

# COAL AGE

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## Railroads Might Stimulate All-the-Year-Round Buying

**S**PASMODIC interest in the purchasing of coal during the summer is stirred up by various public bodies, and this is indeed well, but the delaying habit is so strong in the public that, if we wish to stir the buyer to continuous action, we need continuous advertising. The railroads are just as much interested as the coal companies, so why do they not advertise by putting a placard conspicuously in their waiting rooms, explaining that the interest of the consumer is to have an unfluctuating market to buy in without shortages and without gluts?

It should be easy to convey to the consumer the story that coal shortages cause prices of coal to rise as they also raise the prices of grain, and it should be easy to show him that both coal and transportation must be excessively costly when both mine and railroad have to be kept competent to do in a few months what could just as well be spread the year through.

Furthermore, it could be urged that a little more foresight on the part of the consumer would keep the miner and railroad employee steadily at work and would maintain a market for the manufacturer and tradesman throughout the year. The railroads, in fact, should advertise the value of steadying markets as helpful to everybody. The idea has not been sold. How could it have been, seeing that it has not been advertised?

## John and Warren Wrangle

**T**HIS monkey-and-parrot time of it that John and Warren are having amuses us. Here is Warren, president of the Brotherhood of Locomotive Engineers, a powerful and normally sane labor union, trying to run a labor-owned coal company down in West Virginia on a business basis—which means he wants to produce coal at wages that will permit the company to break even or maybe declare a dividend. And here is John, president of the United Mine Workers of America, lambasting him for doing it. What Warren ought do with his union-owned Coal River Collieries, if he can't run them without loss at the high wages dictated by John at Jacksonville, is to do it anyway, and hand out to miners the engineers' investment of \$3,000,000 as long as it lasts. That's the way to run a business. Any union mine official will tell you so.

But this labor union, the Brotherhood, has been learning something about competitive business during the last few years. It has been running a bank for one thing. Of course, that may not have been as competitive as some enterprises, partly because a large volume of depositors and investors was guaranteed before the bank even opened its doors. But it was sufficiently competitive so that Warren and his fellow engineer bankers didn't invest much of the money in pure altruism.

When John asked for a big miners' strike loan in 1922, for instance, secured only by John's name in bold black ink, Warren said, No. He wanted to make the loan on a business basis or not at all. He was in the banking business and the bank had to work for what it got. This made John mad. Also it made John pretty mad to think the decently-paid engineers would not quit work and tie up the railroads to help the miners win their strike; but that is only incidental to the present hot time between John and Warren—oh, purely incidental!

And then Warren and the boys who pull the country's throttles bought the Coal River properties. They paid the union scale and tried their best to make the thing go. They probably did everything humanly possible to make it a success on a union-scale basis. But they were in business, and they found that economic forces sometimes cannot be met with thunderous phrases about "no backward step" and the like.

Maybe John can get by that sort of thing, as his income is all collected for him from his own rank and file by the coal operators, no matter whether the rank and file thinks it is a good investment to make or a punk one. But Warren had to get his money in a business. So he told his union miners the jig was up. Either they worked for enough less to make it possible for him to stay in business or down went the mines and nobody worked. So the mines were closed down. Warren at least wouldn't reopen non-union. John ought to give him credit for that.

But John doesn't credit him with anything much, except with "joining other coal operators of West Virginia in an attempt to starve the employees into acceptance of a wage reduction." This is "an intolerable position for a coal company whose stock is largely owned and whose affairs are directed by union men." However intolerable it may be, the locomotive engineers still have the \$3,000,000 they invested in the Coal River Collieries and are probably in position to earn something on that investment if they ever get a chance to run their mine on a business basis. But the fact that they recognize the economic law of supply and demand certainly riles John.

## Summer Coal

**A** GREAT wonder to American tourists who visit Europe during the winter is the extreme coldness and discomfort of the houses heated by inadequate grate fires in front of which one must turn like a spit in order to be toasted on both sides. The reason probably for the meager heating is that the winters are so moderate that the problem of house warming never had to be settled right. Whether that is the real reason one cannot say. Certainly it has never been rightly settled—at least not in Europe.

But while we wonder at Europe freezing in the winter, have we not reason to marvel at the way in



which America swelters in summer? The captain of industry finds his home and his office unbearably hot. He discovers that he must take a long vacation to the mountains, at the shore or in his yacht. If he stays in the city, he gets nine kinds of stiff neck from the fitful breezes of his office fan, which disturbs his papers and delivers to his desk the dust-laden air of the city street.

We have borne with this nuisance so long, however, that it never seems to occur to us that we could have rooms regulated by a thermostat to any degree of heat. We could cool, clean and move the air so that it would give us comfort and allow us to retain all those habiliments that go with dignity—coats, vests, collars and cuffs. Why should not comfort in the summer be as important as in the winter? The Englishman with his draughty house and bucketful of glowing embers is not more sad than your American with wilted collar, perspiring forehead and stiff neck. Some day we shall rise to a superiority over the rises of the thermometer as we have over its downward plunges.

What temperature shall we endeavor to attain? That is a matter for determination. Perhaps ten or fifteen degrees below that of the outside air—a temperature high enough not to chill us on leaving the street but cool enough to keep us active and capable of performing a good day's work, despite the heat. At night we shall sleep and gain strength for the morrow's toil instead of fitfully tossing and watching the passing hours.

The problem of conditioning air is not a new one. In a deep metal mine, the St. John del Rey, the miners are being supplied with artificially cooled air. In many hot American metal mines large volumes of air are being circulated for the purpose of reducing the temperature. The work of the miners is greatly increased by the change, so much so that the companies recognize ventilation as a source of extremely valuable economies. In the textile factories the air is regulated but rather as to its moisture than as to its temperature. If such provisions are made in industry why should they not be provided for comfort?

After a while the electric companies will be buying coal to provide for the demand for summer ventilation and for the operation of air-cooling water sprays. Where ammonia is used, the householder will be using coal to operate his private refrigerator plant and we may find ourselves questioning one another: "Have you bought your summer coal?" Coal men will miss an opportunity if they fail to awaken the public to the advantage of conditioned air.

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### Manufactured Fuels Filling Need for Smokeless Coal

**O**NE POTENT phase of the fuel situation is becoming increasingly important from year to year. This is the production of smokeless fuel. Heretofore the really smokeless coals, so far as the ordinary householder is concerned, have practically all come from the anthracite region of Pennsylvania. The limits of this field have been established with a fair degree of accuracy; both the quantity of coal mined and that yet left in the ground have been computed closely. It may be stated with a reasonable degree of certainty that the anthracite deposits of Pennsylvania will be exhausted within the course of approximately the next

century. Long before that time has arrived the country must have developed a satisfactory substitute fuel.

Though there is doubtless room for improvement in existing anthracite substitutes, nevertheless several such fuels have already reached a fair degree of perfection. The most common of these is probably coke, either byproduct, beehive or gas-house. This fuel being bulkier and more porous than coal must be treated in the ordinary house furnace somewhat differently from anthracite. As it burns with an intense local heat it is liable to warp the firepot of a house furnace unless this is surrounded with water. Its use is most successful in steam and hot-water furnaces.

Of the various other substitutes only two as yet have become important—gas and briquets. Gas possesses the advantage not only of being smokeless, but also of being ever-ready and requiring no kindling for its ignition. It is probably the most convenient fuel known and makes a fire that may be readily controlled throughout its entire range of heat-generating possibilities.

Briquets were at first regarded by the average householder with more or less suspicion. Although those first made in this country were of somewhat doubtful quality, the later product has been much improved. Today it is entirely possible, through a proper heat treatment of the briquet after pressing, to obtain a fuel that is at least as smokeless as anthracite, even though the coal from which it is made is rich in bitumen and consequently decidedly smoky when burned raw in an ordinary furnace.

