coal Company's mine said it was remarkable that cars could be delivered to the machine with a loss of only one minute or less. The loss of time had appeared so important to persons installing machines that they were using cars of unusual capacity in order to reduce that loss to its lowest limits.

D. J. Carroll was using a 5-ton car with loading machines at the Chicago, Wilmington and Franklin mines and one operator was introducing 7-ton cars. Mr. Hockensmith said that the problem had been to devise a car that would have the same capacity as the old cars and yet leave room for loading with a mechanical loader. That made necessary a departure from the wooden mine car. By using a composite car, part steel and part wood, the capacity was increased 10 per cent.

Outside Flare Eliminated

In the last few years the Hockensmith Wheel & Mine Car Co. has devised a semi-box type in which the flare at the sides is eliminated and the wheel is partly housed. This reduces the over-all height from 3 to 6 in. and adds 25 to 50 per cent to the inside capacity. A car has been constructed in the last few years that will hold 3,200 lb. without exceeding the outside dimensions of one of an early type that carries only 1,600 lb.

A car built for the Pittsburgh seam had an increase in capacity over former designs of 25 per cent. The machine operators now need cars that will hold 5 to 7 tons. These can be provided if the seam is thick enough, the roof is good and wide roadways are possible and are provided. The cars in the Pittsburgh region are relatively short. In West Virginia they are 10 to 12 ft. long, and they work satisfactorily but they cannot be constructed of wood. A wooden car would not withstand such loading.

A car 42 in. high, 6 to 7 ft. wide and 12 ft. long has been constructed to carry 7 tons. In order to start long trips with the larger types of cars special draft gear must be provided. The semi-box type of car can be used with other cars without material change of equipment. With a change from the semi-box to the true box type of car an increase of capacity of 10 to 15 per cent can be attained.

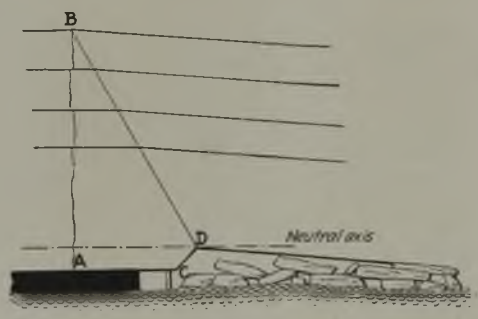
Steel Car Lighter Than Wood

A car only 24 to 30 in. above the rail can be built to carry 3 to 5 tons, but such cars can be used only with rotary dumps. The cost of a car divided by its carrying capacity will be about the same whether it is constructed of steel or of wood, for wood has greatly increased in price and will increase still more. A steel car can be built that will be lighter than a wood car of the same capacity. Some steel cars built over twelve years ago out of bessemer steel are only now being repaired. If they had been constructed of open-hearth steel they would have had a longer life by 25 per cent. The upkeep on steel cars is not expensive so far as repairs are concerned. If they get in a wreck they can be put in a frame and be jacked back into shape. The same wreck would make it necessary to rebuild a wooden car.

It might be interesting to add that investigation has shown that the 18-in. wheel used in the Pittsburgh region is too large. It should be replaced by a 12-in. wheel. Tests the Hockensmith company has made show that the smaller wheel has the advantage because of its lighter weight. The Department of Mines will have a definite pronouncement to make on this in sixty days.

How Does Roof Break Ahead Of Face in Longwall

In the time devoted to the subject of the use of loading machines in longwall working, R. Dawson Hall, engineering editor of *Coal Age*, discussed the nature of the roof break beyond the longwall face prefacing his remarks, however, with the advantages inherent in longwall provided conveyors are not used and the roof tends to break in a manner favorable to operation. He remarked that he had always been an advocate of longwall mining in connection with loading machines.



Where Does It Break

At A B or C D B? If it breaks along the former line it will be impossible to hold the roof when the point A is reached unless the mined area has been closely back filled.

It has the advantage that the face can be cut and loaded continuously, the coal being fed by the machine loader into a trip of cars steadily moved in front of the face which is being loaded. Consequently less time is lost in placing each car in front of the loading machine. However, the progress of the conveyor has shaken that faith. Nevertheless conveyors are expensive and many will desire to use cars instead and consequently will continue to favor the longwall face.

Attempts might be made where something of the nature of a longwall face is being worked to deliver the coal to a trip of cars which pass at right angles to the longwall face on a roadway leading to one of the main roadways of the mine. But as the rear end of the trip when the front car is presented to the conveyor is well back in the goaf, cribs are needed along the roadway and these support the roof for a while but the working thus inadequately supported is always in danger of a sudden and dangerous squeeze or fall which may close the working face and injure the machinery.

Great Britain has a number of longwall faces but we must be cautious in accepting the results obtained in that country as a guide, because in Great Britain it is customary to fill the excavated area, the coal being, in most cases, sufficiently thin to make that practice actually economical for some place must be found for the stowage of waste.

In the early days when subsidence was first being discussed, said Mr. Hall, he was already an advocate of the conclusion that the roof broke back over the solid coal and the roof thus broken could not come down till the coal was removed. The principle which led to that conclusion was derived from the action of a stick held over an edge and pressed down. The stick broke over the support instead of at the ends. George S. Rice has been an advocate of breakage at the extreme edge of the pillar declaring that the roof did not fracture over the coal, at least in room-and-pillar workings.

Breakage Due to "Draw"

That fractures occur over the coal has been abundantly proved in Great Britain. This breakage has been described appropriately as due to "draw"—that is, to a tension in the measures above the coal. But in the United Kingdom the practice has been to deny that this fracture is vertical or even nearly vertical. It is argued correctly that the main roof is partly in tension and partly in compression, an area lying between the two which is neither in tension nor compression but at zero stress. This is known as the neutral area, it corresponds to the neutral axis in beams.

This area lies about one-ninth of the distance between the surface of the ground or upper surface of the rock and the top of the coal or drawslate. The compressed rocks compose the lower ninth and the stretched rocks compose the upper eight-ninths. So far the argument is indisputable. The British assert that the break near the coal slopes out into the gob until it reaches the neutral area and that from that point it slopes back away from the gob and over the coal, its extremity reaching the point of draw. Actually, of course, this break starts from the surface and works down to the neutral axis. Thus the break is not straight nor vertical but an angle break, one break extending from over the coal into the gob and the other extending from over the gob back to or toward the coal.

There is no question but that the observation that the rock above the coal breaks toward the gob is abundantly proved in practice, but the assumption that it connects with the break that comes down from the point of draw is not susceptible of proof. Moreover the lower break, that toward the gob, may be in the drawslate only and not in the roof proper. It is difficult to determine how far above the coal the drawslate extends and how much of the roof may be regarded as a monolith. The lower break may not extend any further than to the true roof. So far every assumption as to the slope of the fracture from the point of draw is a mere surmise. No one has been able to follow it.

News Of the Industry

Summer Storage by Railroads Would Level Coal Production

Coal Exports Tell International Railway Fuel Association That 20,000,000 Tons Each Summer Would Turn the Trick—Many Methods Discussed to "Save that Pound" During 1924

If the railroads would store 20,000,000 tons of coal during every summer, as they did in 1923, it would go far toward solving the coal problem of the nation. The country would follow their lead and they would benefit largely. This doctrine was driven home to 500 railroaders in Chicago last week at the seventeenth annual convention of the International Railway Fuel Association. F. G. Tryon, of the U. S. Geological Survey, laid the groundwork in an illustrated talk pointing out the painful fluctuation of coal production and the steadying effect the 1923 railroad-storage program had on it. Then along came Eugene McAuliffe, president of the Union Pacific Coal Co.; F. R. Wadleigh, of the Tuttle Coal Co., and C. F. Richardson, head of the West Kentucky Coal Co., hammering the idea deeper. Even the association's own committee on storage, surveying the attention the subject had been getting all year in the country, said that "it is the duty of each consumer to consider his responsibility in the matter of storage and see what he can do for himself."

"Save that pound of coal!" was the slogan of the association—an organization made up mainly of executives, operating men and fuel supervisors keen to help the lines of the world to get more out of what they burn. The slogan wasn't officially adopted, but R. H. Aishton, president of the American Railway Association, voiced it during the first session so punchfully that it just naturally was sounded all down the line of speakers from both railroads and the coal industry.

"Save Pound" in Various Ways

"That pound" was saved—verbally—by a variety of suggested methods, both direct and indirect. The burial of the old ax of enmity between railroad purchasing agents and coal men would help save it, Mr. Wadleigh intimated. It was saved by better fuel inspection and by better inspection work by the railroads at mines, proposed by Malcolm Macfarlane, chief fuel supervisor for the New York Central Lines. It was saved fifty times over by many railroaders proposing economies great and small. It can be done because "that pound" per 1,000 gross ton miles was saved nearly three-fold last year, according to Mr. Aishton, reducing the average consumption for that haulage unit 2.8 lb., or down to 160.1 lb. To do that again would save the railroads $3,165,000, he declared.

The four-day meeting was a wide-awake convention of the type this association has been holding every year since 1908, when Eugene McAuliffe and 35 other railroad men who understood coal started the organization. The first few years were not noteworthy for the approval they won from the executives of the world's railroads. But the staggering fuel waste by railroads was a subject that gave the engineers, firemen, roundhouse foremen, road foremen of engines and fuel men composing the association their chance to propose and demonstrate real savings to their companies. The resultant change in the attitude of the executives toward the association was exemplified by the presence and participation at this year's convention of a good many such executives.

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F. G. Tryon

Parliamentary question by Geological Survey attaché, on summer coal storage by railroads, arouses deep interest at International Railway Fuel Association convention.

The doctrine of great coal storage by railroads was preached strongly. Mr. Tryon brought it up "merely as a parliamentary question" but nevertheless forcefully in his address, which will appear later in *Coal Age*. He incidentally raised one of the few voices to be heard in this country in praise of the U. S. Coal Commission, when he paid tribute to the value of the great mass of data on coal and coal mining which the commission collected. He defended the commission in a few words for not producing a panacea for all the ills of coal. The commission showed good judgment by not trying to produce any such thing, he said.

His "parliamentary question" was: "Why should not the railroads of this country store 20,000,000 tons of coal every summer?" He showed with charts how the coal production of the nation fluctuates wildly and disastrously to everybody concerned, including the railroads, and pointed out how the coal production curve had been flattened during 1923 by the admirable program of storage in which the country indulged. Railroads stored 19,800,000 tons early in 1922 against the strike and 19,000,000 tons during the summer of 1923, as compared with a storage of but 13,000,000 tons to meet the emergency of war. Thus he demonstrated that 20,000,000-ton storage programs are entirely possible by American railroads. The exact cost should be studied to determine just what losses there are from fire and chemical change and what counterbalancing gains there are by getting railroad coal out of the way of revenue coal each fall and winter.

Cites Example of 1923

Coal production now is so heavy that the railways never again can handle it in bursts, as formerly, without tremendous additions to equipment. This probably never will be necessary, he said, if the whole country, led by the railroads, will store every year as it did in 1923. He urged the roads to let their reserves work down to about 5,000,000 tons each spring and build them up to 19,000,000 or 20,000,000 tons by autumn, carefully timing the movement of this deadhead coal so as not to interfere with revenue coal. This timing means more money to the railroads than many may realize. He estimated that if railroad coal moved an average of 150 miles from mine to consuming point the average cost to the road of handling that coal would be about $1.30. Multiply this by the 150,000,000 tons of railroad coal consumed annually and the roads can easily realize that getting their own coal is enough of an item of operating cost as it stands without letting railroad coal cut down freight revenue by getting in the way of revenue coal.

When Mr. Tryon finished showing his

charts H. T. Bentley, general superintendent of motive power for the Northwestern, rose to declare it was "the best thing I ever heard," and moved that the paper be printed and distributed.

"Twenty million tons moved in and out at the right times will balance the bituminous production of this country," Mr. McAuliffe told the convention. Maintaining this balance, he said, would benefit the railroads not only financially and in steadiness of rail traffic but in public esteem too. To prove this he declared that 50 per cent of the public criticism of the railroads has been raised at the times that the lines failed to deliver coal to the people when they wanted it. The reason the railroads couldn't deliver it was because so little coal had moved in the summers that it congested in the autumns.

The discussion that day veered for a while to coal miners' wages. Mr. McAuliffe said the agony of fluctuation in the demand for coal had given miners such irregular working time that some of the best racial groups of miners in this country, notably the English, practically quit the industry. The men of all colors and degrees that remained in such great numbers had to have a wage high enough to earn them a living. For this reason some of the most ignorant among them are paid a higher rate than the average American locomotive engineer. McAuliffe himself once was an engineer.

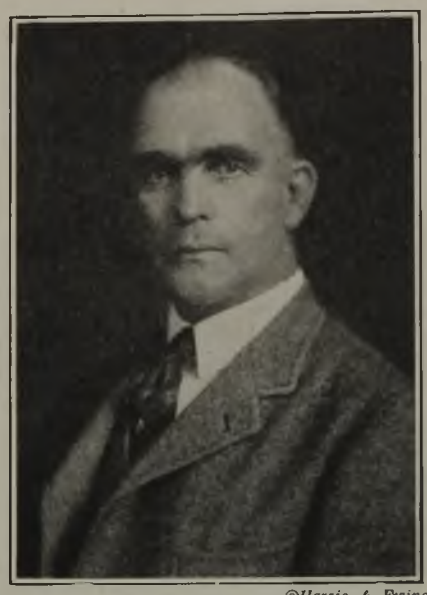
Then came C. F. Richardson, another "hog head" of other days and now head of the West Kentucky Coal Co., telling the audience that miners' wages certainly ought to be lowered but that he believes they ought to get enough work to provide them 4½ or 5 days a week. This, he thinks, should be a part of a big program of regularizing the coal industry. Railroads should help in that process by buying regularly and at such times as would best fill in the low points of the market.

Mining Not Wilfully Wasteful

Still another coal man who used to pull an engine throttle, M. B. Morrow, operating head of the Canmor Coal Co., operating in Alberta, defended the coal operator against the charge of willful waste of coal in the process of mining. He admitted that much coal of low grade must be gobbed because of the presence of impurities in it and showed the reasons for the abandonment of pillar coal, but held that the percentage of extraction in this country still is more than 50 per cent. Recovery of the balance is too expensive to be economical.

"The antagonism that undoubtedly exists" between coal men and the railroads ought to be wiped out, according to Mr. Wadleigh, who was Federal Fuel Distributor and therefore had close contact with both industries before he left the government service last autumn. This is partly due, he thinks, to constant effort on the part of so many purchasers of railroad fuel to beat down the price and to the lack of mutual understanding between railroads and mining companies of their industrial problems. The railroad often loses in the end because of this condition.

He urged that railroads give more attention to the importance of their coal traffic and that some sort of uniform contract for coal purchases be worked out and agreed upon by both industries. He spoke of the proposed "coal institute" which may be of such great technical and economic help to the coal industry and recommended that the International Railway Fuel Association co-operate with it when it is formed. He also urged closer study of the economic side of coal storage by the railroads so as to bring out all the phases of the storage problem.



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F. R. Wadleigh

Former Federal Fuel Distributor, who favors coal institute and indorses proposed summer storage by railroads.

An appeal for better handling at the mines of railroad coal was made by Mr. Macfarlane. If the railroad fuel of this country contains but 10 lb. of non-combustible matter per ton, then there are 15,000 fifty-ton carloads, or 200 trainloads, of such matter hauled and handled every year adding to the cost of fuel and cluttering up channels that ought to be free for good coal.

The miner at the face is the man who should get most of this burden off the railroad, Mr. Macfarlane thinks.

He urged that in loading mine-run railroad coal at the mine the sizes be more thoroughly mixed so that when it gets into use, one engine will not receive a tank full of machine slack while the next one gets all lump.

Railroads should set up larger and more efficient forces of fuel inspectors who would study coal and know its conditions and handling all the way from mine face to coal chutes. Many improvements in the quality and preparation of railroad fuel have been made, he said, because an inspector actually studied mine and tipple conditions and made suggestions to the mine operator.

The greatest railroaders' interest of the convention was awakened by D. F. Stevens, general superintendent of the Baltimore & Ohio, who read a paper showing how division superintendents can make great fuel savings by bearing coal in mind as they handle the movement of their divisions.

The association's committee on storage reported that much study had been given the subject all last year by many agencies and that the general result was good, but that the public must get the storage habit before storage will give the coal industry much relief. The committee gave much space to the report of W. L. Abbott's committee of the Federated American Engineering Societies, in which "a sustained policy of storage by railroads in quantities similar to the practice of the past year is indicated as of advantage to the roads and to the public." The problem of spontaneous combustion, however, needs much further study.