In making a smokeless domestic fuel from a high-volatile coal it is quite possible to recover certain byproducts which in some degree at least tend to pay for the manufacturing process. While it is a comparatively easy matter to enforce local smoke ordinances against the big industrial plant, it is an entirely different proposition to enforce the same regulations against the small householder, whose name is Legion. It would seem therefore, that our cities will not be devoid of smoke until a smokeless fuel is not only available to the ordinary householder but until it has become economically advantageous for him to burn such fuel in competition with raw coal.

Briquets meeting with the most ready sale today are those either manufactured from fine anthracite or from bituminous coal which has been so heat-treated as to drive off practically its entire content of volatile matter. In treating the highly bituminous coals, with which nature has so richly endowed North America, in such manner as to render them smokeless, in addition to various byproducts, two excellent fuels, both of which readily burn to carbon dioxide and water vapor are produced. Thus while raw soft coal can be burned smokelessly only with difficulty gas and coke or heat-treated briquets may be burned to invisible vapor without appreciable hindrance.

This country's supply of bituminous coal is almost limitless; its store of naturally smokeless coal must soon be exhausted. Already several processes are available whereby excellent smokeless fuels may be made from inferior natural products. The use of these fuels must naturally increase from year to year. Fortunately, smokeless manufactured fuels—coke and briquets—are superior to the natural product in heat content. Furthermore as a rule they contain less ash.





Mud Sprayer in Action

## Is Mud Equal to Rock Dust For Mine Protection?

Utah Superintendent with Plenty of Air-Slacked Shale at Hand Saves Grinding Costs by Mixing Dirt with Water and Spraying It Through Rooms and Entries from Home-Made Pumping Machine



Mud-Sprayed Heading

WHY not "mudize" a coal mine instead of rock dusting it? If the same degree of safety from coal-dust explosions can thus be attained at one-fourth the cost and with greater ease, then why not do it? Many a coal-mining man in the Rocky Mountain regions has been asking himself these questions since the idea of "mudizing" was conceived by W. J. Reid, superintendent of the Lion Coal Co.'s mine at Wattis, Utah. If air-slacked shale, adobe or other easily friable clays can be mixed with water and effectively sprayed on coal-mine roofs, ribs and roadways, is there any good reason why a mining company with such material available should go to the trouble and expense of pulverizing hard rocks or shales for the purpose?

As yet nobody knows positively that the new mud process is as efficacious as the better known fine, dry rock dust. Even Mr. Reid, who is better informed than anybody else, being the only man who has done the thing extensively, cannot be positive; his mudized territories have never met the test of a spreading mine explosion. Although pretty well convinced and unable to see any good reason why the scheme should fail, he is trying his best to prove or disprove the theory. Right now he is running a series of tests in a 50-ft. length of corrugated iron pipe such as is used for storm culverts under highways. He is mudizing sections of the interior of this pipe to see whether coal-dust explosions will jump the protected areas. Also he is figuring up every other kind of trial he can think of, short of a mine explosion, to determine just what effect the mud will have under all circumstances.

His mudizing idea is attracting widespread attention, as is his patented mud-spraying machine for mine use, which is still in the development stage. The mine inspectors of Utah have not yet put their stamp of approval on mudizing, but they are watching it closely. Since rock dusting is required in Utah under the new state mine safety code, it is difficult to say whether mudizing can be interpreted to mean rock dusting; but nobody is putting anything in the way of proving out

the idea and eventually it may be accepted as standard rock-dusting practice.

Mr. Reid says the mudizing idea dawned upon him while he was watching a machine shoot cement onto outside wooden construction to render it fireproof. If cement at so much a hundred pounds was a protection against fire, why wouldn't ordinary air-slacked Utah shale, mixed with water, do just as good a job at next to nothing a hundred? The hills all around the Wattis mine are full of the right sort of dirt. In fact, at one point close to the tippie, at the bottom of the long tramway that brings the coal 1,000 ft. down the mountainside from the mine, a bank of this dirt located in a small cut constantly sloughs off and slides down over the track. It has to be shoveled away and is a constant harrassment. Why not see if it could be put to use?

A little of this dirt was shoveled through a screen to remove broken rock and the coarsest of the material. Then it was mixed with water and put through the gunning machine. It stuck to the woodwork splendidly. But did it really fireproof the wood? To find this out, Mr. Reid picked up some broken pieces that were thoroughly covered and carried them home. Into the cookstove they went while a hot fire was burning. He let them lie there for several minutes and then lifted the lids, wondering whether he would see wood ashes to mark a failure of his idea.

### MUDIZED WOOD NEARLY EXTINGUISHES COAL FIRE

The sticks of mudized wood not only lay there unburned; they had almost put out the coal fire itself. So in this way, at least, the method was effective.

The next day a scheme for mudizing the whole wooden weighhouse and tippie went into effect. A shortage of water in the region at the time made it advisable to render the tippie as fireproof as possible and it was done with just plain mud from the mountainside. Today that wooden tippie is plastered with it, and the Lion Coal Co. expects no loss by fire.

Thence the idea spread to the mine. If mud worked well in the tippie it ought to be good protection against

### MUD VERSUS ROCK DUST

Not any too much is known yet about "mudizing" mines; but from present knowledge it seems that such mining companies as have available a supply of the right kind of dry, loose clay or air-slacked shale certainly can shovel it through a screen into a tank full of water and spray the resultant mud through rooms and entries much cheaper than they could rock dust the same areas. The mud has other advantages that rock dust hasn't, as explained in this article. But there is one big main question yet to be answered: Will this mud stop an explosion that has been initiated elsewhere? It is evident that the mud, when it has thoroughly dried on roof ribs and floor, presents a slightly dusty surface. But it remains to be proved whether this is dusty enough. In any event, many mining men are watching Superintendent W. J. Reid's work with interest.



the inflammability of coal dust. So Superintendent Reid went to work on the problem of mudizing the mine.

He devised a crude machine mounted on a mine-car truck, in which dirt and water could be mixed and pumped by a centrifugal pump through a peculiar flat nozzle that produced a well-divided spray. With this device mud was plastered through considerable lengths of entry. Many changes have been made in the machine from time to time and much experimenting has been done to learn just what the paces of the device are. Thus



Close-up of the Mud Slinging Tank

The machine, which is self-propelling, bears a tank 10 ft. long and 4 ft. wide capable of holding a ton of shale dirt in a one-to-two mixture of water. A 20-hp. motor, drawing power from the trolley line, drives the truck and runs both the stirring paddle wheel which keeps the mud in suspension and the centrifugal pump which sprays the liquid through the nozzle. The mud is delivered onto a fan-shaped plate and is deflected by blades set on the face of the plate. It costs but 50c. a ton to load this machine for service and with it one operative can cover from 2,500 ft. to 4,000 ft. of entry 20-ft. wide in a day.

far the Lion Coal Co. is eminently satisfied with its performances, and the Wattis mine will soon be mudized from portal to rooms.

The mud is first shoveled from the thoroughly slacked face of a shale bank near the tippie. It goes through a twenty-mesh sand screen directly into a pit car and is then ready to be hauled up the tramway to the mine. The cost of this "preparation" probably is not over 50c. per ton. This is far less than the total cost of producing and grinding ordinary mine shale.

About a ton of the material is loaded from the pit car into the tank of the mudizing machine with water in the proportion of about three to one by volume. The mixture is kept constantly stirred by the machine and is discharged by the pump through the nozzle as the machine runs slowly through the mine under its own power.

The average application varies in thickness from  $\frac{1}{8}$  to  $\frac{1}{2}$  in. The liquid seems to penetrate perfectly into cracks and crevices and to effect complete coverage of all exposed surfaces on roof and ribs. Though the angle of deflection from the fan-shaped nozzle is such that the mud does not strike directly upon any mine surface lower than a line 30 in. or so from the floor, the ribs below that line are well splattered and the roadway is heavily encrusted.

#### MUD SPRAY WASHES DUST DOWN

The first effect of the spray is to wash down all the coal dust that may have accumulated on roof and ribs, leaving the layer of pure shale. The value of this is apparent when it is remembered that by this process practically all inflammable accumulations in the entry are carried to the floor. And on the floor it is deposited as a thorough—and presumably non-explosive—mixture

of coal and shale instead of in super-imposed layers of coal dust and rock dust.

Of course this caked layer of mixed material on the roadway is partly broken up by travel, especially close to and between the rails, and it might be said that in this manner the coal dust might be brought to the top in a dangerous film.

A careful examination of this floor material, after it had dried thoroughly, indicated, however that in the pulverizing process the shale breaks down to the same talcum-powder fineness as the finest coal dust and that therefore the shale on the roadways should always be ready to fly into suspension with the coal dust under the force of any rush of air such as that which precedes an explosion.

Over part of a roadway surface, where the floor is little disturbed, however, the mud and the coal dust remain caked together in what is probably non-flammable form. A virtue of this caking is that mine sanitation is much improved. Such manure, offal or other organic matter as might be deposited throughout the mine is effectively sealed over.

The plaster of mud on roof, timbers and ribs in the Wattis mine has the light color characteristic of average mine shale—even a little lighter, perhaps—and therefore possesses all the advantages of illumination which are lent by shale dusting.

The appearance of creep in the roof or ribs is easily detected. New cracks probably will show up more plainly than they would in entries that had been dusted with dry pulverized rock because of the sharper delineation of the edges of the crack. Thus the men in the Wattis mine feel that they can more readily detect a developing case of bad roof.

Mr. Reid also thinks that bottom heaves in clay are delayed or prevented by the liquid spray. The stuff is applied in such thin liquid form that deep cracks are filled and a mine bottom is so thoroughly sealed from the air that some causes of heaving are eliminated.

#### MUDIZING REDUCES DUST ACCUMULATIONS

Naturally the main interest in mudizing centers in the question: Will this mud stop the spread of an explosion? In order for it to do so it probably must present a dusty surface bearing enough finely divided shale dust, ready to be blown into suspension, so that the work of loose rock dust may be accomplished. The only answer to the question is this: The mud dries in about 36 hours, or 48 hours at the most. When it is dry, the coating on roof and ribs offers a chalky surface from which dust can be rubbed in a thin film with the finger tips, but nobody knows definitely whether there is enough of this fine shale dust to stop an explosion.

It is worth noting that the mud, when it is first applied, fills even the finest cracks and the most minute niches. While the larger depressions and ledges in roof and ribs are not poured full, they at least fill out flatter and flatter with each succeeding application so that the tendency of the mudizing process is to reduce the opportunity for fine coal dust to accumulate.

"But only a trifling accumulation is necessary in order to make a mine dangerous," say the numerous critics of mudizing, when they first hear of it. "No mine can be prevented from spreading dust about on the air and through spillage from cars. And what if this accumulation is piled up between trips of the spraying machine? Is your mine safe, then?"



"Well," reply such defenders of the scheme as P. H. Burnell, operating head of the Lion Coal Co., "The thing to do is keep your working places mudized right up close, use lots of water at the actual face and make your cars tight. Then you will have reduced the danger of dust accumulations to the lowest point. Nothing is perfect, but it seems to us that if you do those things you get pretty close to perfect mine protection against dust."

One other point is worth discussing with regard to the possible action of mud with a passing burst of flame. The caked layer of dirt, once thoroughly dried in the mine, is compact enough to adhere closely to roof and rib surfaces, but it will pulverize easily between the fingers—so easily, in fact, that it seems probable that the heat and force of an explosion traveling through an entry might easily reduce a part of the layer to finest dust which would be blown into suspension and thus participate in subduing a coal-dust fire in the recoil if not in the initial blast.

#### ECONOMY OF SCHEME IS OUTSTANDING FEATURE

A most attractive feature of mudizing as it is now practiced at Wattis is its economy. The dry dirt—a sort of air-slacked shale—costs but 50c. a ton at the mine portal, ready for the tank of the spraying machine. Power is a small item, for a 20-hp. motor operates the entire unit, supplying power for travel, for agitation in the tank and for spraying. One man operates the outfit. The machine should travel about 100 ft. per minute when it is spraying and the experience of the Lion Coal Co. is that it can easily cover 2,500 ft. of entry a day, allowing for all sorts of delays short of actual breakdown. An average day's work might cover 4,000 ft. of entry.

Mr. Reid cannot help comparing this performance with that of men sprinkling with water. In the Wattis mine a man equipped with a length of hose, whose job it was to proceed from hydrant to hydrant, washing down the mine, almost never covered more than 1,000 ft. in one entire day. Furthermore, it often was possible for him to assert that he had sprinkled sections he had never entered. But with the mudizing machine the evidence is so plain that no operative ever can allege more than he actually has done. In other words he must do his full stint or show good reason why. And the capacity of the machine is three times that of the ordinary sprinkler at one-third the labor cost. A tankful of the mixture will cover 800 ft. to 1,000 ft. of 20-ft. entry. Of course this distance will vary with the size and condition of the roadway and should be greater than 1,000 ft. on repeat coatings.

At intervals through the mine it is necessary to have a supply of the dirt ready for the machine. As the material makes good stemming, piles of it are dumped in rooms. This leaves it handy for the machine when it is working in room entries and keeping up with the advancing faces. But the main supply is hauled into the mine in pit cars and spotted along the route that the machine is scheduled to follow in each tour. The process of recharging the machine is simply one of shoveling dirt into the tank from a pit car on a parting and of filling up the tank with water from the lines, which are necessary in all mines of Utah under the state code.

The self-propelling machine which Superintendent Reid devised, but which is being replaced by an im-

proved type, consists of a tank 10 ft. long, 4 ft. wide and 16 in. deep made of sheet steel and angle iron. The entire top comprises three lids easily removed. The bottom of the tank pitches slightly from both ends to the middle, where an agitator paddle wheel bearing eight spokes revolves constantly above a 2-in. outlet pipe which feeds the mixture by gravity down to a centrifugal pump under the tank. The pump discharges the liquid through a pipe of 1½-in. diameter to an outlet on the apex of a fan-shaped steel pan nozzle. This



Canyon Down Which Lion Tramway Passes

The tramway can be discerned on the left side of the valley. At places along the roadway is found the fine weathered shale that is turned into mud by the rains and is used by Mr. Reid to mudcoat his entries and return airways. Mr. Reid cleans his tramroad of fine detritus and turns it to good use by covering his headings with it.

fan-shaped plate, elevated at an angle of about 45 deg. from horizontal, bears on its face an arrangement of blades standing on edge, so curved and placed as to deflect the mud spray correctly. The spray is further aided by an upturn around the rim of the plate.

The motor, mounted under one end of the tank and operated from the line through a trolley pole, drives the truck, agitator and pump. It operates at 860 r.p.m. and transmits power to a main vertical shaft through a four-to-one bevel reduction gear. Further speed reduction in the transmission of power for locomotion is accomplished by a steel worm on the lower end of the main shaft engaging a bronze wormwheel on the drive shaft. A sprocket and chain connect the drive shaft with one of the truck axles, affording the desired travel of 100 ft. per minute. Another set of sprockets and a chain on the opposite side of the truck make the drive four-wheel.

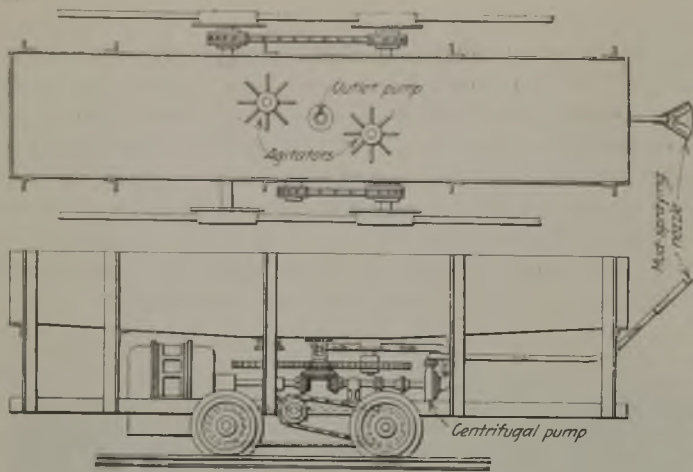
#### AGITATOR RUNS CONTINUALLY

The agitator in the tank is driven at 107 r.p.m. through a gear reduction from the main shaft. It revolves all the time the motor runs, though the truck may be stopped or the pump halted at any time by a shifting of gears. This constant agitation keeps the mud in the tank from settling and choking the pipes and thereby eliminates any likelihood that the pump, becoming clogged, will break. The pump is driven at 1,720 r.p.m. through a speed-increasing gear and shaft equipped with a flexible coupling to absorb shock.