In a symposium on coal and oil fuel R. E. Rightmire, engineer of tests for the Consolidation Coal Co., spoke briefly of the improvement in the preparation which railroad coal has received, due partly to increased coal inspection by the roads, partly to the fact that of late coal had to be well prepared or it wouldn't sell, and partly to the fact that there are some operators who take pride in their output. Apparently the present standard of quality will be maintained so long as there are no serious disturbances affecting coal production, he said.

George W. Reed, vice-president of the Peabody Coal Co., welcoming the association to Chicago on behalf of the coal fraternity of the city, remarked that 20 per cent of the coal produced in the United States is sold through Chicago, 95 per cent of this by rail, and that therefore there is a close interest between the Chicago coal man and the railroad. Of all the Chicago-handled coal, he said, 86 per cent moves direct from producer to consumer. This is an important low-price factor probably not equalled in any other industry.

He paid tribute to the increasing attention railroads are giving to fuel economy. Last year with 50 per cent more traffic than in 1914, the railroads consumed only 3 per cent more coal. He said the country's coal operators are trying to help in this improvement of efficiency by preparing coal better every year. Today it is an actual fact that operators are shipping coal cleaner than nature made it.

In the election of officers at the final session P. E. Bast, J. W. Dodge and J. R. Evans were candidates for the presidency, nominated by a committee. Mr. Bast won by a large vote and Mr. Dodge moved that it be made unanimous. Thus Mr. Bast succeeded M. A. Daly, of the Northern Pacific. The other officers chosen were: Vice-presidents, J. R. Evans, C. & O.; J. W. Dodge, Illinois Central; E. E. Chapman, Santa Fe. New members of the executive committee are: A. W. Perley, Oregon-Washington Railroad & Navigation Co., T. C. Hudson, Canadian National; O. J. Brown, B. & M.; W. J. Tapp, D. & R. G. W.

Berger Wants Government to Own Natural Resources

Victor Berger, Socialist, of Wisconsin, has introduced in the House of Representatives a joint resolution proposing that the government take over and operate the natural resources of the country, including coal, minerals, oil, water power, waters and forests. The resolution was referred to the House Judiciary Committee.

Varying Estimates of Coal Stocks Reveal Need of Accurate Consumption Data

Figures Necessary for Intelligent Production and Buying—Would Prove Valuable Business Barometer—Small Outlay by Congress Required—Incomplete Statistics Responsible for Heavy Losses

By Paul Wooton
Washington Correspondent of *Coal Age*

Some exception has been taken to reference, in this correspondence last week, to 65,000,000 tons as the amount of coal in storage on April 1. That figure was arrived at only after due study had been given such information as throws light on the extent of storage. The fact, however, that the figure was questioned prompted an inquiry of various coal specialists as to their estimates of storage on April 1. These estimates varied from 40,000,000 tons to 75,000,000 tons. The inquiry also developed that the men who are specializing in coal recognize that one of the important elements in the present situation is the amount of storage.

While the reference to the 65,000,000-ton figure was made only incidentally in an effort to reflect opinion to the effect that consumers would be well advised to buy coal now, when it is selling below cost, and save their stockpiles against the time when transportation may be scarce and coal prices higher, this incident has emphasized the deplorable lack of figures showing current consumption of coal. Not only are such figures necessary for the intelligent production and purchase of coal but they would furnish one of the most valuable business barometers just at this time when there is such difference of opinion as to the extent industry is slackening its pace.

It would cost only $20,000 a year for the U. S. Geological Survey and the Bureau of the Census, possessing as they do going statistical divisions handling coal exclusively, to compile a stock report quarterly.

As it is, the only way of estimating consumption is to take the figures of the railroads, the public utilities and the few large industrial establishments which prepare such statistics. There are figures showing the amount of coke burned and certain other facts which can make the estimate more accurate, but at best it is only an intelligent guess.

When it is considered that great losses could be avoided by having these figures, it is difficult to understand why there should be this loophole in our coal statistics. Since the public is the chief beneficiary, it frequently has been suggested that Congress appropriate the small amount needed. With that parsimony which characterizes the attitude of the appropriations committees toward the mining industry, this item fails to get into the supply bills.

There are some who contend that there is little use to provide consumers of coal with this information, as most of them would pay no attention to such figures. This contention is that with a few outstanding exceptions, coal is used with less intelligence than nearly any other operation entering into the business of conducting industry. The average consumer burns storage when he finds that coal is selling for less than it was when he bought his reserve. By the time he has consumed his stock on hand and he prepares to go into the market again, he finds that coal has risen in price. Then, being low on coal, he rushes into the market along with thousands of others who have done the same thing, with the result that prices are forced to abnormal levels and the railroads are called on to handle an unnecessary peak in the coal movement.

The foregoing, however, is a minority view. The majority believe that the storage idea is well intrenched. There are current statistics to show how well the railroads, the public utilities and the large manufacturing plants have learned the lesson. Enough is known of the practice of smaller concerns to justify the belief that they too have change their policy. All consumers, however, would be able to regulate the amount of their storage more intelligently were there a positive knowledge as to the general level of stocks.

A warning comes from an important official source that in calculating the extent to which reserves of coal can be depleted consideration must be given to the possibilities of weather conditions that would interfere with transportation efficiency. For several years the winters have been open ones. The railroads have been able to operate during the period of grain movement and other heavy demands for transportation without having to combat much unfavorable weather. There always is the chance that the next winter will set in early. Not only would that interfere with the efficiency of transportation but the early advent of cold weather would accentuate the autumn peak, with resulting price increases and the possibility that many plants might be unable to obtain the supplies necessary to continue operation. That official expresses the opinion that the provident consumer buys in a buyers' market and does not put himself in the position where he must buy in a sellers' market.

Ruhr Coal Strike Settled

Indications point to the resumption of work this week by the Ruhr miners who have been on strike, refusing to accept a lengthened working day. According to an announcement May 31 the miners' union decided that work should be resumed on the terms of the award made by Dr. Syrup, special arbitrator of the Department of Labor. The award, announced May 27, grants a 5 per cent increase in wages.

Texas Retailers' Convention Urges Summer Buying

The Retail Coal Dealers' Association of Texas met in nineteenth annual convention in Vernon, Texas, May 20 and 21, with a large attendance.

In compliance with a written request by Herbert Hoover, Secretary of Commerce, a campaign was ordered and will be inaugurated immediately under the direction of Secretary Goldman to induce coal consumers to purchase their winter supply of fuel during the summer months. Representatives of miners, operators, wholesalers and railway companies present pledged co-operation to the fullest extent.

J. E. Simpson, an operator in the Henryetta (Okla.) field, declared that wages and freight rates put into effect during the war period have not been reduced in the coal industry as in other lines of activity, and this makes appreciable reductions in the prices of coal impossible, he said. Operators, wholesalers and retailers are operating on the smallest margin of profit possible with safety, he said.

Senator F. R. Wood, of Trinidad, Colo., president of the Colorado-New Mexico Coal Operators' Association, urged closer co-operation among operators, wholesalers and retailers to bring about a higher standard of ethics and business practices in the industry as the best means of eliminating waste.

Elijah Coles, of Houston, president of the association, reviewed in his annual address the association's activities during the year, and related at length efforts that had been made to bring about all-year buying of coal to the end that the industry may be stabilized. Mr. Coles referred to the fact that there are about 2,000 retail coal dealers in Texas, but that so far only about one-eighth of this number had become members of the association, and suggested a campaign to increase the membership of the association.

C. R. Goldman, of Dallas, secretary of the association, reviewed the work of the association during the seven years he has been secretary. Closer co-operation among the retailers, he said, may be regarded as the outstanding accomplishment of the association.

Gomer Jones, of Muskogee, Okla., vice-president of District 21, United Mine Workers, in a brief address pledged the co-operation of the mine workers of his district in any movement looking to the improvement of conditions in the coal industry.

W. F. Sterley, of Fort Worth, general freight and passenger agent of the Fort Worth & Denver City Ry., said that only by starting the movement of coal during the summer could it be hoped to avert a car shortage during the fall and winter months when the demand for coal becomes heavy.

At the closing business session on Wednesday, Houston was selected for the convention c ty in 1925 and Harvey S. Trewitt, of Dallas, was elected president. Other officers elected are: W. N. Martin, of Vernon, first vice-president; D. F. Bushnell, of Waco, second vice-president; C. R. Goldman, of Dallas, secretary and treasurer.

More Connellsville Plants Return to 1917 Scale

Effective May 27, the following companies in the Connellsville coke region reduced wages to the Nov. 10, 1917, scale: Hillman Coal & Coke Co., Oliver & Snyder Steel Co., Washington Coal & Coke Co., Puritan Coke Co., Consolidated Coke Co., Reliance Coal & Coke Co. and Redstone Coal & Coke Co., the two latter being subsidiaries of the Weirton Steel Co.

All these companies continued at work without any trouble at the reduced wage scale. The Hillman Coal & Coke Co. is firing some additional ovens at the Isabella plant, at Hillcoke. The Westmoreland-Fayette Coal & Coke Co., at Cheat Haven, Pa., which had been idle for several months, has resumed operations at the 1917 scale.

The Republic Iron & Steel Co., W. J. Rainey, Inc., and the Monessen Coal & Coke Co., subsidiary of the Pittsburgh Steel Co., have not yet made any reduction.

The following are the rates paid under the Nov. 10, 1917, scale:

		Rates Before Reduction
Pick mining and loading, room and rib work, per 100 bu.	$2.29	$3.24
Pick mining and loading, heading work, per 100 bu.	2.52	3.56
Loading machine mined coal, per 100 bu.	1.65	2.10
Pick miners drill their own holes and furnish their powder, while the company drills holes and furnishes powder for machine-cut places.		
Drivers, rope riders, motormen, snappers, blasters, timbermen and tracklayers (8 hrs. per day)	5.00	7.50
Helpers for same (8 hrs. per day)	4.35	6.75
Inside common labor (8 hrs. per day)	4.15	6.55
Mine mechanics and wiremen (8 hrs. per day)	5.00	7.50
Outside common labor (9 hrs. per day)	3.30	3.60 to 4.50

Eastern Coal Retailers Scan Trade Problems

Nearly a thousand retail coal dealers of eastern Pennsylvania, New Jersey, Delaware and Maryland were represented at the twentieth annual convention of the Pennsylvania Retail Coal Merchants' Association, May 22 and 23 in the Commercial Museum, Philadelphia. Public officials and men prominent in the coal and railroad industries made addresses.

In addition to the regular business sessions there was a dinner at the Bellevue-Stratford, May 22, with Edward J. Cummings, Director of Public Welfare Grakelow and former Director of Public Safety Sheldon F. Potter as the speakers; a luncheon at the Commercial Museum, May 23, with Henry Wolf Bikle, general solicitor of the Pennsylvania R.R., and Howard W. White, former president of the Pennsylvania Retail Coal Merchants' Association, speaking, and a dinner in the Bellevue-Stratford Friday night, with Walter L. Montgomery, vice-president of the association; J. Washington Logue and the Rev. Arthur C. Baldwin making addresses. For the ladies there was a dinner at Valley Forge on May 23, with addresses by Mrs. Maurice J. Crean and Rev. W. Herbert Burk, in addition to a luncheon in the Bellevue-Stratford, when E. E. Bach, director of the Americanization Bureau of the Chamber of Commerce, was the speaker.

Among the important topics considered at the sessions were a general discussion of coal legislation. "Coal Organization," by Samuel L. Kamps, commissioner of the Philadelphia Coal Exchange, and "The Future Anthracite Market," by James B. Neale.

An interesting feature of the convention was an exhibition, open to the public, of heating problems and methods by which the householder may economize in the consumption of fuel. A demonstration of the mechanical problems involved in the delivery of coal also was given.

Northwest Dock Operators Win Lake Dock Cases

In a decision covering nearly 50 pages the Interstate Commerce Commission has upheld the objections of the plaintiffs in the case of the Northwestern Coal Dock Operators' Association vs. the Chicago & Alton R.R. et al., and has ordered that "the present unduly prejudicial and preferential rates" be withdrawn on or before Aug. 21, 1924.

Dr. Bain to Study British Accident-Prevention Work

Dr. H. Foster Bain, Director of the Bureau of Mines, is en route to England, where he will spend some weeks in the study of the measures employed in that country to prevent or minimize accidents in the coal-mining industry.

Dr. Bain's mission is in furtherance of the agreement effected some months ago between the British Home Office and the U. S. Department of the Interior for the exchange of technical information as to means of preventing mine accidents and the promotion of mine safety conditions, and follows the recent visit to this country of Dr. R. V. Wheeler, Director of the Eskmeals Testing Station, Cumberland, England, for the purpose of observing conditions in the American coal-mining industry.

The Director of the Bureau of Mines will visit the Eskmeals Testing Station and will attend mine-safety conferences of British government officials and mine operators' and miners' representatives. He will devote special attention to the study of the stone dusting method generally employed in England to limit coal-dust explosions. He also will visit a number of the larger coal mines in France for the purpose of noting conditions in these mines. Dr. Bain expects to return to the United States on July 3.

Navy and Marine Corps Award Coal Contracts

The Navy Department awarded contracts, May 26, based on proposals opened May 21, covering the delivery of 300,000 tons of steaming coal at Hampton Roads during the fiscal year beginning July 1, as follows:

Pocahontas Fuel Co., New York, 150,000 tons at $4.58 per ton; Crozer-Pocahontas Co., Philadelphia, 100,000 tons at $4.48 per ton; Castner, Curran & Bullitt, Inc., New York, 50,000 tons at $4.72 per ton. Awards for delivery of coal during the coming fiscal year to other points will be made during the next few days.

Contracts for bituminous coal, for delivery during the coming fiscal year, also were awarded by the U. S. Marine Corps on the basis of proposals opened May 15, as follows: Sixteen thousand tons run of mine for delivery at Paris Island, S. C., Clinchfield Fuel Co., Spartanburg, at $3.56 per ton f.o.b. mines; 6,000 tons for Quantico, Va., Johnstown Coal & Coke Co., New York, $4.80 per ton delivered; 3,500 tons for Philadelphia, Maryland Coal & Coke Co., Philadelphia, $4.385 delivered; 4,000 tons Paris Island, S. C., Clinchfield Fuel Co., $1.95 f.o.b. mines; 3,000 tons for Quantico, Va., Chesapeake & Virginia Coal Co., Lynchburg, Va., $4.91 delivered, and 300 tons for Charleston, Clinchfield Fuel Co., $1.95 per ton f.o.b. mines.

Coal Commission Report To Be Printed

Washington, May 31.—The joint committee on printing finally has been convinced that it will be wise to print the report of the U. S. Coal Commission. As the printing of this report involves a cost of more than $20,000, the committee declined for several months to authorize the expenditure. Arguments to the effect that it is poor economy to eliminate the expense of harvesting after the crop has been planted finally prevailed with the committee, which has submitted a favorable report. The report, however, must be acted on by each house. As a rule, however, resolutions carrying recommendations of the committee on printing are passed perfunctorily.

Two of the reports, the Cost of Production of Bituminous Coal and the Investment and Profit of Bituminous Operators, were not issued even in mimeographed form. The question has been raised whether these reports are open to public inspection. The policy of Director Smith, of the U. S. Geological Survey, the custodian of the Coal Commission's record, has been to give every possible access to these reports. The manuscripts of all the reports have been in the hands of the Senate committee and of the Public Printer for some months. Duplicate copies, however, have been available for inspection and portions of these reports have been copied during recent months by those interested in them. As some time is certain to elapse before printed copies of the report will be available, Director Smith calls attention to the fact that copies of all the reports may be consulted at his office.

Model Mining Law Chief Objective of House Safety Hearings

Increased Facilities for U. S. Bureau of Mines Also Sought—Recent Mine Disasters Responsible for Action in Congress—Varying Conditions Make Possibility of Standardized Regulations Uncertain

Although the hearings on mine safety which have been conducted recently at Washington by the House committee on mines and mining will not be concluded until Congress reconvenes, anticipating adjournment on or about June 7, it is evident that committee members at present have in mind two definite objectives relating to the subject, namely, increased facilities for the U. S. Bureau of Mines and a model law under which mines on government land shall be operated.

How far the committee will go in recommending legislation to embrace these objectives remains to be seen, as the information desired by the committee has not been developed fully. The hearings thus far held, called by Chairman John M. Robsion after attention had been directed to the general subject by explosions in mines in West Virginia, Pennsylvania and Utah, have been rather in the nature of educating members of the committee as to what constitutes hazards in coal mining. With this as a background, the committee intends to go more deeply into the subject and also to give attention to conditions in metal mines.