The new type of Reid machine will have two agitators, one whirling on either side of the main feed pipe leading to the pump. The single paddle wheel did fairly well but in the 10-ft. tank too much mud was precipitated at the far ends.

In the experimental work with the Reid machine all sorts of places in the mine were mudized. It was recognized that a machine on a track cannot reach every opening in a mine that needs rock dusting and some





Detail Drawing of Mud Sprayer

The agitators prevent the precipitation of the mud, being kept at work even when the pump is not operating. As the dust with which the water is mixed is extremely fine it is kept in suspension with a minimum of agitation. By using two agitators the dirt even at the car ends shows little disposition to settle.

## North Carolina Mines May Have Byproduct Ovens

BY J. H. ROSE

Erskine Ramsay Coal Co., Cumnock, N. C.

THE two mines in operation in the Deep River coal field of North Carolina are located approximately six miles northwest of Sanford, the coal field lying in Lee and Chatham counties. Deep River flows through the field in a generally northeast direction. It is traversed in a northwesterly direction by the Atlantic & Yadkin R.R. between Raleigh and Charlotte, and it is within convenient reach of the Seaboard Airline Ry. that passes through Sanford. A branch of the Atlantic Coast Line comes into Sanford and connects with the Atlantic & Yadkin at that point.

The strategic location of this coal field in relation to a large surrounding steam-coal market is unusually favorable. It lies 180 miles east of the great Appalachian coal regions. The coal occurs in the Triassic or New Red Sandstone formation, in the shape of a long synclinal trough, having a northeasterly direction. Tracing the coal seam from the outcrop to the diamond-drill holes shows the measures to be pitching on an average of 8 deg. At the bottom of the Farmville slope the measures are pitching 3 deg. The main slopes driven off from the Cumnock shaft are now showing the measure to be pitching 10 deg. The two mines (about a mile apart) and exposed surface measures overlying the coal indicate a large acreage of comparatively fiat measures.

### FIELD MAY COVER 25 SQUARE MILES

The rocks consist of sandstone, shales and fireclay, with some interbedded coal seams extending over a limited section. A section of the coalbearing measures, as shown by the mine operations at Cumnock and Farmville is set forth in Table I.

Records of diamond drillings and mine operations have proven approximately 4,250 acres of workable coal, definitely in the field. A strange geological freak will be developed should the exploration proposed fail to prove up from 10,000 to 12,000 acres of workable coal in addition to the 4,250 acres just mentioned.

The coal-bearing strata contain a number of coal seams of varying thickness and quality. Only one of

attention had to be given to the trackless entries and aircourses which every mine has to watch. Dry rock dust can be blown into intake air with good results but mud can hardly be distributed in that manner.

To meet this difficulty Mr. Reid and his men used hose between the machine and spraying nozzle. At first they tried only a 50 ft. length. The results were so good that they added more and more hose until finally they were using 300 ft. and were able to spray 50 ft. beyond the end of the line. They believe they can use as much as 500 ft. of hose and still get sufficient pressure from the pump to spray mud successfully, although it may be necessary to thin down the mixture.

Thus they are perfecting the mudizing idea at Wat-tis. They may not have it worked down to a fine point, but they feel that they are approaching this stage. It is possible that they have gone far enough already to reduce greatly the cost of dust protection in those mines which have available a supply of dust material of the proper quality for this work.

these seams is commercially workable—it being known as the "Four foot" seam. It occurs at the top of the coal-bearing strata. However, tests are now being con-

Table I—Coal-Bearing Measures, Deep River Field, North Carolina

Sandstone cap rock	10 to 14 in.
Draw slate	2 to 6 in.
Coal ("Four ft." seam)	37 to 54 in.
Blackband ore	15 to 18 in.
Low-grade coal	20 to 30 in.
Fireclay, slates, shales	25 to 35 ft.
Blackband	2 to 3 ft.
Coal	24 to 32 in.
Blackband	18 to 34 in.

ducted as to the possibility of utilizing the low-grade coal for mechanically fired boilers for steam standby power plants operated by the larger power companies located in the state. A recent analysis, made by the state geologist, of the coal is given in Table II.

Dependable records of coal cuttings made and diamond drillings, indicate an average thickness of the "Four foot" seam, of 42 in. exclusive of 2½ in. of bone coal underlying the seam.

The large power companies in the state are exhibiting much interest in the possibility of locating a byproduct plant at one of the mines and have engineers in the field

Table II—Analysis in Four-Foot Seam, Deep River Field

Moisture	1.15
Volatile Matter	24.89
Ash	5.64
Sulphur	3.17
Fixed Carbon	57.03
B.T.U.	14,230

working in conjunction with the coal companies. The coal yields large quantities of illuminating gas, ammonia and coal tar.

Both mines are being rapidly developed and by the end of this year a production of 600 tons per day is anticipated for the field, the combined production of the mines at this time being 300 tons per day. The market for this coal far exceeds the production and a good price is realized for the coal during the entire year. Neither mine lost a day's time during the past eighteen months on account of no market for coal.



# Germany's Return to Honest Money and Economy Marked by Speedy Recovery

BY E. J. MEHREN

Vice-President, McGraw-Hill Co., Inc.

**N**O COUNTRY in the world to-day is, from the economic viewpoint, so interesting as Germany. She occupies the spotlight in Europe. What is to be her future?—is the question that everyone in the old world is asking.

The answer to that question no one can tell. The problem is complicated. But this even the casual visitor to Germany can say: *Germany has made tremendous strides since the war; she is showing extraordinary recuperative power—against tremendous handicaps; she has worked a financial miracle since November of last year; and, finally, no nation that shows Germany's potential strength can be permanently kept down, can be crushed.*

These observations, let me repeat, even the casual visitor must make. The signs are written everywhere: in a people again well nourished, in a public administrative ability (irrespective of party) that was able without new revolution to stabilize the currency, in a returning hope that Germany can again rise. There is not buoyancy of spirit, but there is a deep-founded confidence that the nation is not going to pieces.

The situation is in sharp contrast to what one expects. In America we hear of the wrecking of the currency, of the sufferings of last winter, of the difficulties under which her industries labor in securing raw materials and finding markets. Upon these reports—which of course, are correct—we paint with our imaginations a country on the verge of despair, a disrupted industry, a tottering government. The surprise is a great one—and, if one is fair-minded, he must come away with deep admiration for what has been accomplished.

Let us briefly paint the picture of Germany's economic circumstances:

Under the Versailles treaty or as a result of it she lost heavily of her iron and coal deposits—in Alsace-Lorraine, the Saar and Upper Silesia; she lost her colonies, her foreign investments, her shipping, her export organization and its connections; she has a large part of her territory under the control of her former enemies. In addition she has been through an exhausting war and political revolution.

These conditions are not new; they existed when I was in Germany just four years ago, in the summer of 1920. The result was what might have been expected—an under-fed, discontented people, a disorganized industry, and an all-pervading discouragement, unrelieved by any ray of hope.

Since then, since 1920, two other financial disasters have forced themselves into the picture—the occupation of the great industrial district of the Ruhr, and the wrecking of the currency.

With these added calamities one should logically expect that conditions

would be worse instead of better, that the despair would be even blacker than before.

And yet conditions are as I have described—immeasurably better. Here is a nation on the up-grade, rather than the down. Here is a nation to be reckoned with economically, not to be ignored; here is a nation that is sure to be an important factor in the world's industry.

This last is a bold statement. I realize what terrific handicaps the rest of the world can put upon Germany if it wishes. It can keep Germany impotent, but it is my belief that it will not do so. Sentiment, moreover, will play no part; commercial considerations alone will lead to trading with Germany. Other nations will want to sell to the markets of a reviving Germany. If they sell to Germany, they will buy from Germany, and if they buy from Germany, a prominent place in world affairs is assured her by the potential strength she is now so conspicuously displaying.

Let it be clearly understood that the path of recovery for Germany is not an easy or a quick one. She is not out of difficulty. The economic handicaps recited above are still upon her; some of them are being slowly removed—such as the absence of shipping and foreign commercial connections; some of them—such as the lack of colonies—may never be removed. But a nation that under present handicaps has recovered as she has done will rise despite the obstacles that a commercially minded world is likely permanently to place upon her.

## THE TURNING POINT

The great German economic miracle was wrought in the closing months of 1923 and the early part of 1924. Early last autumn Germany truly, to use the words of Basil Miles, administrative commissioner for the United States in the International Chamber of Commerce, was at the cross-roads. Directly ahead—on the road she was traveling, the road of unbalanced budgets, of state subsidy of the railroads, of currency debasement—was revolution, industrial suicide, destruction. To the right was a stormy path, extremely difficult, beset possibly by disorder, possibly by revolution, but leading, if the difficulties could be mastered, to economic soundness. It was the road of a stabilized currency, with its accompaniments of balanced budgets and governmental economy. Germany chose to go to the right, to take the difficult road, to bear the stress of financial reform and currency stabilization. She did it at a time, too, when the situation in the Ruhr was at its most critical stage, when strong forces were seeking to pry loose the Rhineland and erect it into an independent state, when the attitude of Bavaria toward the rest of Germany was much in doubt. But she

went on, nevertheless. The government declared that the mark should be stabilized at four trillion 200 billion to the dollar. There was a severe contest with the mark speculators, but by severe measures the government won. and since November, 1923, legally, and about Jan. 1, actually, the rentenmark has stood at 23.8c. to the dollar. There was no revolution.

Germany is beyond the cross-roads and has chosen rightly. The future is long and difficult, but there is health where there was disease, there is hope where there was despair.

The severest present industrial handicap is lack of credit. The great credit reservoirs were nearly or entirely wiped out by the fall of the mark. Further, there was no incentive to save; industries and individuals converted the tobogganing mark into goods as quickly as possible. Today the credit resources of the banks are estimated at one-tenth the pre-war amount. When credits are obtained the interest rate is 2½ per cent per month for the very best security.

Wages are at approximately pre-war level. Prices, as of July 15 (according to the *Frankfurter Zeitung* index, the highest index I could find and which takes in ninety-eight commodities) are 34 per cent above 1913. (The government's index for wholesale prices is 12 per cent above 1913.)

Efficiency of labor has increased notably and is still increasing. *I heard no general complaint against the working man in Germany as I did in England.*

Unemployment, while fairly large just now, is not as great as that of Great Britain, and does not present the all-engrossing problem in Germany that it does in the British Isles.

The works councils, elected by the workers, are said by the employers to be a good influence. They help smooth out difficulties and, in general, have not been radical.

Hours of work per day are increasing.

The coal supply, which by its shortage was expected to be for many years a serious handicap to German industry, is now more than ample, on account of the very large development of lignite deposits.

The heavy taxes imposed on industry and individuals are beginning, under the stabilized rentenmark, to yield a good revenue. Recent figures show a surplus that has been used to retire obligations.

There is much more to be said and the details just given need elaboration. But these few particulars will help to fill out the picture as I saw it—the picture of an industrial nation again on a sound basis, well organized, confident that somehow it will work out its difficulties and play a part in the world of industry and commerce.

Berlin, Aug. 13, 1924.



## Nation Is Using Less Coal as It Finds Price Too High

With Same Coal Railroads Give Eighty per Cent More Service—Utilities Make Coal Go Twice as Far as in 1915

BY F. C. HONNOLD

Secretary, Illinois Coal Operators' Association  
Chicago, Ill.

WHENEVER clothing or any other personal or household gear advances greatly in price, we are all more careful both of the purchase of such items and in their subsequent use, making every effort to prolong their life and serviceability. The same is true with respect to food. When times are flush and we have plenty of money, it is our natural inclination to buy other things than necessities and to indulge ourselves in luxuries to a possible point of outright extravagance. When times are hard all such items are eliminated and we begin to consider the need of not only confining ourselves to actual necessities but utilizing, wherever possible, the lower priced offerings.

Just such a situation has arisen with every coal-consuming industry in the country as a result of the steadily advancing price of coal during and since the war. In 1915 the railroads of the country used, in round numbers, 106,000,000 tons of bituminous coal and during that year hauled approximately 275,000,000,000 ton-miles of freight. With the much greater volume of business done in those years, the quantity of coal used by the railroads in 1917, 1918 and 1920 varied from 133,000,000 to 135,000,000 tons each year and with an average cost approximately twice that paid for engine fuel in 1913.

As a result, every device both in the way of change of equipment and more economical use of fuel by employees was introduced. The net result of these efforts is to be found in the published figures of the Interstate Commerce Commission for the calendar year 1923. In this year the railroads carried the heaviest tonnage they had ever handled in any previous year of their history, amounting to the astonishing total of revenue and non-revenue freight of 457,000,000,000 ton-miles—almost twice the service rendered in the year 1914. Despite this showing, their use of coal amounted to only 109,000,000 tons, barely 3,000,000 tons over their use in the year ending June 30, 1915—an increase of only slightly over 2 per cent in coal used as against 80 per cent increase in tonnage hauled. Nor was this accomplished through substitution of other fuel. The use of oil at the present time constitutes only about 8 per cent of the total fuel requirements of the railroads and has shown an increase of only about 2 per cent in the past three or four years.

As another illustration of the effect of increased cost of coal, we note the rapid growth of the so-called super-power plants—public utilities providing electric energy for sale through a large territory and for a wide variety of uses.

Going back to the period slightly before the war, say 1915 and 1916, a kilowatt-hour of power was generated from the consumption of about 5 to 6 lb. of coal, some specially inefficient plants using as much as 10 lb. By 1919 a kilowatt-hour was being generated by 3.2 lb. of

coal, and in 1923 the coal used per kilowatt-hour had been reduced to 2.4 lb. At some of the most recently completed power plants a kilowatt-hour of power is being made at the astonishingly low consumption of only 1 lb. of coal.

This cheap provision of power for several years past has been and at the present time is to a rapidly growing degree displacing the individual power plant at which the use of coal was very much heavier. As a result of this change the increased use of coal at public-utility power plants throughout the United States for the five-year period from 1919 to 1923 has amounted to less than 3,000,000 tons, whereas the output of these plants has increased 50 per cent.

In addition to the foregoing also, we have at the present time to reckon with fuel oil, which is making itself felt in a competitive way at a great many points.

Odd also as it may seem to some, the great improvement in the transportation service of the country as a whole has greatly affected southern Illinois mines. With more cars and more engine power Eastern coal-carrying lines are in position to care regularly and fully for the growing markets of their coal-mine operators in this Western territory.

In times past a notable lack of equipment and other facilities to some extent isolated these Western markets from Eastern producing mines, especially during the late fall and winter months, and during that portion of the year southern Illinois mines have always enjoyed their best running time. Already a large part of this advantage has been swept away.

### Coal Company Raises Milk as a Sort Of Side Line to Mining Coal

IN THE group of pictures on the opposite page are illustrated a few steps of the United States Fuel Co.'s venture into dairying on a remodeled ranch near Hiawatha, Utah. The company originally bought a ranch of the variest wild-west movie type, Fig. 1, with corral fences built of stakes and with sod-thatched log huts strung around the place. A dry arroyo ran along the back edge of the corral. The place was wont to raise a few cattle and some of the goats which range through the piñon of the foothills.