Committee members appear convinced that the Bureau of Mines is in a position to do greater good for the mining industry if Congress will provide the money to increase its personnel and to make possible further research and experimentation. Whether it would be possible to draft a law to govern the operation of mines on government land and to serve as a model upon which state laws might be builded is regarded as somewhat uncertain by the committee members in view of testimony that widely differing physical conditions in various sections of the country make a single mining law impracticable, although the desirability of a model law is recognized.

Stresses Government Responsibility

In testifying before the committee, H. Foster Bain, director of the Bureau of Mines, explained the research work of that agency and its educational work in training operators and miners in safety and first-aid work. He stressed the permissible system of the Bureau in testing explosives and mine equipment. Safety precautions must be increased as the upper veins are worked out and the mines are thrust deeper into the earth, Mr. Bain emphasized. He expressed the opinion that the responsibility for mine safety will rest more heavily upon the federal government in the future, because the great coal reserves of the nation are on public land in the West, which will be developed in the future generation as older mines become exhausted.

L. C. Ilsley, electrical engineer of the Bureau of Mines, told the committee the Bureau lacks sufficient personnel to test apparatus as rapidly as it is offered for this purpose. The use of electrical equipment increases the hazards of coal mining, Mr. Ilsley said, but if it were forbidden the cost of mining would increase heavily. There are about 200,000 pieces of electrical equipment in use in mines of the country which bear the safety label of the Bureau of Mines, the witness said. Safety equipment costs more, he said, but pays in the long run even from the sordid dollars and cents standpoint because of minimizing disaster. The field is a large one, Mr. Ilsley stated, as there is not a single approved motor for pumps, loading machinery or hoists. The Bureau could use to advantage an electrical engineer at every coal mine in the country, the witness said, but hopes in the next fiscal year to be able to add three to its staff. Mr. Ilsley testified that the recent explosion in West Virginia was caused by an unapproved electric coal drill; that in Pennsylvania by an unapproved electric coal-cutting machine, and that in Utah by an unapproved flame safety lamp.

Compares Conditions in Europe

Information regarding conditions in European mines as compared with those in the United States was given the committee by George S. Rice, chief mining engineer of the Bureau. Natural conditions in Europe are more hazardous than here, he said, but greater precautions are taken. Safety precautions are not keeping pace with increased use of mechanical devices in United States mines, Mr. Rice testified. He also declared that there is a lack of technical operating staffs at domestic mines as compared with those abroad.

O. P. Hood, chief mechanical engineer of the Bureau, testified that there is a large field of work in testing mechanical devices which the Bureau has been unable to enter because of lack of funds. The Pittsburgh experiment station has never been used to its capacity for this reason, he stated. The Bureau could use $100,000 immediately in tests of safety stops, overwind devices and brakes on mine locomotives, Mr. Hood said. He told the committee that economy and efficiency in the use of fuel is highly important also, as tending to reduce consumption and thus reduce the opportunities for mine accidents.

E. A. Holbrook, head of the School of Mines of Pennsylvania State College, who was chairman of the Mine Safety Committee of the U. S. Coal Commission, urged that personal contact in educating miners in safety precautions is the outstanding need. The Bureau of Mines is undermanned and hampered in investigations and research by lack of funds, Dr. Holbrook asserted. He suggested extension of the permissible system. Explosions are dramatic, this witness said, yet are not the principal cause of fatalities in mines. He explained to the committee that the chief hazard in bituminous mines is falls of roof or of coal; secondly, underground transportation, and third, explosions. This information appeared to astound several members of the committee. Many state laws need revision badly, Dr. Holbrook said, declaring that competitive conditions have interfered with progress in this line and that in some instances changes have been opposed by operators and by miners in other cases. Dr. Holbrook urged means of extending the preventive work of the Bureau of Mines.

Edgar Wallace, of the American Federation of Labor, urged more appropriations for the Bureau of Mines and a model federal mining law. He urged that surface water lines be piped into the shafts and that working places and roads be sprinkled. John B. Andrews, national secretary of the Association of Labor Legislation, New York, urged uniform mining laws as far as uniformity may be carried.

The bituminous operators stand ready to co-operate in saftey work at all times, Harry L. Gandy, executive secretary of the National Coal Association, told the committee. Personal education of the miners in saftey work is necessary, he declared. Miners in some instances have resisted installation of saftey devices, Mr. Gandy stated. A uniform law to apply to all coal mines would be impractical, this witness said, owing to varying conditions under which operations must be conducted. He suggested that state universities give instructions in mining according to local conditions. He also stated that state mining laws should apply to all operations, large and small, as some states exempt smaller mines and this tends to make the workers careless. He further suggested that a survey be made to determine whether more mine-rescue stations and cars are needed, and where.

The question of more mine-rescue stations and mine-rescue cars is one that the committee has expressed great interest in and will be taken up more fully later.

Railroads Indorse Move to "Ship Coal Now"

The Car Service Division of the American Railway Association has joined Secretary Hoover's campaign to get large manufacturers to ship their coal early. All of the railroads throughout the country will call attention of their consumers to the conditions.

The transportation companies call attention to the fact that the usual autumn demand for coal comes at the period when railroads are handling the grain movement. In the second place, the volume of coal handled in recent weeks has been far below that moved in the same period of last year. These conditions indicate an immense movement of coal traffic in the fall unless something is done to avoid such congestion.

Illinois Union Curtails Farrington's Power

Miners who answer more questions than the law requires in applying for work in Illinois mines will be subject to expulsion, according to an amendment to the constitution of the Illinois district union as adopted at Peoria just before their fifth biennial and thirtieth consecutive convention ended May 27. The restriction was an indirect blow at the operators, who, it was complained, are requiring new workmen to fill out a questionnaire before getting work. The convention instructed the miners that they must answer no questions except those required in the miners' certification law and the workmen's compensation law. Delegates complained that operators are rejecting men over 45 years old because they are more expensive risks under the compensation law.

A roll call vote of 496 to 443 deprived President Frank Farrington of power to appoint the nine legal investigators, three auditors and three alternate auditors, one arbitrator, two special accountants, and two legislative committeemen. They will henceforth be subject to election, the first one Dec. 9, 1924.

Efforts to abolish the district executive board failed, as also did efforts to abolish the sub-district organizations. A heated fight over the Ku Klux Klan issue was avoided by the chairman by delaying it till the last half hour of the convention.

The miners voted to investigate the possibilities of the giant power-plant proposal of President Farrington, by which the entire state would be provided with electricity, and Illinois coal be consumed in making it. They also adopted an old-age pension of $25 monthly for miners 65 or over who have been miners twenty years, ten consecutively in Illinois, and then decided to refer it to the rank and file for approval in a referendum. Funds for the pension would be raised by a 1-per cent assessment of members. The convention voted to join the states of Michigan and Kansas in demanding that Alexander Howat, deposed Kansas district president, be restored all rights and privileges and that an international convention be called to give him a hearing.

C. W. Hunt Succeeds Murdock On Trade Commission

Charles W. Hunt, of Logan, Iowa, secretary of the Iowa Farm Bureau Federation, was nominated by President Coolidge, May 26, to be a member of the Federal Trade Commission, succeeding Victor Murdock, of Kansas, who recently resigned. The Senate confirmed the nomination May 31.

Appointment of Mr. Hunt was recommended by the Iowa delegation in Congress, including Senators Cummins and Brookhart. He also had the indorsement of the Farm Bureau Federation and other farmers' organizations in Iowa, Nebraska and Missouri.

Mitchell Memorial Unveiled At Scranton

Mine workers from all sections of the United States, labor leaders, state and national officers, and men prominent in business and professional life, assembled in Scranton, Pa., on Friday, May 30, to pay tribute to John Mitchell, president of the United Mine Workers at the time of the anthracite strike of 1902. A monument and bronze life-size statute of the famous labor leader was unveiled on the Court House Square following a parade of 10,000 mine workers from the three hard-coal districts. Miss Catherine Mitchell, only daughter of the deceased miners' leader, unveiled the monument.

The memorial was erected by the miners of the anthracite region at a cost of $75,000. It is constructed of Dummerstone granite from a Vermont quarry. Peter B. Sheridan, of Hazleton, is the designer; Charles Keck, of New York, the sculptor. The granite block originally weighed fourteen tons. Four tons was cut away in designing the memorial. The design shows seven miners at work in the mine, a mule pulling a loaded car and other mine equipment is depicted. On the block under the bronze statue is this inscription: "John Mitchell, 1870-1919."

Lehigh Valley Strike Called Off

At a meeting at West Wyoming May 23 the general grievance committee of the Lehigh Valley Coal Co. voted to call off the strike of 12,000 miners that had been in progress for a week and to send the men back to work Monday morning, May 24. Early May 22 the same committee voted to continue the strike and threatened to call out all maintenance men if their grievance was not adjusted by May 28. It was said that the threat of President Cappellini to appeal to the miners directly and ignore the general grievance committee had much to do with the sudden change.

The strike followed an alleged reduction in wages of 75c. in yardage work at the William A. colliery. The union heads blame the company for such action. Failure of the company to restore the old rate of wages may result in a walkout that will have the sanction of the entire union, it was intimated.

Bureau of Mines Opens Bids

Keen competition for government contracts was again disclosed when bids were opened last week by the Bureau of Mines for the supply of bituminous and anthracite coal for the Government fuel yards during the fiscal year 1925.

Quotations were asked on 239,600 tons of bituminous and 14,990 tons of anthracite, forty-eight proposals being received for the former and six for the latter. A wide range of prices was revealed in some items, the more important being as follows:

One hundred and fifty thousand one hundred tons run of mine: Sugar Creek Coal Sales Co., 20,000 tons at $2.50; Central Pocahontas Coal Co., $1.68; Minter Fuel Co., Beckley, W. Va. 54,000 tons at $2.19; C. G. Blake Co., $2.35 to $2.49; Fayette Smokeless Fuel Co., $2.10 to $2.20; Smokeless Fuel Co., 60,000 tons at $2.22; Leckie Coal Co., Columbus, Ohio, 50,000 tons, $2.18; Johnstown Coal & Coke Co., Johnstown, Pa., $2.13; Chesapeake & Virginia Coal Co., Lynchburg, Va., 20,000 tons at $2.22; Lynch & Read, Baltimore, 24,000 tons, $2.33; Equitable Fuel Co., Baltimore, 29,200 tons, $2.54; White Oak Coal Co., 75,000 tons, at $2.24; Lake & Export Coal Corporation, New York, 60,000 tons at $2.18.

Shipping Board Contracts Awarded on Second Bids

The U. S. Shipping Board at New York on Monday of this week opened bids for furnishing and delivering alongside vessels, and stored in bunkers, operated by the board from New York harbor a maximum of 18,000 gross tons of bituminous coal per month, deliveries to run over a period of 12 months. The specifications called for coal with a minimum of 14,500 B.t.u., bidders to give the name or names of the mines from which the coal is to be shipped. Bids for this tonnage were opened by the board on May 12 and later rejected because of the failure of some of the bidders to name the mines from which coal was to be shipped.

There were seventeen bidders on June 2 and the prices alongside ranged from $5.19 to $6, as compared with $5.17 to $6.12 on the former opening. The bidders and prices named follow:

	T.I.B. Over Top	T.I.B. Over Side	F.A.S.
Cosgrove & Co.	$6 42	$6 62	$5.62
McNeil Coal Co.	....	....	5.74
J. H. Weaver & Co.	....	....	$6.05 to $6.55 according to tonnage taken
Quemahoning Coal Co.	....	....	5.375–5.23
Morrisdale Coal Co.	....	....	6.00
Coleman & Co.	....	....	5.40
H. B. W. Haff	....	....	5.99
Horgan Fuel Corp.	....	....	5.34
Eastern Fuel Co.	6.30	6.50	5.65
Seiler Coal Co.	6.08	6.28	5.43
E. Russell Norton	6.40	6.78	
Pattison & Bowns	6.52	6.87	5.82
Independent Coal Corp.	5.89	....	5.19
Johnstown Coal & Coke Co.	....	....	5.47
Imperial Coal Corp.	....	....	5.50
Dexter & Carpenter, Inc.	....	....	5.59
Steamship Fuel Corp.	....	....	5.51

Practical Pointers For Electrical And Mechanical Men

Selecting Standard Pipes for Columns or Struts

Standard pipes often come in handy for use as columns or struts or for use as push members in transmitting forces. This is because a pipe is strong both in tension and compression.

However, when it comes to calculating columns, it often takes considerable time digging in handbooks, etc., and as result, the use of a pipe is avoided, or a pipe much too large or too small is used, chosen entirely by guess. The pipe that is too small may fail and be the cause of disaster. It is always best, of course, to be on the safe side, but at the same time, one should practice economy.

Table of Pipe Sizes and Loads

Size of Pipes in In.	Column *A* Maximum Length in In.	Column *B*	Column *C*
⅛	14.5	826.40	0.07
¼	19.4	617.30	0.12
⅜	25.0	480.80	0.17
½	31.3	383.10	0.25
¾	40.0	300.30	0.33
1	50.6	237.50	0.50
1¼	64.7	185.50	0.67
1½	75.0	160.50	0.80
2	94.7	126.90	1.07
2½	114.0	105.30	1.71
3	139.0	86.21	2.24
3½	161.0	74.63	2.68
4	181.0	66.23	3.18
4½	202.0	59.52	3.68
5	226.0	53.19	4.32

To assist those who may have occasion to use standard pipes and to make it as easy as possible for them, the following simple table and rules have been developed:

(1) Knowing the load that is to be carried and the length of pipe needed, make a guess as to the size of pipe. Column *A* in the tables will help in making the guess as it gives the maximum length of pipe that may be used. Thus, never use a ⅛-in. pipe as an important column longer than 14.5 in. Never use a 3-in. pipe as an important column longer than 139 in., etc.

(2) Multiply the length of the pipe in inches by the corresponding figure in column *B* of the table. This product should never be greater than 12,000. If it is greater than 12,000 it means that you have guessed a pipe that is too small. After getting the right size, proceed as follows:

(3) Subtract the product, obtain as stated above, from 19,000. If the difference is equal to or less than 13,000 use it, in 4. If the difference is more than 13,000 use 13,000 in 4.

(4) Multiply by the figure in column *C* corresponding to the pipe size.

The result is the number of pounds that the pipe will carry as a column, strut, or push member. If the result is less than the load to be carried, try again, using the next larger pipe size, and so on until the proper and most economical size is selected.

For example, it is desired to support a load of 10,000 pounds at a height of 84 inches. What size of pipe should be used? Following the rules, we do this:

(1) Guessing the size of pipe, column *A* shows that 84 in. falls between 1½-in. and 2-in. pipe. We will therefore try a 2-in. pipe.

(2) 84 × 126.9 = 10,650. This is less than 12,000 and we will continue.

(3) 19,000 — 10,650 = 8,350. This is less than 13,000 and we may therefore use it in 4. If the difference were 18,350 we would have to use 13,000 in 4.

(4) 8,350 × 1.07 = 8,950 pounds.

Since 8,950 pounds is less than 10,000 pounds a 2-in. pipe is too small. We will therefore recalculate, this time trying a 2½-in. pipe.

(2) 84 x 105.3 = 8,850.

(3) 19,000 — 8,850 = 10,150.

(4) 10,150 × 1.71 = 17,370 pounds.

This shows that a 2½-in. pipe would be amply safe to hold up 10,000 pounds. It shows that a 2½-in. pipe is capable of holding almost twice as much as a 2-in. pipe at a height of 84 inches. The small difference in pipe sizes and the great difference in strength indicates the necessity of careful computation and the danger involved in guesswork.

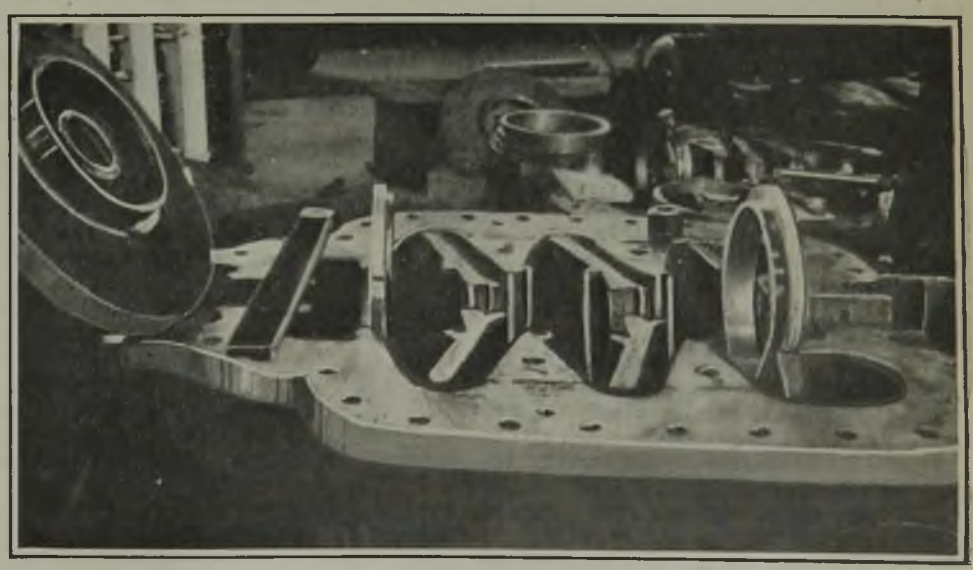
W. F. SCHAPHORST.

How Pipe Joints Can Be Made Truly Tight

So many forms of joints for pipes conveying oil, water or gases have been made that another new type would seem to be almost impossible. It is well known that pipes with screw connections are much more satisfactory than those with clamped joints, especially when carrying liquids or gases which easily flow through small openings.

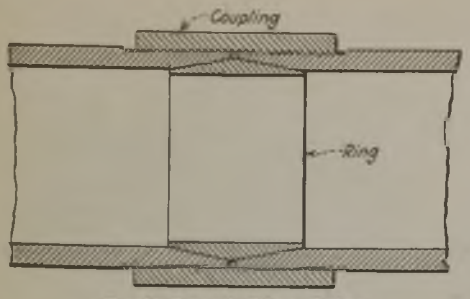
Ordinarily the ends of pipes are screwed into collars or sockets and the cutting of the threads on the pipes, and particularly in the sockets, must be exact and accurate. For connecting the ends of pipes parallel sockets threaded from each end generally are used. In many cases, and especially where considerable pressures have to be carried, it is customary to give the threaded socket a slight taper from both ends, so that the pipe ends fit more tightly as they are screwed into the sockets.

The new joint-making device shown in the illustration will make it less necessary to taper the threads in the sockets, and is a simple method of obtaining a tightness that will prevent leakage. A machined ring tapered to the same angle as the inside of the pipe ends is placed in the joint. As the internally tapered ends of the pipe are screwed into the socket a radial pressure is exerted by the ring, tending to swell the pipe outward and thereby make an absolutely pressure-tight fit.



Pump Casing Salvaged at Low Cost

The ring shown in the illustration was used to close the leakage space worn between the second and third stage of the centrifugal pump. Most pumps are scrapped when leakage from stage to stage has become too great to permit the pump to operate efficiently. Many times the unit is in every other way as good as new and considerable money can be saved by making the above simple repair, which was described in detail in the April 3 issue of *Coal Age*.



Leak-Proof Pipe Joint

The machined ring seals the joint between the pipe and sleeve coupling and also expands the end of the pipes so as to close the space along the threads.

The tightness of the joint is therefore not dependent solely on the precision of the screw thread on the pipe and in the socket. Although with the perfected system of the most recent thread-milling machinery great accuracy is insured, the tapered socket is frequently required, but it is thought this new ring joint will generally make this tapering of the socket less necessary. THE ENGINEER.

Transformers Meet Many Requirements

Instrument transformers are used for two reasons: first, because they make the front of switchboards safe, and second, because they make it possible to use instruments with a reasonable amount of insulation and a reasonable current-carrying capacity. The function of these transformers is to deliver to the instruments and other controlling equipment a current or voltage which shall always be proportional to the primary current or voltage. Generally, the secondary of a high-voltage transformer is designed for about 115 volts, and the secondary of a current transformer for 5 amp.

In connecting instrument transformers to the various types of meters used in conjunction with them, it is necessary to know the relative instantaneous direction of current in the transformer leads. For this reason one primary and one secondary lead of the transformer is usually marked to indicate this polarity. The relation of the marked leads is such that the instantaneous direction of the current in them is the same; that is, toward the transformer in the marked primary lead, and from the transformer in the marked secondary lead, or vice versa.

GROUND INSTRUMENTS FOR SAFETY

All instrument transformers should be grounded on the secondary side as an extra precaution against danger from the high voltage in case the insulation of the transformer should be punctured by lightning, or other abnormal stresses. It is also a general and safe practice to ground the cases of the meters to which the transformers are connected. In polyphase groups of transformer connections any point of the secondary may be grounded, but it is preferable to use a connection where a neutral point or a common wire between the transformers may be readily grounded.

Voltage transformers are used with electrical measuring instruments, synchronoscopes, synchronizing apparatus, protective and regulating relays, and no-voltage and over-voltage trip coils of automatic circuit breakers. One transformer may be used for a number of instruments, or other potential coils at the same time, provided the total current taken by the equipment does not exceed that for which the transformer is designed, and compensated. Voltage transformers of this type usually have a capacity of 200 volt-amperes, but are compensated to give a correct ratio of voltage transformation at 40 volt-amperes, as this is the average load demanded by a voltage transformer. Special transformers may be compensated for any desired load condition up to the full capacity of 200 volt-amperes. The standard secondary voltage is nominally 115 volts.

The instrument voltage transformer is essentially an ordinary constant-potential device especially designed for close regulation, so that the secondary voltage under any condition will be as nearly as possible a fixed percentage of the primary voltage. There are several reasons why the secondary voltage can never be exactly proportional to the primary voltage or exactly opposite to it in phase. The losses in the transformer and the magnetic leakage between the primary and secondary winding must be considered. These two classes of errors, inherent in voltage transformers, namely the ratio error and the phase-angle error are always present. These errors are in part due to the exciting current which is however constant for any given applied voltage. In the design and manufacture of voltage transformers this error may be reduced to a minimum by choosing the best quality of iron and working it at a low magnetic density. That part of the error due to the load current, obviously, varies directly with the load and in turn can be minimized in the manufacture and design of the transformer by making the resistance and reactance of the winding low.

Low Power Factor Affects Meter Accuracy

The effect of the phase displacement of the secondary voltage in the voltage transformer is not important when using meters having only a voltage element and when using protective relays, because these devices depend only upon voltage for their operation. However, when watt-hour meters and similar apparatus are used the indication of these instruments depends not only on the value of the voltage, but also on its relation to the line current, therefore, the phase error has some effect. Obviously, the lower the power factor of the load the greater will be the phase error of the voltage transformer upon this type of instrument. The phase displacement depends not only upon the constants of the transformer but on the power factor of the load to be measured, and, therefore, the effect of this error cannot be compensated in the transformer. In the design of the transformer if the phase displacement is made as small as possible, its effect on reading for commercial purposes is not great.

Grease Cars with Bicycle Pump

The need for the proper lubrication of mine cars should hardly be a matter for argument. Nevertheless, it is not uncommon to see some mine-car bearings almost "crying" for lubrication.

With transportation equipment both expensive in first cost and maintenance our company has saved much money by keeping mine cars well greased, thus making it possible for every locomotive to pull a larger trip of cars than usual.

Grease Gun Lubrication

When one considers the delay occasioned by a dry bearing or the cost of repairing an axle worn out due to lack of proper lubrication, there is ample justification for providing efficient lubricating equipment whether it be by grease or oil.

As soon as we began to give close consideration to the lubrication of car bearings, we realized that the reason why equipment was sometimes inadequately greased or oiled was because the workman found the application of lubricant difficult or arduous. We were not long in learning that the best way to get good results is by making it as easy as possible for the workman.

One of the mechanics' helpers at the mines brought an old bicycle pump to the shop one morning and before long had placed a nozzle on the end suitable for the grade of grease which we use. Now our oiler merely puts the nozzle of the grease gun in a pail of grease and with little effort can lubricate a large number of bearings in a short time.

Another advantage of this gun is that with it the workman need not get smeared with grease. This fact makes it much easier for us to get men for this work. J. T. WARTON.

Oil Grooves for Locomotive Motor Bearings

In general, it is not considered necessary to have the axle bearing fitted with oil grooves, as these bearings have large surface areas and windows, and are of the split type. However, many men, who believe grooves necessary, use them as an extra precaution against hot axle bearings. Frequently a deep ridge cut in the babbitt at the joint between the upper and lower half of the bearings supplies sufficient extra lubrication.

Production And the Market

Bituminous-Coal Market Marks Time as End of Industrial Depression Approaches

That it requires patience and staying power to an unusual degree to stick in the coal business probably never was exemplified in a more striking manner than at the present time with reports of market conditions from the various centers week after week running the gamut in lugubrious expressions describing the state of business. The end of the depression—or "breathing spell," as the more optimistic have termed it—seems to be nearing an end, however, the latest report of the Federal Reserve Board indicating that "constructive programs are under consideration in some business circles which a few months ago were content to meet only the demands upon them and make no future plans." While the activity in some lines is traceable to seasonal increases, the general tone is healthier and it is prophesied that the approaching revival will have more than temporary life.

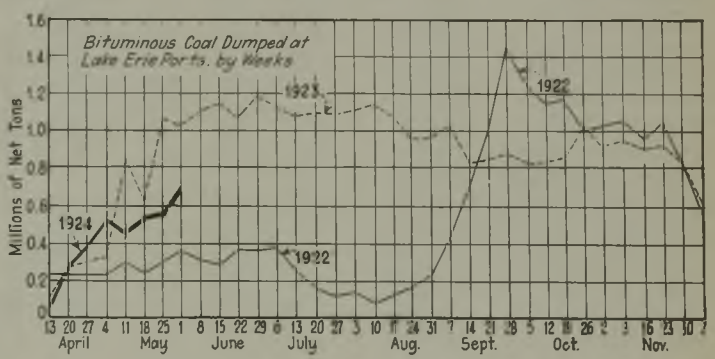
Government Departments Award Contracts

Regular summer storage of coal by the railroads, as proposed and warmly indorsed by the International Railway Fuel Association last week, is a big step in the direction of stabilization of the industry, which has been so strongly urged by Secretary Hoover. The government is doing its part, the Navy Department having awarded several large contracts last week with others to follow. The Bureau of Mines opened bids May 28 for 239,600 tons of bituminous coal and 14,990 tons of anthracite, the quotations of soft coal varying from $1.69 to $2.54 f.o.b. mine. Meanwhile the coal trade is marking time, there being little change in either demand, prices or output.

Coal Age Index of spot prices of bituminous coal advanced 2 points during the last week, registering 169 on June 2, the corresponding price being $2.04. This compares with $2.02 on May 26.

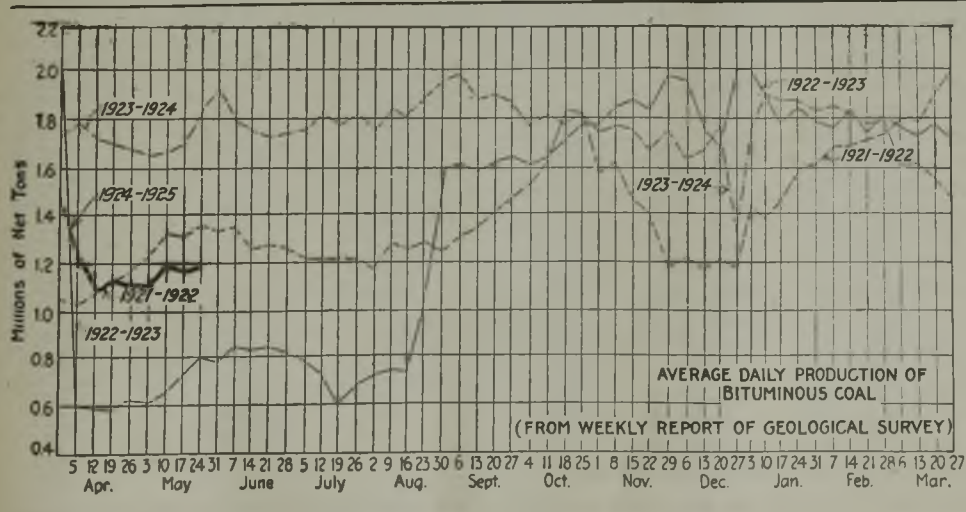
Dumpings of coal for all accounts at Hampton Roads during the week ended May 29 amounted to 371,564 net tons, compared with 241,490 tons dumped during the previous week. Coal dumped at Lake Erie ports during the week ended May 31, according to the Ore & Coal Exchange, were as follows: Cargo, 625,440 net tons; fuel, 39,640 tons. The figures for the preceding week were 529,883 tons of cargo coal and 35,748 tons of fuel coal.

Output of bituminous coal during the week ended May 24, according to the Geological Survey, was 7,155,000 net tons, an increase of 124,000 tons over



the week before, when 7,031,000 tons was produced. Production of anthracite fell off slightly, the output being 1,850,000 net tons, compared with 1,898,000 tons during the week ended May 17.

The anthracite market is beginning to show unmistakable evidences of a tendency to slow down. Demand has slackened and independents are preparing for cancellations. Stove continues to lead the van, but the call for egg, chestnut and pea is noticeably tapering off. While the output of hard coal is smaller than last year it is sufficient to satisfy immediate requirements. A slightly stronger note was apparent as a result of the mines being idle over the holiday.



Estimates of Production

(In Net Tons)

	1923	1924
BITUMINOUS		
May 10	10,175,000	7,125,000
May 17 (*a*)	10,270,000	7,031,000
May 24 (*b*)	11,049,000	7,155,000
Daily average	1,842,000	1,193,000
Cal. yr. to date (*c*)	218,591,000	190,473,000
Daily av. to date	1,768,000	1,542,000
ANTHRACITE		
May 10	1,903,000	1,924,000
May 17 (*a*)	2,045,000	1,898,000
May 24	1,956,000	1,850,000
Cal. yr. to date	41,519,000	36,921,000
COKE		
May 17 (*a*)	411,000	189,000
May 24 (*b*)	415,000	159,000
Cal. yr. to date (*c*)	7,999,000	5,414,000

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

Midwest Expects Improvement

There was a hopeful undertone to the mournful lay the coal trade in the Midwest region was singing just before June 1. A good many men were of the impression that the demand for coal was due for a slow but steady pick-up after that date. Stockpiles are still high but there is more indication of summer buying now than there was a week ago. The urgings of Secretary Hoover and others are having a certain effect.

Production in Illinois last week would have registered a slight improvement had it not been for the shutdown of two busy mines in the central Illinois field caused by a labor dispute. Indiana production also appears to have reached rock bottom and is ready to rebound. Both states are so low, however, that a little business makes a big showing.

In the Chicago region a steady though thin dribble of domestic business has continued, due to unseasonably cool weather. Smokless lump and egg has had a small market at a mine price of $3.25@$3.50, which is an improvement of 25c., and mine run has reached that territory at $2, but with no indication of a June 1 rise. Yards are taking the customary amount of hard coal for this time of year.

Conditions are unusually quiet at St. Louis. There seems to be no domestic business moving excepting in small quantities for current needs. Rain and cool weather have developed a little country business, but the storage of coal on the part of the consumer for next winter has not started, although indications are that it will pick up in June.

Kentucky Remains Somnolent

Demand for Kentucky coal at Louisville continues quiet, movement of western Kentucky coal being very slow, as retailers are not buying and small industrial demand is not heavy. Eastern Kentucky isn't getting much lake business as yet, as movement has been sluggish and is not expected to get well under way for another thirty days. Eastern Kentucky, however, is busier than most fields, due to low non-union scale of wages and low selling price.