Now it is all changed. The dry arroyo still lies where water and the Almighty put it, but the rest of the ranch is different. A comfortable ranch house, Fig. 2, has been erected in the midst of a collection of good wooden sheds to house machinery and chickens, and a power and light line has been built to the ranch to supply illumination in houses and barns and to run the electrical machinery including milking devices. The ranch is irrigated with water brought down from the company's watershed back in the mountains.

A set of modern farm barns, Fig. 3, has been erected, a herd of milk cows has been purchased and the company has gone into the dairy business, distributing milk through its mining town of Hiawatha, Utah, and other communities within reach. One object of the enterprise was to guarantee the company's employees an adequate supply of milk hauled in so sanitary a way that the health of the communities would be safeguarded. The model dairy barn, Fig. 4, shown on the opposing page, is equipped with steel stanchions and feed carriers, and is otherwise built to house contented cows.

NOTE—From address delivered at meeting held by Lions Club at Herrin, Ill., Aug. 20, to ascertain causes and cure of present inactivity of southern Illinois mines.







# Bad Water Made Suitable for Domestic and Power-Plant Use by Treatment and Purification

Water Usually Requires Less Treatment for Domestic Use Than for Steam Power-Plant Supply—Accumulation of Scale in Boilers Often the Greatest Operating Difficulty—Any Water Can Be Made Suitable

BY FRED L. SERVISS

Brookland, Washington, D. C.

**I**NJURIOUS substances occur in practically all water. However, when the water is to be used for domestic purposes the impurities generally are less objectionable than when it is to serve as boiler feed. The least desirable features in domestic water are turbidity, color, taste, odor, pathogenic bacteria and hardness. Though ordinary hardness is to be avoided in boiler-feed water, it is not hygienically objectionable. The impurities present in water usually are detrimental to boilers or interfere with their proper operation. The troubles from impure feed water are formation of scale, corrosion, foaming and priming.

Objectionable matter usually can be removed without difficulty from water for domestic use, but to render some waters suitable for boiler feed may require elaborate treatment. In the treatment of domestic water some of the color may be eliminated by filtration and all of it by chemical means. Water from swampy watersheds is characteristically colored, the colorization being produced by the growth of certain algæ on the water surface. Where water is drawn from lakes or reservoirs it may in the spring or autumn become obnoxious owing to its odor and turbidity, for at these seasons the water may be overturned either by being warmed by the sun's rays or by contact with the air. However, as water is a poor conductor of heat as well as a poor radiator, the changes in temperature will not be as great as those reached under similar conditions by solid rock masses.

## TEMPERATURE VARIATIONS IN RESERVOIRS

The temperature of lakes and reservoirs is of great importance where it is desirable to obtain water of good quality and uniform temperature. Seasonal changes of temperature, especially in deep ponds (50 ft. and deeper), may produce vertical currents and thus the water will vary in quality at different depths.

If a series of temperature observations are made throughout the year in any lake or reservoir, and at different depths, it will be noticed that the shallower depths show the greatest temperature ranges and the lower depths (usually below 50 ft.) show little or no variation in temperature. In summer the deeper layers of fresh-water lakes are quite cool because water is at its greatest density at 39.2 deg. F. and the water which becomes cooled to this temperature in the winter naturally sinks to the bottom and when there the low conductivity of water prevents the warmth of the sun being communicated to it.

In the cooler seasons of the year the bottom temperature is at 39 deg. F., and it may be even below that if during severe weather the water has been stirred by high winds. The several water layers will lie in the order of their density, the temperature increasing up-

ward to within a few feet of the surface, where it will approach the atmospheric temperature or freezing if the surface is covered with ice. The water will remain in this state until the weather warms the surface to the temperature of the bottom layer, causing a state of unequal equilibrium, and because of this unstable condition circulation will take place from the top to the bottom.

This phenomenon is known as the working or overturning of the water and takes place in early spring and autumn. During the quiescent period of summer, stagnation may occur, and if much organic matter, such as dead leaves and plants, is present, may continue until all the available oxygen of the water is consumed. The water then becomes darker, has a disagreeable odor and taste. With the overturning of the water, especially in the autumn, this decayed matter is stirred up and so brought to the surface.

If a pond or lake is less than 25 ft. deep the temperature variation is not great, for such relatively shallow ponds are easily stirred to their depths by the winds, thus keeping the temperature equalized. These shallow sources usually produce turbid water which needs filtering.

Tastes and odors although often harmless are nevertheless objectionable in a domestic-water supply; they usually are due to the same cause as color. They may be removed by aeration and filtration or by chemical means. By proper location of off-take pipes pure water may be obtained throughout the year. In deep artificial reservoirs an auxiliary low off-take pipe usually is provided for drawing off the impure and stagnant water in the autumn.

## HARDNESS EITHER "TEMPORARY" OR "PERMANENT"

Hardness may be defined as that quality the variation of which makes it more difficult to obtain a lather or suds from soap in one water than in another, and is direct evidence of the presence of scale-forming impurities in the water. It is objectionable in domestic water used for washing or the laundry because much soap is consumed in eliminating the impurities before a lather can be obtained.

Hardness is classed as "temporary" or "permanent," the distinction being that temporarily hard water may be softened by boiling, whereas permanently hard water must be treated chemically to render it soft. Temporarily hard waters are those containing bicarbonates of calcium, magnesium or iron, which are removed by boiling, the bicarbonates being reduced to normal carbonates which are practically insoluble and are precipitated from the water. The familiar "fur" in a tea kettle or the boiler crust in a boiler are the precipitated normal carbonates.



Water containing no other impurities than the carbonates or bicarbonates mentioned may be softened by boiling. Permanently hard waters are those containing the sulphates of calcium and magnesium, principally calcium sulphate, which can be precipitated only by heating to near 300 deg. F. or removed by chemical treatment. The total hardness of a water is the combined temporary and permanent hardness, which may be determined in many ways, the most accurate being to compute the total hardness from the chemical analysis of the water. The soap method may be used to obtain an approximate result, but it is not to be recommended.<sup>1</sup>

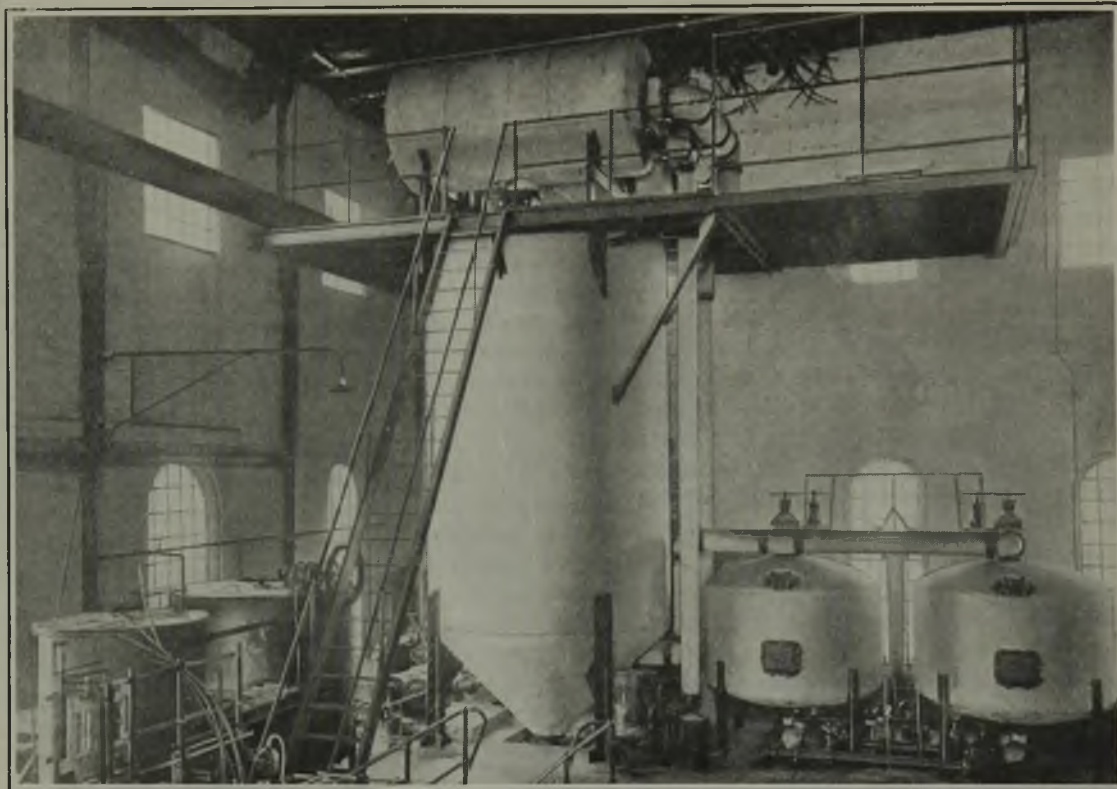
The hardness of water is estimated in "degrees." In France and in some chemical laboratories one part of calcium carbonate (or its equivalent of other impurities) per 100,000 parts constitutes one degree. In the United