The situation in the western Kentucky field remains unchanged, there being a generally slow demand for all grades, but with some improvement noted in stove sizes from the South. Screenings are scarce and selling at about the mine-run price, while large egg, block and lump sizes are a bit quiet. Strike benefits are now being rationed out to the miners in the affected portion of the field. The

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

Low-Volatile, Eastern	Market Quoted	June 4 1923	May 19 1924	May 26 1924	June 2 1924†
Smokeless lump	Columbus	$6.25	$3.45	$3.50	$3.35@$3.65
Smokeless mine run	Columbus	4.25	2.25	2.30	2.20@ 2.40
Smokeless screenings	Columbus	3.60	1.85	1.85	1.75@ 2.00
Smokeless lump	Chicago	6.10	3.10	3.10	**3.25@ 3.50**
Smokeless mine run	Chicago	4.10	2.00	1.85	**2.00**
Smokeless lump	Cincinnati	6.25	3.50	3.60	3.50@ 3.75
Smokeless mine run	Cincinnati	4.10	1.85	1.85	**2.00@ 2.25**
Smokeless screenings	Cincinnati	4.00	1.75	1.60	**1.50@ 1.75**
*Smokeless mine run	Boston	6.35	4.45	4.40	4.35@ 4.50
Clearfield mine run	Boston	2.35	2.00	1.95	**1.65@ 2.35**
Cambria mine run	Boston	3.10	2.50	2.50	2.25@ 2.75
Somerset mine run	Boston	2.85	2.25	2.15	**1.90@ 2.50**
Pool 1 (Navy Standard)	New York	3.75	2.75	2.65	**2.50@ 3.00**
Pool 1 (Navy Standard)	Philadelphia	3.75	3.00	3.00	2.75@ 3.25
Pool 1 (Navy Standard)	Baltimore				
Pool 9 (Super. Low Vol.)	New York	2.85	2.20	2.20	2.00@ 2.40
Pool 9 (Super. Low Vol.)	Philadelphia	2.85	2.20	2.20	2.00@ 2.45
Pool 9 (Super. Low Vol.)	Baltimore	2.55	1.85	1.85	1.80@ 1.95
Pool 10 (H.Gr.LowVol.)	New York	2.35	1.85	1.85	1.75@ 2.00
Pool 10 (H.Gr.Low Vol.)	Philadelphia	2.30	1.85	1.85	1.70@ 2.00
Pool 10 (H.Gr. Low Vol.)	Baltimore	2.15	1.65	1.70	1.65@ 1.75
Pool 11 (Low Vol.)	New York	2.00	1.60	1.60	**1.60@ 1.75**
Pool 11 (Low Vol.)	Philadelphia	1.95	1.50	1.50	1.30@ 1.70
Pool 11 (Low Vol.)	Baltimore	1.95	1.55	1.55	1.50@ 1.65
High-Volatile, Eastern					
Pool 54-64 (Gas and St.)	New York	1.85	1.50	2.50	1.40@ 1.65
Pool 54-64 (Gas and St.)	Philadelphia	2.05	1.55	1.55	1.45@ 1.70
Pool 54-64 (Gas and St.)	Baltimore	1.75	1.45	1.45	**1.40@ 1.65**
Pittsburgh sc'd gas	Pittsburgh	2.85	2.40	2.40	2.30@ 2.50
Pittsburgh gas mine run	Pittsburgh		2.10	2.10	2.00@ 2.25
Pittsburgh mine run (St.)	Pittsburgh	2.20	1.85	1.85	1.75@ 2.00
Pittsburgh slack (Gas)	Pittsburgh	1.55	1.35	1.35	1.30@ 1.40
Kanawha lump	Columbus	2.75			
Kanawha mine run	Columbus	2.05			‡ ‡ ‡
Kanawha screenings	Columbus	1.60			
W. Va. lump	Cincinnati	3.10	2.10	2.25	2.00@ 2.50
W. Va. gas mine run	Cincinnati	1.70	1.35	1.35	**1.35@ 1.60**
W. Va. steam mine run	Cincinnati	1.70	1.35	1.35	**1.35@ 1.60**
W. Va. screenings	Cincinnati	1.40	1.05	.85	**.85@ 1.00**
Hocking lump	Columbus	2.60	2.40	2.40	2.25@ 2.60
Hocking mine run	Columbus	1.85	1.60	1.60	**1.60@ 1.85**
Hocking screenings	Columbus	1.35	1.40	1.35	**1.30@ 1.50**
Pitts. No. 8 lump	Cleveland	2.85	2.40	2.40	2.10@ 2.75
Pitts. No. 8 mine run	Cleveland	2.05	1.85	1.85	1.85@ 1.90
Pitts. No. 8 screenings	Cleveland	1.45	1.45	1.25	*1.10@ 1.20*

Midwest	Market Quoted	June 4 1923	May 19 1924	May 26 1924	June 2 1924†
Franklin, Ill. lump	Chicago	$4.05	$2.75	$2.75	**$2.75@$3.00**
Franklin, Ill. mine run	Chicago	3.10	2.35	2.35	2.25@ 2.50
Franklin, Ill. screenings	Chicago	1.80	2.15	1.85	**1.90@ 2.10**
Central, Ill. lump	Chicago	2.60	2.60	2.35	2.25@ 2.50
Central, Ill. mine run	Chicago	2.10	2.10	2.10	2.00@ 2.25
Central, Ill. screenings	Chicago	1.85	1.90	1.60	1.50@ 1.75
Ind. 4th Vein lump	Chicago	3.35	2.85	2.85	2.75@ 3.00
Ind. 4th Vein mine run	Chicago	2.60	2.35	2.35	2.25@ 2.50
Ind. 4th Vein screenings	Chicago	1.80	1.95	1.95	1.90@ 2.00
Ind. 5th Vein lump	Chicago	2.80	2.35	2.35	2.25@ 2.50
Ind. 5th Vein mine run	Chicago	2.10	2.10	2.10	2.00@ 2.25
Ind. 5th Vein screenings	Chicago	1.55	1.80	1.60	1.50@ 1.75
Mt. Olive lump	St. Louis		2.85	2.85	2.75@ 3.00
Mt. Olive mine run	St. Louis		2.50	2.50	2.50
Mt. Olive screenings	St. Louis		2.00	2.00	2.00
Standard lump	St. Louis	2.35	2.15	2.15	2.00@ 2.35
Standard mine run	St. Louis	1.80	1.95	1.85	*1.75@ 1.85*
Standard screenings	St. Louis	1.50	1.80	1.65	*1.50@ 1.70*
West Ky. lump	Louisville	2.30	2.35	2.00	1.90@ 2.15
West Ky. mine run	Louisville	1.80	1.65	1.55	1.35@ 1.75
West Ky. screenings	Louisville	1.35	1.60	1.55	1.40@ 1.75
West Ky. lump	Chicago	2.35	2.25	2.25	*1.75@ 2.00*
West Ky. mine run	Chicago	1.45	1.60	1.60	1.50@ 1.75
South and Southwest					
Big Seam lump	Birmingham	3.05	2.80	2.80	**2.70@ 2.95**
Big Seam mine run	Birmingham	2.05	2.00	2.00	*1.75@ 2.00*
Big Seam (washed)	Birmingham	2.35	2.20	2.20	*1.75@ 2.25*
S. E. Ky. lump	Chicago	3.25	2.25	2.25	*2.00@ 2.25*
S. E. Ky. mine run	Chicago	2.35	1.60	1.60	1.25@ 2.00
S. E. Ky. lump	Louisville	3.50	2.15	2.10	2.00@ 2.25
S. E. Ky. mine run	Louisville	2.25	1.50	1.50	1.25@ 1.75
S. E. Ky. screenings	Louisville	1.65	1.10	1.10	*.80@ 1.15*
S. E. Ky. lump	Cincinnati	3.05	2.35	2.75	*2.25@ 2.75*
S. E. Ky. mine run	Cincinnati	1.60	1.35	1.35	**1.40@ 1.60**
S. E. Ky. screenings	Cincinnati	1.55	.95	.95	**.90@ 1.10**
Kansas lump	Kansas City	3.85	4.50	4.50	4.50
Kansas mine run	Kansas City	3.25	3.50	3.50	3.50
Kansas screenings	Kansas City	2.60	2.50	2.50	2.50

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

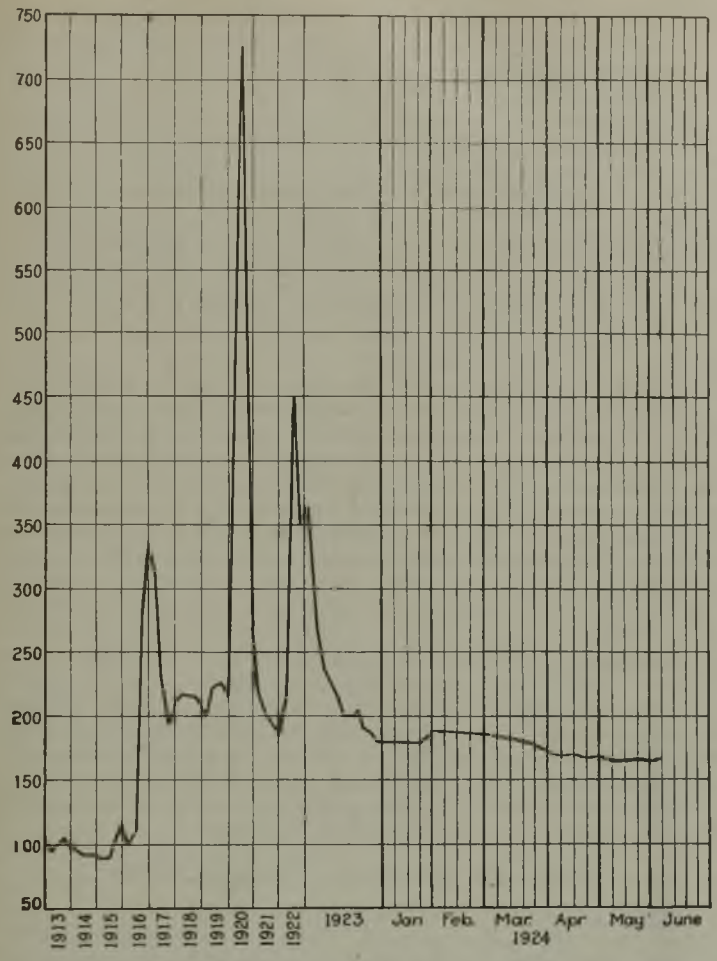
† Advances over previous week shown in **heavy type**, declines in *italics*.

‡ On strike.

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

	Market Quoted	Freight Rates	June 4, 1923 Independent	June 4, 1923 Company	May 26, 1924 Independent	May 26, 1924 Company	June 2, 1924† Independent	June 2, 1924† Company
Broken	New York	$2.34		$7.75@$8.35		$8.00@$8.75		$8.00@$8.75
Broken	Philadelphia	2.39		7.00@ 8.10		8.60@ 8.75		8.60@ 8.75
Egg	New York	2.34	$8.50@11.25	8.00@ 8.35	$9.00@$9.25	8.35@ 8.75	$9.00@$9.25	8.35@ 8.75
Egg	Philadelphia	2.39	9.25@ 9.50	8.10@ 8.35	8.35@ 9.50	8.70@ 8.75	8.35@ 9.50	8.70@ 8.75
Egg	Chicago*	5.06	8.50@11.50	8.00@ 8.50	7.68@ 7.77	7.73@ 7.81	7.68@ 7.77	7.73@ 7.81
Stove	New York	2.34	8.50@11.25	8.00@ 8.35	9.00@ 9.25	8.35@ 9.00	9.00@ 9.50	8.35@ 9.00
Stove	Philadelphia	2.39	9.25@ 9.50	8.15@ 8.35	8.70@ 9.60	8.75@ 8.95	8.70@ 9.60	8.75@ 8.95
Stove	Chicago*	5.06	8.50@11.50	8.00@ 8.50	8.03@ 8.17	7.94@ 8.14	8.03@ 8.17	7.94@ 8.14
Chestnut	New York	2.34	8.50@11.00	8.00@ 8.35	9.00@ 9.25	8.35@ 8.85	9.00@ 9.25	8.35@ 8.85
Chestnut	Philadelphia	2.39	9.25@ 9.50	8.15@ 8.35	8.75@ 8.85	8.70@ 8.85	8.75@ 8.85	8.70@ 8.85
Chestnut	Chicago*	5.06	8.50@11.50	8.00@ 8.50	7.90@ 8.03	7.81@ 7.99	7.90@ 8.03	7.81@ 7.99
Range	New York	2.34		8.30		8.60		8.60
Pea	New York	2.22	6.30@ 7.50	6.00@ 6.30	5.50@ 6.00	5.50@ 6 00	*5.00@ 6.00*	5.50@ 6.00
Pea	Philadelphia	2.14	7.00@ 7.25	6.15@ 6.20	5.75@ 6.25	5.75@ 6.00	5.75@ 6.25	5.75@ 6.00
Pea	Chicago*	4.79	7.00@ 8.00	6.00@ 6.50	5.36	5.36@ 5.91	5.36	5.36@ 5.91
Buckwheat No. 1	New York	2.22	2.50@ 3.25	3.50@ 4.15	2.25@ 2.75	3.00@ 3.15	2.25@ 2.75	3.00@ 3.15
Buckwheat No. 1	Philadelphia	2.14	2.75@ 3.50	3.50	2.50@ 3.00	3.00	2.50@ 3.00	3.00
Rice	New York	2.22	1.75@ 2.50	2.50	1.90@ 2.25	2.00@ 2.25	1.90@ 2.25	2.00@ 2.25
Rice	Philadelphia	2.14	1.75@ 2.50	2.50	2.00@ 2.25	2.25	2.00@ 2.25	2.25
Barley	New York	2.22	1.00@ 1.50	1.50	1.50@ 1.75	1.50	1.50@ 1.75	1.50
Barley	Philadelphia	2.14	1.15@ 1.50	1.50	1.50	1.50	1.50	1.50
Birdseye	New York	2.22	1.50@ 1.60	1.60	1.50	1.60	1.50	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
	June 2	May 26	May 19	June 4
Index	169	167	169	215
Weighted average price	$2.04	$2.02	$2.05	$2.60

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.

non-union, stripper and other operations in the field are not busy, in spite of the large number of mines that are down.

West Virginia operators discern a fundamental improvement in conditions, based on gradually increased production in some sections, but depression still prevails in many sections. Virginia mines are producing a little less coal than for the corresponding period of May and yet market losses are not any heavier than they have been.

Northwest Gets Busy

The one significant feature of the coal market at the Head-of-the-Lakes is the better temper which prevails among all dock men. It is not optimism exactly but merely the better feeling produced by more hustling for orders. Old stocks must be moved to avoid deterioration and fire losses. For the first time in months the coal market is really awake, and it is probable that business will be done. Duluth coal men predict that much of the anthracite trade which was lost at Twin Cities will be brought back into the fold. A high-spot survey has brought to light unusually light stocks in northern consumers' bins, and the trade looks for orders to fill soon.

The market is fairly stable at present prices. One significant increase during the week is of Pocahontas to $7.25 for lump, $5.50 for run of mine and $4.50 for screenings. This shows that many docks expect consumers to use smokeless soft as an anthracite substitute next winter.

Receipts at Duluth-Superior docks showed marked improvement last week, when 25 cargoes, three of them hard coal, were landed. This compares with 18 the week before. Since the opening of navigation 591.660 tons of soft and 126,930 tons of hard coal have been landed.

Iron range towns have lately come into the market for lots of coal ranging from 5,000 to 20,000 tons, mainly for utilities. Bids on these contracts will be opened the first week in June.

There is very little business at Milwaukee. A moderate demand for anthracite and Pocahontas is all there is. Coal is coming quite steadily by lake. The receipts by vessel thus far since the season opened aggregate 131,908 tons of anthracite and 282,499 tons of soft coal.

Southwest Bestirs Itself

Operators began the last week in May to open up mines in Arkansas and take orders for semi-anthracite in anticipation of the reduction in freight rates effective June 5. A slight increase in activity is noticeable also in Kansas, where a few more mines, both shaft and shovel, have been reopened in the last week, and where others are expected to be reopend before the middle of June. The resumption of mining is partly due to the current demand and partly in preparation for the storage market, which will open soon, and for the threshing market, which will open in June. Kansas City prices are: Kansas lump, $4.50; nut, $4; mine run, $3.50; screenings, $2.50; Arkansas semi-anthracite lump, $5.50@$6; mine run, $3.50; screenings, $2; Henrietta (Okla.) lump, $5.50; nut, $3.75; mine run, $3.50; screenings, $2.50.

Colorado buyers were inactive during the week, despite the fact that everyone was expecting an advance in prices June 1. Mines worked on an average of 20 hours last week and the operators' reports show that 46 per cent of the working time lost was attributed to "no market." With the miners' resumption of work at the Broadhead mine all labor disorders have been eradicated for the time being.

In Utah the coal industry is marking time. Production figures show mines are working below 30 per cent of full-time capacity. Dealers are making an effort to get their customers to put in their winter coal now, but the response is poor.

Undertone Stronger at Cincinnati

June prices of smokeless at Cincinnati are up 25c. for lump and egg, and first of the month bookings are said to be heavier than May orders. While the prepared sizes are moving in good shape there is not the ready market for screenings, and some sales have been made down to $1.50. The undertone continues to be stronger. Movement to the lakes is 35 to 40 per cent behind normal, but there is no rush to get coal for that movement. Utilities are not in the market as they might be but the closing of several large railroad contracts within the last two or three weeks shows that pressure that formerly kept driving the market down has been released. A slight recovery in the price of slack and run of mine resulted. There is little or no change in retail prices. River business continues good with a high stage flowing. Kanawha tonnages show an increase. Specialized coals are quoted as follows: Egg, $2.50@$3; block, $3.25@$3.75.

The trade continues rather dull in Columbus and central Ohio. Buying is limited, as neither retailers nor steam users are showing any disposition to stock up for the future. The weather has mitigated against a more lively domestic trade. Dealers have been making rather low prices in order to clean up and as a result quotations are irregular. Some smokeless grades, including Pocahontas, are being sold and there also is a demand for splints and Kentucky grades. Ohio-mined coals are extremely dull. Steam business is quiet as reserves in the hands of some of the larger users are still heavy. Contracting is not brisk, as most of the steam users are content to buy from the open market. One of the features is the shrinkage of distress coal due to the closing down of more mines. Lake trade is showing signs of becoming more active, but contracting for lake shipment is not strong.

The trade at Cleveland is pessimistic, seeing little immediate hope for material improvement. Inquiries are scarce, and producers are of the opinion that the mines may as well be closed completely as to operate only one or two days per week. Almost one-half of the mines in the eastern Ohio field are closed down indefinitely, and no attempt will be made to reopen until the market is much improved. During the week ended May 24th the eastern Ohio No. 8 Field produced 253,000 tons, or about 36 per cent of the combined potential capacity of the district, estimated at 700,000 tons. This is a gain of 5,000 tons over the preceding

week, but this increase is without significance as a market factor, because it was due largely to a slightly accelerated production of coal for shipment to the lake by operators with dock interests at the head of the lakes.

Demand for coal at Pittsburgh continues extremely poor. Steel mill operations continue to decrease, as buyers of steel are liquidating stocks. There are no signs marketwise of increased interest on the part of lake shippers. Wage reductions by independent operators in the Connellsville region, it is thought may influence the Pittsburgh coal market. Strip mines are crushing considerable coal, which accounts for increased offerings of slack.

The Buffalo market is still quiet, with not much prospect of early improvement. Demand seems even poorer than it was, as consumers continue to rely on their stock piles.

Pessimism Enshrouds New England

In New England the market for steam coal shows no sign of recovery. Prices drag along much as they have for the past 60 days and it cannot be said that the trade is at all encouraged over the prospect. In the textile centers, like Lowell, Lawrence, Fall River and New Bedford, there is a pronounced pessimistic tone, and from these sources and the shoe industry there is today almost no inquiry for coal.

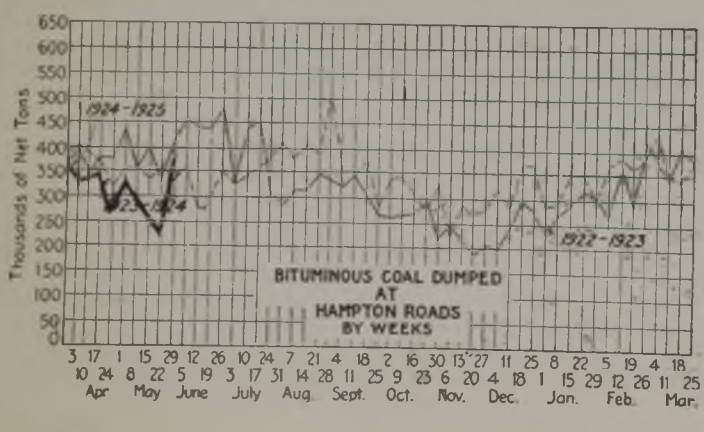
At Hampton Roads there is little change. Some days the spot market improves to a degree, but invariably thus far these periods have been followed by dull spells that bring down the average of both tonnage and price. No. 1 coals are still being sold down to $4.35, with an occasional sale made at $4.40, these figures being per gross ton f.o.b. vessel. A few agencies have set $4.50 as an asking price; no sales are reported at that level. No. 2 coals can be had at prices down to $4. Output fluctuates from week to week with the trend of prices, but practically all the time there are considerable accumulations at the piers.

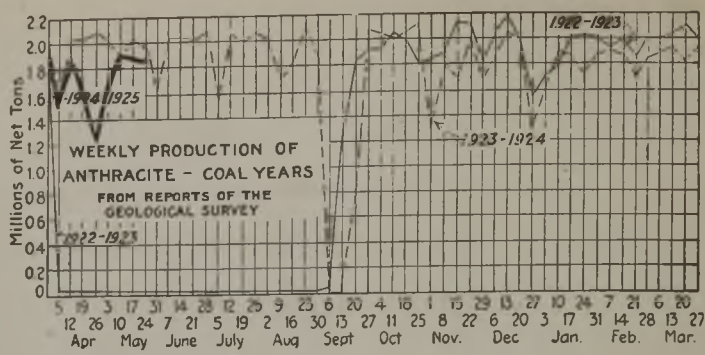
All-rail there is the same stagnant market. Receipts week by week show heavy declines compared with other years, and there is today no rosy outlook for coals in central Pennsylvania so far as this territory is concerned. Via the New York and Philadelphia piers there is no noticeable improvement.

Inquiries Drop in Atlantic Seaboard Markets

There has been a falling off in inquiries at New York and the prospects of increased business during this month are not as bright as they were. Buyers continue to hold to the policy of caution which they have followed for many weeks. Receipts at the local tidewater piers increased to around 1,500 cars some days during the past week and there was an accumulation of coal, but not in sufficient quantities to lower prices. Demand was slow, however, and it required hard work to keep the coal moving. There were reports current that a 50,000-ton order for foreign shipment had been obtained by a local house but it could not be confirmed. Inquiry, however, points to some new business with South America.

Faint signs are discernible in Philadelphia that some consumers are inclined to take in a little stock, but even the most hopeful producer is not willing to admit that it is likely to become general soon. General industrial conditions are unsatisfactory, especially in textiles. Manufacturers expect a favorable turn soon, but the unseasonable weather all spring has held them back and they are waiting for warm weather to move their goods and get back to longer working time. The only real demand is for slack. The spot market remains unchanged as to price, and the market is firm at present figures.





Inquiries are beginning to come in at Baltimore for contract delivery over the late summer, autumn and winter. The competition in selling is still so keen and mines are still selling at such a low price to the jobbing trade that so far there is little response in price raise either in the open market or on contracts, which are being made at "ruinous rates." The spot market shows but little change, demand being moderate and competition keen. The export situation continues to drag, only seven ships with a total of but 25,399 tons cargo and 2,341 tons in bunkers loading from May 1 to 23.

Buying in the Birminghan market is very slow, with consumers indifferent and taking as little as they can get by with, as a rule. Slight price reductions on some grades as a result of wage adjustments recently made, has not stimulated buying so far, even on the grades affected, emphasizing the fact that the trade inactivity is not attributable to the price of fuel but rather to restricted industrial requirements and a disinclination to stock.

Anthracite Business Slowing Down

There are many indications of a slight slump in the New York anthracite market. Demand has slackened and some of the smaller operators and sales agents of independent coals are taking orders at less than last week's quotations. One producer announces prices for some of the domestic coals 10c. lower for June than for May and he is said to have orders booked for June and July delivery at these prices. Stove continues to lead in demand. Both egg and chestnut are accumulating in some quarters and pea coal is moving much more slowly. Retail dealers' yards are well filled. Independent operators are well booked ahead but with demand subsiding cancellations are looked for. Some shippers of independent coals had an oversupply of chestnut at tidewater which they were forced to load into boats in order to save demurrage charges. Demand for steam sizes has already slowed down considerably. Only the better grades of independent No. 1 buckwheat and rice are quoted at full company circular. Barley continues to be the most active of these coals. Hard-coal business at Philadelphia is slowing down. Retailers have few orders on their books for cellar filling and orders are just straggling in. There is still quite a shortage of stove and shippers are being urged for deliveries.

Coke Output Slumps Again

The general reduction of wages inaugurated by the independent coke operators in the Connellsville region to the scale of Nov. 10, 1917, is not proceeding as rapidly as was expected. This, however, does not mean that the reduction is any less certain to be general among the independents in operation, for not a few are entirely closed. Output of beehive coke again slumped during the week ended May 24, when 159,000 net tons was produced, compared with 189,000 tons during the previous week, according to corrected returns by the Geological Survey.

Car Loadings, Surplusages and Shortages

	Cars Loaded	
	All Cars	Coal Cars
Week ended May 17, 1924	913,407	135,650
Previous week	909,187	136,046
Same week in 1923	991,797	181,599

	Surplus Cars		Car Shortage	
	All Cars	Coal Cars		
May 14, 1924	319,106	167,102		
Previous week	324,779	180,888		
Same date in 1923	18,419	2,776	23,761	15,653

Foreign Market And Export News

British Market Notes Stronger Tone; Inquiry and Output Better

The South Wales market has been slow in recovery by reason of a number of difficulties, chief of which is labor. Coupled with the labor trouble is the problematical effect of the new wages on prices and the strike in the Ruhr. The settlement of the wage question for the next twelve months is an encouraging influence, but fifteen thousand miners are still on strike, owing to a local dispute. The tone of the market has improved slightly due to an increase in inquiry in anticipation of the holidays. Exports also are expanding, though supplies are ample and prices are holding barely steady.

European inquiry on the Newcastle market has improved somewhat, though the market is in a state of great uncertainty, due to the same factors that have influenced South Wales. There has been considerable anxiety as to the possible result of the negotiations between operators and miners. The Norwegian State Rys. have placed orders aggregating 35,000 tons of steams at prices between 23s. and 28s., while two other contracts for 7,000 tons of best steams and 10,000 tons of steam smalls have been placed.

A cable to *Coal Age* states that the coal production by British mines during the week ended May 17 was 5,659,000 tons, according to the official reports. This compares with an output of 5,220,000 tons during the previous week.

Prices Stiffen at Hampton Roads, New Business Scarce

Demand for coal at Hampton Roads having reached rock bottom, the piers turned in the lowest monthly dumping record for a year, though there was a marked increase last week. Prices have stiffened somewhat due to shortage at the piers rather than to demand.

Foreign business, except for a sporadic movement to South America, is without feature, bunkers holding their own chiefly on account of old contracts, with little or no new business reported, New England trade has slumped materially and the opening of lake shipments did not help trade here.

Supplies at the piers has been lower than for a great many months, operations in southwest Virginia and elsewhere having curtailed their output substantially because the market did not make it attractive to operate.

French Industrial Demand Holds; House Coal Orders Slacken

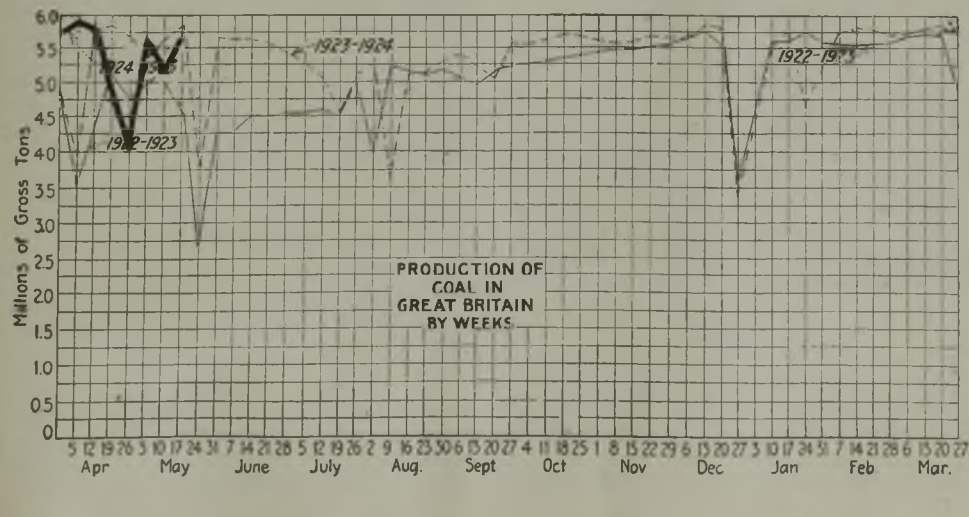
The French coal market is almost stationary. Orders for household coals have slackened at the French mines, but the demand for industrial fuels remains satisfactory.

Imports from Great Britain have been better of late, especially when the rates of sterling stood around 67@68 fr.; besides most of the f.o.b. prices at the shipping docks have been lowered, the result being that certain grades of British coals have been selling here at either equal or even lower prices than French coals. Since the last rise of sterling, however, the situation has changed.

The Belgian miners have accepted a reduction in wages and a strike has been averted. There is still much difficulty encountered in marketing the output, however. Although prices have not been officially changed, rebates of 10 to 20 fr. per ton can be obtained on sized products for transportation on barges.

Rail traffic has been good and freight is being maintained at 22 fr. Bethune-Paris.

Deliveries of indemnity fuel to the O.R.C.A. from the Ruhr for France and Luxemburg during April included 524,600 tons of coal, 729,400 tons of coke and 47,100 tons of lignite briquets, a total of 1,301,100 tons, or an average of 43,370 tons daily. During the first two weeks of May the daily average was 19,000 tons.



U. S. Exports of Coal and Coke During April, by Countries

(In Gross Tons)

	1923	1924
Anthracite	421,922	245,483
Bituminous	1,384,879	942,638
Exported to:		
France	175,518	78,551
Italy	60,478	109,433
Netherlands	19,239	
Other Europe	96,415	501
Canada	889,900	542,358
Panama	9,800	
Mexico	11,440	9,089
Br. West Indies	11,811	18,557
Cuba	51,713	28,020
Other West Indies	9,517	26,922
Argentina	11,553	25,881
Brazil	16,107	73,508
Chile		5
Egypt	2,569	
French Africa	9,019	17,298
Other countries	9,800	12,515
Coke	201,788	45,382

Export Clearances, Week Ended May 31, 1924

FROM HAMPTON ROADS

	Tons
For Brazil:	
Braz. Str. Pocone for Pernambuco	4,826
Br. Str. Gilbraltar for Rio de Janeiro	5,645
Br. Str. Severnmede for Rio de Janeiro	5,355
Br. Str. Ramon De Larrinaga for Rio de Janeiro	7,704
For Canada:	
Nor. Str. Bratland for Kingston	2,000
Br. Str. Wearbridge for Three Rivers	6,279
For Chile:	
Dan. Str. Norslys for Iquique	5,679
For Italy:	
Ital. Str. Alberta Cavalletto for Porto Ferrajo	5,618
Amer. Schr. Orleans for Monopoli	1,009
For Venezuela:	
Amer. Schr. Fred W. Thurlow for Tucacas	1,522
For West Indies:	
Nor. Str. Wascana for St. Thomas	7,531

FROM BALTIMORE

For Canada:	
Nor. Str. Gunnar Heiberg	3,579
For Italy:	
Am. Str. Alamo	2,317

Hampton Roads Pier Situation

N. & W. Piers, Lamberts Pt.:	May 24	May 31
Cars on hand	1,459	717
Tons on hand	86,910	40,568
Tons dumped for week	82,737	141,254
Tonnage waiting	30,000	5,000
Virginian Piers, Sewalls Pt.:		
Cars on hand	1,375	768
Tons on hand	98,950	56,150
Tons dumped for week	78,034	112,826
Tonnage waiting	10,697	5,780
C. & O. Piers, Newport News:		
Cars on hand	1,356	1,618
Tons on hand	67,580	79,345
Tons dumped for week	54,855	77,671
Tonnage waiting	8,200	

Pier and Bunker Prices, Gross Tons

PIERS

	May 24	May 31†
Pool 9, New York	$4.85@$5.00	$4.85@$5.00
Pool 10, New York	4.60@4.75	4.60@4.75
Pool 11, New York	4.40@4.50	4.40@4.50
Pool 9, Philadelphia	4.70@5.05	4.70@5.05
Pool 10, Philadelphia	4.45@4.80	4.45@4.80
Pool 11, Philadelphia	4.30@4.55	4.30@4.55
Pool 1, Hamp. Roads	4.35@4.40	**4.40@4.50**
Pool 2, Hamp. Roads	4.20@4.25	4.20@4.25
Pools 5-6-7 Hamp. Rds.	4.00@4.10	4.00@4.10

BUNKERS

Pool 9, New York	5.15@5.30	5.15@5.30
Pool 10, New York	4.90@5.05	4.90@5.05
Pool 11, New York	4.70@4.80	4.70@4.80
Pool 9, Philadelphia	5.00@5.40	5.00@5.40
Pool 10, Philadelphia	4.75@5.00	4.75@5.00
Pool 11, Philadelphia	4.50@4.80	4.50@4.80
Pool 1, Hamp. Roads	4.35@4.40	**4.50**
Pool 2, Hamp. Roads	4.20@4.25	**4.25**
Pools 5-6-7 Hamp. Rds.	4.00@4.10	**4.10**

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

Quotations by Cable to *Coal Age*

Cardiff:	May 24	May 31†
Admiralty, large	28s.	*27s.6d.@28s.*
Steam smalls	18s.@19s.	*18s 6d*
Newcastle:		
Best steams	26s.	26s.5d.
Best gas	23s.6d.24s.	*22s.@23s.*
Best bunkers	23s.	*22s.*

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

News Items From Field and Trade

ALABAMA

Reports from Jasper, Walker County, state that the Deepwater Coal Co., recently organized by L. B. Musgrove and associates, is preparing to make drillings on the Black Creek seam with a view to locating openings for the development of the property.