accumulates to any extent, the life of the boiler may be shortened, and its condition eventually may cause an explosion. The removal of impurities which cause a water to be permanently hard requires an elaborate chemical process and will be discussed under the treatment of water for boiler use.

Contamination of domestic-water supply by sewage is not necessarily objectionable, but there always is the possibility that domestic sewage is contaminated with pathogenic bacteria, especially germs of cholera and typhoid fever. *Bacillus coli* (*B. coli*) are bacteria present in great quantity in the intestines of human beings and some animals, and are more tenacious of life than either the germs of cholera or typhoid, so that in the sanitary examination of a water the absence of the *B. coli* group is taken to be certain indication of the

### An Indianapolis Purifying Plant

Water system of water softening, a combination chemical and heat treatment, as installed at the Indianapolis plant of the Merchants Heat & Light Co. by the Power Plant Specialty Co. of Chicago. The large tank is the heater and precipitator, the smaller tanks are filters and containers for lime and soda ash. The plant has a rated capacity of 6,000 hp.



States one degree is one grain per U. S. standard gallon or one part in 58,333 parts. The English degree is one grain per gallon of 70,000 grains. In the United States waters containing up to 10 grains of hardening impurities per gallon are considered soft; 10 to 20 grains per gallon, moderately hard, and above 25 grains per gallon, very hard.

#### SCALE HARMFUL IN SEVERAL WAYS

When hard water is fed continually into a boiler, naturally the precipitated matter accumulates and in time produces a heavy scale or crust which settles on the tubes. This scale, being a poor conductor of heat as compared with iron, will increase the consumption of fuel many times. In addition, the iron, not being in direct contact with the water, is heated to a higher temperature and may become red hot, thus oxidizing more quickly on the outside next to the fire than when properly cooled by the water within. It also will displace the hydrogen from the water or steam on the inside, in time changing the iron on both sides to the brittle magnetic iron oxide.

If care be not taken to remove this scale before it

absence of pathogenic germs. Presence of chlorine and certain compounds of nitrogen are evidence of pollution by sewage. Examinations for the above mentioned impurities should be made by a sanitary chemist.

In order to determine whether a certain water is fit for domestic or industrial use, a complete analysis should be made. From such analysis it can be determined what treatment, if any, should be employed before the water is used.

#### TYPE OF ANALYSIS DEPENDS ON INTENDED USE

Water analyses may be divided into two parts: (1) Sanitary, physical and chemical, and (2) mineral. Under the head of sanitary analysis would come the physical examination of the sample to determine its turbidity, color, odor and taste; and under chemical analysis for the total residue, fixed solids, loss on ignition, free and albuminoid ammonia, certain nitrogen compounds, chlorine as chlorides, and oxygen consumed. When water is to be used for domestic purposes microscopical and bacteriological examinations also are made. The former consists of the enumeration of the kinds of microscopic organisms and an estimate of their quantity. It is used to indicate sewage contamination or pollution and often is helpful in explaining the chemical analysis and the

<sup>1</sup>"Standard Methods of Water Analysis," American Public Health Association, Boston, 1917.





presence of odors, color and taste. The bacteriological examination is made for the purpose of determining the presence or absence of certain harmful bacteria, more especially the B. coli group, to which reference already has been made. From these analyses the sanitary quality of the water is judged and its availability

In many localities crude ferrous sulphate, a byproduct from cleaning iron, is used and is cheaper than alum. However lime also must be present in the water or be added to it. The lime precipitates ferrous hydroxide, which is easily and quickly oxidized to colloidal ferric hydroxide. This coagulates the suspended matter much the same as alum.

LIME TREATMENT FOR TEMPORARY HARDNESS

The temporary hardness of a water may be reduced by using slaked lime in the proper proportion, about 0.1 lb. per 1,000 gal. of water for each U. S. degree of hardness. This treatment may be applied to a water which is both turbid and temporarily hard. Filtering if properly conducted is efficient in removing turbidity and bacteria, and in many cases will decrease the discoloration. Filtration may be by either of two methods: (a) Slow sand filtration; (b) pressure or mechanical filtration. In using the slow sand method if the water is very turbid with an excess of algae it should be subjected to preliminary sedimentation or coagulation before it is admitted to the slow filter bed; this to prevent clogging and unnecessary cleaning and renewing of the sand bed. Mechanical filters are used after preliminary coagulation or coarse filtering. They are more rapid than slow filters, require less space, and are efficient when properly designed and controlled.

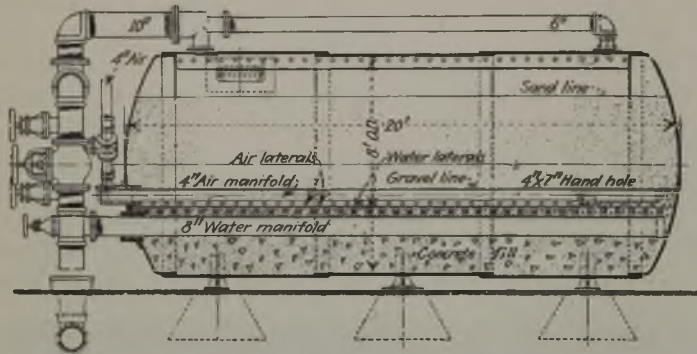
An added precaution often taken in treatment of water for domestic consumption as protection against bacteria is disinfection. Chlorine is used extensively for this purpose, the two most common forms being calcium hypochlorite  $Ca(OCl)_2 \cdot H_2O$ , and liquid chlorine supplied in tanks under pressure. If the calcium salt is used it first must be emulsified with water and then continuously agitated while being fed to the water to be treated. Liquid chlorine necessitates special feeders which when once in operation require little attention.

In some instances water for drinking is boiled to insure its sterility, all pathogenic germs being killed by this method in less than five minutes. The taste of boiled water is not pleasant and may be improved by aeration, but this is likely to undo the effect of the boiling by recontaminating the water. Distilled water is perfectly safe, but from a physiological standpoint is not desirable for continued use.

The mine operator, from the standpoint of power development, is familiar with the great heat losses and the increased operating expense resulting from scale formation, corrosion and rusting. To these may be added other disadvantages less frequent but nevertheless troublesome and dangerous—namely, foaming and priming. When an untreated feed water is evaporated to steam in a boiler, all the impurities are left behind, and as the evaporation proceeds, the concentration of the scale-forming impurities increases until crystallization or precipitation takes place. The precipitated matter is the scale or sludge found in boilers. As has already been noted, the effects of scale are: (1) A reduced steaming capacity, and (2) overheating, with liability to explosion. The first effect results in fuel waste, the second is extremely dangerous.