The Etowah Investment Co. has leased coal properties from the Raccoon Coal Co., of Gadsden, and will make openings on lands located in the western part of the county.

ALASKA

Operation of a first-aid and mine rescue car to serve all the mines located along the Alaska R.R. in the Territory of Alaska has been arranged by Secretary Work of the Interior Department. A railroad car is to be turned over to the Bureau of Mines by the railroad and equipped with oxygen-breathing apparatus, oxygen tanks, first-aid material and fire-fighting equipment, in addition to living quarters for the safety men in charge. This car will be prepared to answer emergency calls. The plan of safeguarding lives of Alaskan miners was initiated by General Manager Landis of the Alaska R.R. and D. J. Parker, chief engineer of the mine-safety service of the Bureau of Mines, who is looking over the bureau's work in safety instruction in Alaska.

COLORADO

J. B. Elby, government geologist, of Washington, D. C., was in Denver late in May en route to western Colorado and eastern Wyoming, where he will survey coal fields and oil deposits.

ILLINOIS

The Inter-State Fuel & Power Corporation, 313 North Main St., Decatur, has been incorporated with capital of $500,000 to mine and deal in coal and other fuels. The incorporators are M. Harvell, S. O. Harvell, and H. O. Hood.

A meeting of the stockholders and certificate holders of the Lovington Coal Mining Co., of Lovington, was held a few days ago in Decatur and $20,000 of the necessary $40,000 was subscribed. The work will be continued and it is believed that the mine will be reopened and operated.

Clarence Bean, for the past year superintendent of the two mines of the Jewel Coal & Mining Co. at Du Quoin, has resigned to be head of a mine of the Willow Creek Coal Co. at Terre Haute, Ind. **Fred W. Price**, formerly of the Tamaroa, Little Muddy Coal Co., Tamaroa, has been appointed to succeed Mr. Bean with the Jewel concern.

Jewel No. 2 of the Jewel Coal & Mining Co., of Du Quoin, began operations last week. A new crusher was moved from Mine No. 1 to No. 2 and will be used at this time to crush the lump and egg coal into smaller sizes.

The Hart-Williams mine near Benton has been sealed up and probably will not be operated again. The mine, which is one of the oldest large mines in the state was operated for years by the Hart-Williams Coal Co. of Benton. The machinery and most of the equipment was taken over by Pollack Bros., of Herrin, largest junk and machinery dealers in that section of the state.

KENTUCKY

State Banking Commissioner James P. Lewis, Frankfort, has authorized the **Defiance Coal Co.**, of Lexington, to sell $100,000 of preferred stock in the state, under the blue sky law regulations.

It was reported from Owensboro on May 22, that United Mine Workers of District 23, who have been on strike since April 15, were to **start receiving strike relief** on Monday, May 26, announcement to this effect having been made by Lonnie Jackson, district president at Central City, who stated that the international finance agent would arrive on Monday to supervise distribution of supplies. Food and supplies will be issued from commissaries in various parts of the district, and about $25,000 is to be expended in the first relief.

Abner Lunsford, of Stone, who has charge of Henry Ford's coal interests in Kentucky and West Virginia, was recently elected a delegate to the Democratic National Convention which will be held in New York in June.

MASSACHUSETTS

Boston has awarded a contract for 14,000 tons of semi-bituminous coal for the police, public buildings and other departments to the Metropolitan Coal Co. on proposals advertised twice. The coal for the public buildings department will cost $6.32 a ton and that for the police and fire boats $5.95. The Mayor asserts that a saving of nearly $2,000 was effected on the second bids.

OHIO

The mines of the New Lexington Coal Co., the Silver Fox Coal Co., the Caledonia Coal Co. and mine No. 19 of the Sunday Creek Coal Co., in the vicinity of New Lexington, are resuming operations, following a suspension in most cases of about six months.

The Chesapeake & Virginian Coal Co., Inc., announces the appointment, effective May 12, of Thomas R. Morgan, formerly sales manager of the Webb Fuel Co., as western manager, located at 1322 Union Trust Building, Cincinatti.

Ohio coal miners are being urged to produce more coarse coal and less slack as the result of a conference recently at New Philadelphia between coal operators and Ohio officials of the United Mine Workers. The conference was called by W. H. Haskins, Coshocton, operators' commission to improve Ohio coal in competition with West Virginia and Kentucky coal. Lee Hall, president of the Ohio miners, and G. A. Savage, secretary, are said to have agreed to circularize locals in an effort to improve the quality of coal. Half of the 21,000 Ohio miners are idle, but little relief will be felt until a huge reserve of stock is consumed, Mr. Hall said.

The Central States Coal Co., of Toledo, Chas. T. Harther, president, and S. T. Walbolt, general manager, advise that a reorganization of the Defiance Coal Mining Co., in which they are now financially interested, was completed in their office at Toledo, May 28. The following officers were elected: C. P. Harley, president; W. G. Jarvis, vice-president; Carel Robinson, secretary-treasurer. Mr. Robinson is associated with the Central States Coal Co. and manages the other mines in which that company is interested, viz: Rockhouse Coal Co., Blackey, Ky.; the Solar Coal Co., Conda, Ky., and the Bermuda Coal Co., at Chavies, Ky.

PENNSYLVANIA

Payment last week by the Glen Alden Coal Co. of state taxes amounting to $922,231 to Auditor General Samuel S. Lewis brought the total receipts for the first year of the present biennium up to $65,633,679.90. More than a year ago the Auditor General predicted that the receipts for the present appropriation year, ending May 31, would surpass $65,000,000.

Work has been started by Maurice Sullivan, contractor, on the dismantling of the Sloan breaker and shaft of the Glen Alden Coal Company. The timben and machinery are being salvaged. It will take several months to complete the contract.

The Bureau of Mines, Pittsburgh station, proposes to broadcast a message to the chapters of the Joseph A. Holmes Safety Association at 8:30 p.m. (daylight saving), June 6 and 20. A.

C. Fieldner, superintendent of the Pittsburgh Station, will deliver the first address, which will be in referenc to the service being rendered by the Pittsburgh station of the safety association. Mr. T. T. Read, safety service director, who became safety service director June 1, will make the second talk, on the safety work of the Bureau of Mines.

The Baton Coal Co. (George S. Baton), First National Bank Building, Pittsburgh, has taken charge for the Union Trust Co. of the mines acquired at the sale by the receivers of the property of the American Coke Corporation several months ago. The properties consist of American mines Nos. 1 and 2 and beehive ovens at Linn, near Brownsville, and the Sunshine Mine at Martin, both in Fayette County. The mines at Linn are nearly worked out and the Baton company is withdrawing the pumps and will allow them to fill with water, dispensing with the services of the superintendent at that plant, William H. Hardy. The property will be left in charge of a watchman. None of the above mentioned plants has operated since being acquired by the Union Trust Co.

A four weeks' course in coal mining, for which 25 men will be accepted as students, will be given beginning June 16 by the Carnegie Institute of Technology, Pittsburgh, in co-operation with the U. S. Bureau of Mines experiment station. The course, the subjects for which will be prepared with the advice of a committee of coal operators, will include sessions each morning at the institute in mine laws and regulations, ventilation, gases, safety lamps, methods of working, explosives, timbering and mine arithmetic. Afternoon sessions will be held at the experiment station in mine rescue and first aid, coal-dust explosion demonstrations and permissible explosion demonstrations, with lectures. A special examination for firebosses, assistant mine foremen and mine foremen will be given at the station by the State Department of Mines at the close of the course, July 16, 17 and 18.

A class of 247 took the examination in Johnstown last week for first- and second-grade mine foremen certificates and 100 applied for fireboss certificates. The board of examiners is composed of Mine Inspector Nicholas Evans, of Johnstown; George W. Wilkes, of Windber, mine superintendent of the Berwind White Coal Mining Co., and Robert Jones, a miner, of Windber. The board was assisted by John I. Thomas and Thomas D. Williams, both of Johnstown. Additional examinations will be held at State College and in Pittsburgh following the close of the short courses in mining at Carnegie Tech. and State College on July 15.

TENNESSEE

O. P. Pile, Chief Mine Inspector, and the Examining Board will hold a mine foremen's examination in the Federal Building, Knoxville, June 3, 4, 5, 1924.

WASHINGTON, D. C.

C. Lorimer Colburn, who is promoting the Joseph A. Holmes Safety Association work for the U. S. Bureau of Mines, will soon make a trip to Norton, Va.; Knoxville, Tenn.; Birmingham, Ala.; Baton Rouge, La.; Bartlesville and McAlester, Okla.; St. Louis, Mo.; southern Illinois and Vincennes, Ind., thence returning to Pittsburgh.

WASHINGTON

Examination and prospecting of six sections of land south of Wilkeson and adjoining that property, under the direction of Mel C. Butler, proved the continuation of the Wilkeson seams and also revealed three additional seams, making seven seams of high-grade of coking coal containing considerably over 25,000,000 tons. The Pacific Coke & Coal Co., will develop the property through a tunnel some two miles long which will cut all the seams on both dips. The company expects to produce 2,000 tons of washed coal per day. E. F. Lawson is manager of the company and Mr. Butler is engineer-superintendent.

Ira Clemens

President of the Clemens Coal Co., Pittsburg, Kan., and one of the new vice-presidents of the National Coal Association named at the Cincinnati meeting.

WEST VIRGINIA

The Coal River Collieries Co. has increased its capitalization from $2,500,000 to $5,000,000 and the American Eagle Colliery from $400,000 to $500,000.

Construction work has been started by the Philadelphia & Cleveland Coal Co., the Logan Dock Co. and I. R. Ingersoll, of Cleveland, on a coal dock for the Ohio River at Huntington, to cost approximately $600,000.

The following coal companies have been dissolved as corporations: Thomas Smokeless Coal Co., Plum Eagle Coal Co., High & Low Volatile Fuel Co. The Anchor Coal Mining Company has been dissolved by deed of sale. The New River Collieries company has withdrawn from the state.

The property of the Barbara Mining Company on Scott's Run in the Monongalia field was sold at public auction on May 24. This is a fully equipped mining plant operating in the Waynesburg seam. The sale included company houses, tipple, siding, trackage and other mining equipment and machinery.

D. C. Jones has been designated as receiver for the Carry-On Coal Co., a Huntington corporation capitalized at $200,000, by Judge Thomas S. Shepherd in the Circuit Court of Cabell County. H. S. Brown, who with his wife, owns a controlling interest in the company, asked that a receivership be appointed in connection with a pending chancery suit against the company.

At a special convention of the miners of District No. 17 held at Charleston a resolution was adopted calling for abolition of the four subdistricts in the district, subject to a referendum of the members of the union in the district, in order to reduce operating expenses. At the same time a policy was formulated providing for the strictest economy possible in the conduct of the affairs of the district. Such action became necessary in order to meet conditions now confronting the organization in its effort to maintain its existence in northern and southern West Virginia, for with membership greatly reduced the union has not been able to pay any strike benefits where circumstances appeared to call for it.

The statement in *Coal Age* of May 22 that the Elkhorn Piney Coal Mining Co. had closed its Huntington offices was a mistake. The company has curtailed the personnel of its Huntington office but the office is still in operation. D. T. MacLeod, who resigned as of Jan. 1, 1924, has been superseded by George W. Mackie.

The Circuit Court of Monongalia County has sustained the exceptions to the answer of the defendant in the injunction proceedings of the Chaplin Collieries Co. against the Pursglove Coal Mining Co. involving the right of the defendant company to mine all of the coal beneath the Sewickley coal of the plaintiff company. This case, as has already been stated, involves the mining laws of West Virginia as well as the question of mine rights.

After a delay of about two months, the Bertha-Consumers Company has signed the Baltimore agreement. The contract between the company and the union was signed at Pittsburgh at a meeting between John H. Jones, president of the company, and Percy Tetlow and others representing the United Mine Workers. Inasmuch as the contract is effective at once, it is understood that President Jones contemplates a resumption of operations at the Bertha mine at Maidsville in the near future.

Receivership proceedings having been instituted against the Beckley Pocahontas Coal Co. in Cabell county. A. P. Grady, of Huntington, has been appointed receiver by the court. Those familiar with the case are inclined to believe that the company will be able to right itself and that its affairs will be worked out satisfactorily. This company has its mines at Besoco, in Raleigh County, on the Stone Coal Branch of the Virginian Ry. as well as on the Chesapeake & Ohio Ry. There are about 2,000 acres of smokeless coal

under lease, with about 18,000,000 tons available. Under present equipment the property is able to produce from 18,000 to 20,000 tons of coal per month.

The Consolidation Coal Co. adopted a centralized system of purchasing, effective June 1, by which this phase of the company's business is conducted from the company's main offices in the Watson Building, Fairmont. This will eliminate the division purchasing offices at Somerset, Pa., Frostburg, Md., Jenkins and Van Lear, Ky., and Coalwood, W. Va., all of which are grouped in Huntington with A. T. Watson as general purchasing agent and F. C. Davis as assistant purchasing agent.

WYOMING

Miners for the Rock Island Coal & Mining Co. at Hartshorne struck May 20 when the company refused to permit them to go back to open-flame carbide lamps. Electric lamps had been adopted but ruled against by Ed. Boyle, mine inspector. The company has appealed to the federal court to enjoin Boyle from interfering with the safety program.

Promotions in the personnel of the Union Pacific Coal Co. have been made by President Eugene McAuliffe to fill the vacancy caused by the death of E. S. Brooks. George B. Pryde moves up from general superintendent to the vice-presidency and general managership of mines, A. W. Dickinson is advanced from safety engineer to general superintendent and John A. Smith from engineer to safety engineer.

CANADA

Sir Stephenson H. Kent and Sir John Scott Hindley, British coal dealers, are in Montreal with a view of establishing in connection with local distributors a new company to deal with the Canadian trade. It will be known as the British Canadian Coal Co. and will be operated in connection with the Canadian Industrial Coal Co., Ltd., Sir Stephenson Kent said in an interview: "We do not anticipate sending over sufficient quantities to appreciably affect the amounts received from American mines." He pointed out that the English collieries must have a market to enable them to maintain steady production. The mines being made much deeper than those of the United States, requiring large capital and heavy overhead charges, could not be worked on short time with low production without entailing a loss.

Following a conference in Toronto between Premier Ferguson and various interests concerned in shipping Alberta coal to Ontario, it was announced that Ontario and Alberta jointly would submit a new proposal to the Canadian National Rys. to the effect that two solid trainloads of Alberta fuel be sent eastward and that these trainloads be made a practical test of cost per ton of transportation.

At last account there was no indication of any termination of the deadlock existing between district No. 18 of the United Mine Workers, embracing Alberta and eastern British Columbia, and the Western Canada Coal Operators' Association. The miners have been on strike since April 1 and neither side is inclined to make any move in the direction of conciliation or the reopening of negotiations.

The Princeton, (B. C.) Colliery Co. has been incorporated in London, with a capital of £1,100, to take over and operate the Princeton Coal & Land Co.'s coal mines and town sites. This appears to be a reorganization with nominal capitalization. The Princeton Coal & Land Co. is capitalized at $1,000,000, and for several years has been operating a small coal mine and developing prospects near Princeton, besides selling land in the town.

The Mineral Tax Act of the Province of Alberta has been disallowed by the Dominion Government on the ground that it interfered with Dominion rights and was in conflict with Dominion policy and interests. The public lands of the western provinces belong to the federal government and the mineral rights are reserved when the lands are disposed of. The Alberta act provides for the collection of the tax by distraint upon the equipment and plant of the lessee, which often is the only security the federal government has for the payment of rent or royalties. The act was therefore declared *ultra vires.*

Courtesy U. S. Distributing Corp.

"Fording" Through a Mine Entry in Wyoming

This scene was taken in the Monarch mine. The seam reaches a thickness of 40 ft. so this picture gives only a partial idea of the depth of the deposit.

New Companies

The new Bevier Coal Co., Cleaton, Ky., capital $100,000, has been chartered by John W. Price, John W. Bastin and R. S. Lytle.

The Paramount Fuel Co. of Illinois, with a capital of $30,000, has filed articles of incorporation in Missouri, with headquarters in Kansas City and with a capital of $10,000. The company will mine coal and sell coal and coke. The principal agent in Missouri is Julius C. Smith, of 524 Dwight Building, Kansas City.

The Valentine Coal Co., of Kansas has filed articles of incorporation with the Secretary of State at Jefferson City, for Missouri, with a capital of $60,000 and headquarters in Worland. The company will carry on a business of mining, stripping and selling coal. A. A. Grimmel of Worland is the principal agent in Missouri.

The Missouri-Oklahoma Fuel Co. has been incorporated at Muskogee, Okla. with a capital of $100,000. The incorporators are William McKinnon, of Kanima; E. H. Mills, of Springfield, Mo., and E. D. Holley, of Stigler, Okla.

The Vanzandt Coal Co. has been incorporated at Gadsden, Ala., with a capital stock of $2,000 and will begin mining operations near Altoona. W. A. Booker is president and W. M. Booker, secretary-treasurer.

The Portage Coal Co., Kenmore, Ohio, has been chartered with an authorized capital of $125,000 to mine coal and deal in coal and coke at both wholesale and retail. Incorporators are S. M. Ranger, B. R. Felt, D. S. Felt, S. H. DeLong and L. C. Wogan.

A Dominion charter has been granted to the **McMaster Coal & Transportation Co., Ltd.,** Montreal, Canada, who engage in business as manufacturers, operators and dealers in coal and all its byproducts. The authorized capital is $50,000 and the incorporators are Montreal lawyers.

Industrial Notes

The Pulaski Iron Co., of Eckman, W. Va., has completed arrangements for the installation of a "Rands" shaker loading boom to be used at the tipple of the company at Eckman. The contract for the installation has been awarded the Roberts & Schaefer Co., of Chicago.

Construction work has been started at Whitman, in the Logan county field, on a new steel tipple which will rank as one of the best in southern West Virginia. It is to cost approximately $100,000 and will replace a wooden structure now in use. The tipple will be ready for operation about Sept. 1.

The Blackwood Coal & Coke Co., of Blackwood, Va., has contracted with the Roberts & Schaefer Co., for the complete installation of concrete storage bins and tipple at their new operation at Calvin, Va. The tipple will be complete with revolving dump and reinforced concrete storage bins of a capacity of 2,500 tons. In connection with the storage bins will be built a steel Marcus tipple.

L. D. Albin, formerly general sales manager of the **Ingersoll-Rand Co.,** 11 Broadway, New York City, has been elected vice-president in charge of European sales of that company. D. C. Keefe, formerly assistant general sales manager, has been appointed to succeed Mr. Albin as general sales manager.

Traffic News

Buffalo-Twin Cities Rate Boost Effective July 1

The Wabash R.R. has given notice that the increase in rate on hard coal from Buffalo to the Twin Cities, amounting to $1.16 per gross ton, becomes effective July 1. It was expected to go into force May 29, but it was not possible to get out the new tariffs in time. Retailers who specialize in all-rail hard coal have been rushing deliveries through in advance of the new rate, and are going to be pretty well stocked up. The dock concerns state that they do not expect to advance prices in the Twin Cities because of the virtual elimination of all-rail competition.

Obituary

Ray M. O'Connell, 27 years of age, died at his home at Delhi, a suburb of Cincinnati, on May 26. He had been in the coal business all of his business life. Was associated with the Western Coal Company and afterward a partner in the Southeastern Coal Co., resigning a year ago to go into business for himself. Early this year he was stricken with typhoid fever in Cumberland, Md. He had been out only a month when he took the boat ride at the convention of the National Coal Association, where he contracted a cold that turned into pneumonia resulting fatally.

W. L. Davis, attorney, of Lexington, Ky., died at his home there on May 22 after a short illness, of apoplexy. Mr. Davis has long been associated with Colonel Dudley, of the Kentucky River Land Corporation, which owns large acreages in the Hazard district under production of coal. With Colonel Dudley and others he was a large stockholder in operations in Perry and Clay Counties, Kentucky.

Recent Patents

Method of and Means for Extinguishing or Suffocating Explosion in Mines; 1,476,624. Hermann Kruskopf, Dortmund, Germany. Dec. 4, 1923. Filed July 7, 1920; serial No. 394,597.

Byproduct Coke Oven; 1,476,524. Z. H. Kevorkian, Fairfield, Ala. Dec. 4, 1923. Filed July 7, 1919; serial No. 309,192.

Peat-Fuel Machine; 1,476,407. Alexander McDougall, Duluth, Minn. Dec. 4, 1923. Filed Dec. 30, 1922; serial No. 609,788.

Apparatus for Loading Coal; 1,476,882. John A. Forsyth, Nemacolin, Pa., assignor of one-fourth to Clyde J. Smith, Uniontown, Pa. Dec. 11, 1923. Filed Oct. 19, 1921; serial No. 508,712.

Mining Machine; 1,476,726. Thomas E. Pray, Chicago, Ill., assignor to Goodman Mfg. Co., Chicago, Ill. Dec. 11, 1923. Filed Aug. 3, 1921; serial No. 489,517.

Loading Apparatus for Mining; 1,476,897. Nils D. Levin, Columbus, Ohio, assignor to the Jeffrey Mfg. Co., Columbus, Ohio. Dec. 11, 1923. Original application filed Oct. 22, 1910; serial No. 588,471. Divided and this application filed March 6, 1918; serial No. 220,818. Renewed April 30, 1923.

Association Activities

The Buffalo Bituminous Coal Association held its annual meeting May 27 and elected Harry F. Coxon, Fred A. Mohr and Gurnsey Camp, trustees, Harold B. Alderman and C. J. Renwick holding over. On the following day the new board, according to rule, selected from its own body the following officers: President, Harold B. Alderman; vice-president, Harry F. Coxon; secretary-treasurer, C. J. Renwick; delegate to the convention of the American Association at White Sulphur Springs, retiring President C. F. Westfall.

The Toronto Wholesale Coal Association held its annual meeting and luncheon recently and elected the following officers: President, Fred A. Fish, of the F. A. Fish Coal Co.; Vice-President, W. H. Cox, of the Cox Coal Co.; Secretary-Treasurer, K. Thompson, of the Dunlop Coal Co. Only routine business was transacted at the meeting.

Publications Received

Coal Resources of the Raton Coal Field, Colfax County, New Mexico, by Willis T. Lee, U. S. Geological Survey, Washington, D. C. Bulletin 752. Pp 254; 6x9 in.; illustrated. Describes the geologic features and coal resources of the developed part of the Raton coal field.

Stone Dusting or Rock Dusting to Prevent Coal Dust Explosions, as Practiced in Great Britain and France, by George S. Rice, Bureau of Mines, Washington, D. C. Bulletin 225. Pp. 57; 6x9 in.

Central District Bituminous Coals as Water-Gas Generator Fuel, by W. W. Odell and W. A. Dunkley, Bureau of Mines, Washington, D. C. Bulletin 203. Pp. 92; 6x9 in.; illustrated. Covers work done under a co-operative agreement between the Bureau of Mines, Illinois State Geological Survey and the Engineering Experiment Station of the University of Illinois, with the hope of helping the gas industry during the latter period of the war and of promoting the use of Central District coals for gas making.

Bankruptcy Reform. The Merchants Association of New York. Pp. 116; 6x9 in. Report by the Committee on Bankruptcy appointed by the President in 1922.

Coming Meetings

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

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

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

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

Colorado and New Mexico Operators' Association. Annual meeting June 18, Denver, Colo. Secretary, F. O. Sandstrom, Denver, Colo.

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

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

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

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

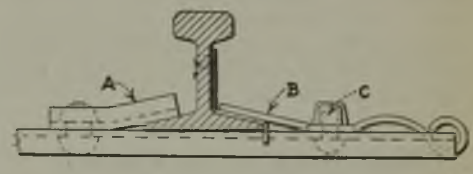
Rocky Mountain Coal Mining Institute. Summer meeting, Aug. 7-9, Rock Springs, Wyo. Secretary, Benedict Shubart, 521 Boston Bldg., Denver, Colo.

New Equipment

Another Metal Track Tie

For more than 14 years, many different kinds of metal ties have been placed on the market. S. M. Casterline, of Crafton, Pa., has lately designed a tie which, he claims, overcomes many of the disadvantages of other ties.

In the illustration, cleat *A* holds one flange of the rail and is riveted to the tie, which is of the usual steel channel construction. Strap *B*, fastened to the tie by means of a circular collar holds the other flange of the rail. In the strap is a longitudinal slot, so that when it is swung inward to extend over the flange of the rail, the upper end of the stud *C* projects through the slot. A track spike or any piece of wood or metal may then be forced through the stud, thus jamming the strap down in position and holding it there. It is claimed that one of these ties can be put in position or released in a moment's time with very little effort.



Boltless Mine Tie

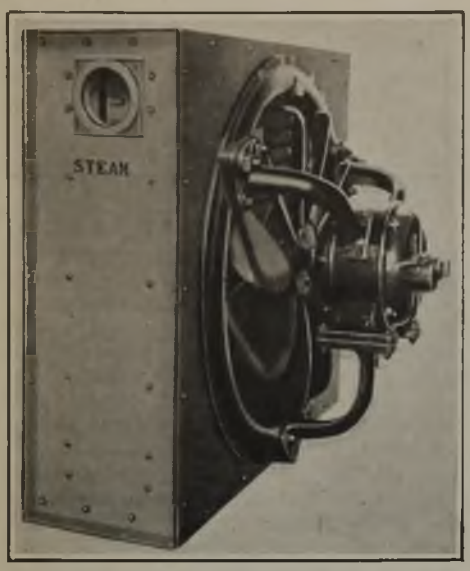
Cleat *A* holds one side of the rail and strap *B* the other. The end of the strap fits into the slot *C* and locks the strap in position.

Fan with Heating Unit

A new device has just been placed on the market by the American Blower Company, Detroit, Mich., for heating the air entering warehouses, offices and other buildings. Its light weight and rugged construction make it applicable to installations where ordinary heating units would be cumbersome and impracticable. Steam coils in the heater are made from copper and brass, which offer much less resistance to the heat. The arrangement of the tubes, it is claimed, is such that approximately five times as much heat is transferred to the air as is usual with similar heating devices.

The tubes are made of straight, seamless, copper and brass tubing, upon which is a helically wound copper ribbon forming a continuous fin. This fin is shaped so that a large part of its surface is in contact with the tube. The construction insures easy transmission of heat from the tube to the fin and from there to the air passing over the pipes.

Standard heaters are built to withstand a pressure of fifty pounds of steam, liquid, or any commonly used vacuum. All materials used are of non-corrosive metals insuring long service even under severest conditions. A disk type fan driven by a standard motor is part of the unit and is usually supplied with all orders.



Motor-Driven Air Heating Unit

This heater provides means for controlling the ventilation and temperature of the air in offices or warehouses. A fan circulates the air around steam heating coils designed to warm the incoming air and prevent drafts.

The most efficient way to install the heater is to place it in a steel housing designed to take in cool air near the floor, and discharge it about 7 ft. higher. This insures complete circulation of the air within the range and capacity of the fan.

Transformer for Electric Arc Welding

The American Transformer Co., 178 Emmett St., Newark, N. J., has just developed a new air-cooled welding transformer. The secondary coils are constructed of heavy drawn-copper strips and the terminals are braised to the winding at each turn. This arrangement obviates the necessity of cast copper terminals clamped to the winding and has made it possible to design the transformer for 750 amps.

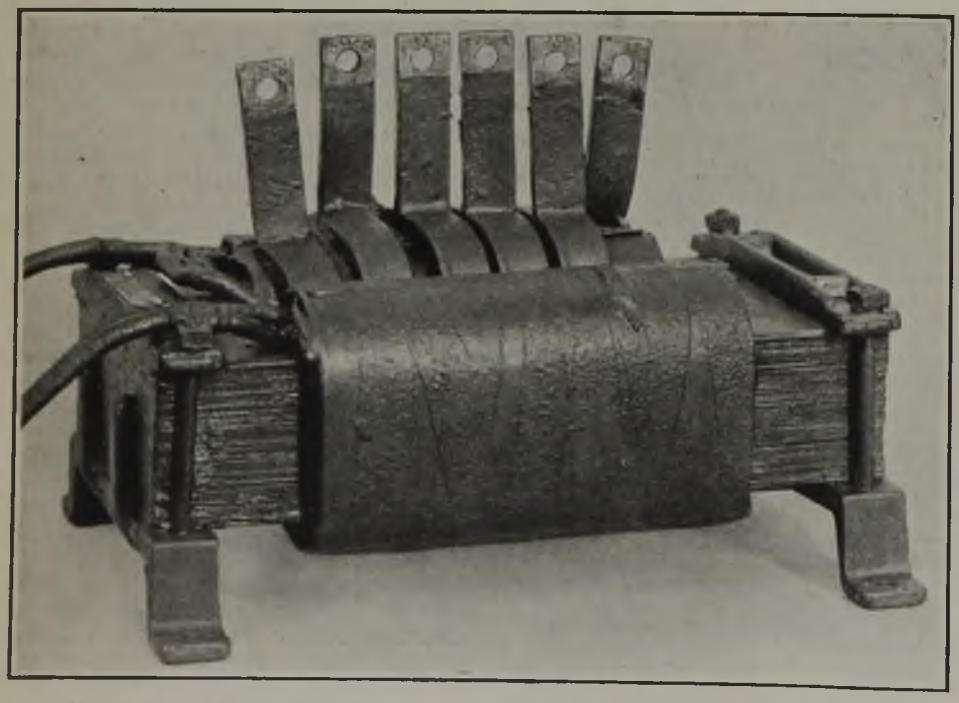
The primary circuit consists of two coils so arranged that the transformer may be used on 110-volt or 220-volt circuits. The secondary winding is split into five sections so that from 0.67 to 3.35 volts can be obtained. The transformer is rated for 1 kva. and is for use on 60-cycle circuits. It is particularly suitable for operation on lighting circuits and will no doubt be found very useful wherever high currents are desired.

Relay Indicates Current Flowing in Line

After an accident has happened to a power line or a piece of electrical machinery many have wondered why the protective equipment did not function to prevent the disturbance. Frequently an investigation showed that the protective relays did not function properly, were out of order, or were not even connected in the circuit as was supposed.

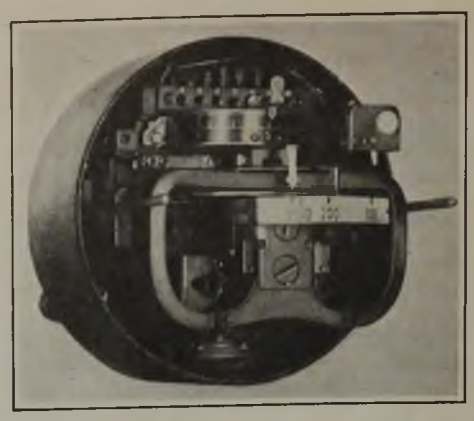
To meet such conditions the Westinghouse Electric & Mfg. Co. have recently placed on the market an improved-type induction relay, with an indicating scale which shows the value of the current flowing in the line. This new feature obviates many difficulties, and removes, beyond the question of a doubt, any confusion in a electrician's mind, as to whether or not current is pasing through the relay and it is ready to trip a circuit.

There are other advantages of such an indicating relay, it shows the current flowing in a line and directly impresses the electrician or engineer with the difference between the actual current flowing in a line due to poor power factor, and the estimated current which one might think should be flowing. Unbalanced, three-phase circuits are very easily detected by this relay. This is especially important on three-phase, grounded-neutral systems. Many three-phase machines and transformers are now working under conditions where they cannot deliver their full or expected kilowatt capacity, because of unbalanced conditions, existing on the lines unknown to the electrician.



Transformer with High-Current Secondary

There are no clamped or soldered connections in the windings of this transformer. Such a detail makes it particularly suitable for alternating-current welding, high-current testing and pipe thawing. Taps can be easily made to the copper lugs.



Instrument Protects Equipment and Discloses Unbalancing

Such a device as this takes much of the guess work out of properly setting overload relays. It immediately indicates any unbalancing of three-phase circuits when used in conjunction with two other similar relays.

New Ball-Bearing Pump

The Ives Manufacturing Co., 203 Hanover St., Baltimore, Md., has recently placed on the market a direct-gear-driven ball-bearing shallow well pump. This unit consists of a single-cylinder, double-acting, brass-lined column pump made in several sizes. It is compactly designed and accessible for repair. It is driven by an eccentric shaft working at all times in oil. Noiseless operation is obtained by the use of soft-rubber valves fitted on renewable bronze seats. The capacity of the pump is 120 gal. per hr., and it is driven by a ¼ hp. high-torque motor with automatic pressure control.

Small Single-Cylinder Pump

Being brass-lined and having bronze valve seats this unit is quite practical for pumping small quantities of mine water.