MINERAL ANALYSIS FOR BOILER FEED WATER

The chemist bases his judgment of the value of a water for boiler use on the results of the mineral analysis, consideration being taken of the following points: Sulphates of calcium and magnesium are the



Horizontal Pressure Filter

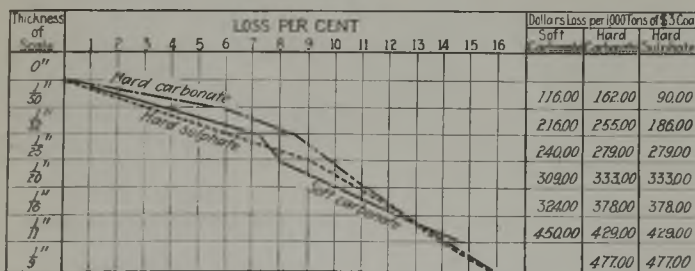
This air-agitation filter is constructed on the reverse-current-wash principle and is manufactured by the American Water Softener Co., of Philadelphia. The internal pressure in these filters may run up to 100 lb. or over.

for domestic consumption determined. The interpretation of a sanitary analysis is a matter of experience and as yet no hard and fast rules have been set down.<sup>2</sup>

It is not difficult to obtain a complete analysis which will show the incrusting and non-incrusting impurities. Before this analysis is attempted, however, the physical properties should be determined, and in the case of a turbid water it should be filtered and the analysis for mineral matter made on the filtered portion.

Domestic water may be purified in several ways: (a) By settlement (either naturally or by adding a coagulant such as alum); (b) by sunlight or by a chemical treatment with chlorine or ozone, all of which diminish bacterial life; or (c) by aeration, which expels objectionable odors, or again by sunlight, which decolorizes the water.

The water may be aerated by allowing it to fall over a cascade or dam. The water may then be filtered so as to decrease the turbidity. Coagulation is used to render a turbid water clear. It also effectively removes bacteria. Alum, in the proportion of one grain per gallon, is commonly used as a coagulant, being added before the water reaches the storage reservoir. When



Cost of Letting Scale Accumulate in Boilers

To obtain high boiler efficiency the flue-gas should leave the heating surface at as low a temperature as possible. Scale defeats this by preventing rapid conduction of heat from the flue-gas to the water. This curve, based on Prof. Schmidt's determinations at the University of Illinois, is published by courtesy of the Power Plant Specialty Co., of Chicago.

it is used relatively small ponds will serve for settlement. If the water is slightly hard crude alum alone is added, but if no lime salts (calcium salts) are present, lime is needed to assist in the coagulation.

<sup>2</sup>"Standard Methods of Water Analysis," American Public Health Association, loc. cit.



chief scale-forming impurities; the carbonates and bicarbonates of the same metals will be deposited as sludge and not as scale if the sulphates are low or absent, but if calcium sulphate be present even in small quantities it will tend to act as a cement and form a scale with the carbonates.

The treatment of boiler-feed water in general deals with the elimination of the scale- and sludge-forming impurities. Other materials usually found in water and considered harmless have been found by analysis in the boiler scale, proving that if sufficient cementing material be present they will add to the trouble. The chloride of magnesium, known to be an active corrosive agent, is a very soluble compound often found in natural waters. In dilute solution it has a very corrosive effect upon iron; the reaction appears to be catalytic, as the chloride of magnesium shows no diminution and no magnesium comes out of the solution.<sup>3</sup>

Large quantities of alkali carbonates as well as much organic matter may cause foaming and priming. Priming causes the steam to carry with it more or less water

methods: (1) The soda process, in which carbonate of soda or caustic soda is used to precipitate the sulphates of calcium and magnesium. Either the carbonate of soda or caustic soda may be used alone or in combination, depending upon the water. Caustic soda generally is used when the water contains much carbon dioxide. It is changed to carbonate of soda, which then reacts on the water to remove the remaining impurities. (2) The lime process, also known as Clarke's process—In this method, the necessary milk of lime or lime water is added to convert all the acid carbonates of lime (calcium) and magnesium into normal carbonates, in which form they are precipitated. In this treatment we have the curious paradox: "Add lime to remove lime." (3) The soda-lime process—This is a combination of the first two and the one most generally adopted. It is used on water that contains the sulphates of calcium and magnesium together with their bicarbonates or free carbonic acid, which combination will tend to render the soda process ineffective.

#### HEAT TREATMENT SATISFACTORY IN SOME CASES

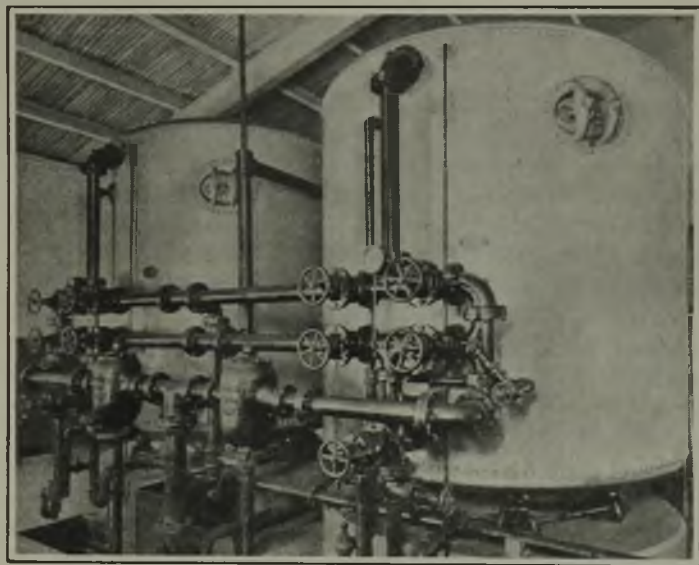
Preheating the feed water, often referred to as the "heat treatment," is employed where the water contains carbonates of calcium and magnesium with free carbonic acid and no sulphates. The temperature to which water must be heated before it enters the boiler depends entirely upon the quantity of dissolved salts. Open-type heaters are used where the dissolved salts will precipitate out below 200 deg. F., these being the carbonates previously mentioned. In certain instances the sulphates have been removed from feed waters by preheating to nearly 300 deg. F., using live-steam heaters or economizers in which this high temperature can be maintained.

Many plants require for economy a combined chemical and heat treatment, heat being used to remove the temporary and chemicals to remove the permanent hardness. Commercial chemicals are employed in the chemical treatment, the more common being lime (containing 90 per cent CaO) and soda (58 per cent Na<sub>2</sub>O). Barium hydroxide, a byproduct of cement manufacture, is efficient in removing permanent hardness, but is relatively expensive compared with lime. Other compounds often used are barium chloride, barium carbonate, sodium oxalate and alums, all of which are more or less costly and used only in rare cases. It is desirable that all treatment of water take place before the water is fed into the boilers. There are times, however, when internal treatment is permissible, but it should not be undertaken without the advice of an expert.

#### CAN READILY DETERMINE LIME AND SODA NEEDED

Many methods have been devised for the rapid estimation of the quantity of lime and soda necessary for softening water.<sup>4</sup> The accompanying table has been calculated to show the quantity of soda or lime to be used in treating 1,000 gallons of water, each gallon containing one grain of the impurity noted, from which it is possible to calculate the quantity of chemicals necessary to use when the impurities are shown from a mineral analysis.

What is known as the "Permutit process" often is used in water-purification systems. Permutit is an artificial sodium silico-aluminate (Na Perm) supplied for use in the form of coarse sand. The calcium, etc., in the



Permutit Type of Zeolite Water Softener

Zeolite in the form of coarse sand removes such impurities as calcium, magnesium and iron by a chemical exchange. A treatment with common salt restores the zeolite to its original activity. It is claimed that this zeolite can be used over and over again for a period of twenty years.

in suspension, which, if it enters the engine cylinder, may cause a cylinder head blow-out. Where surface condensers are used and the water fed again to the boilers some effective means of separating the oil from the water should be used. This precaution is not necessary with turbines where oil is used only on the bearings and not fed into the steam.

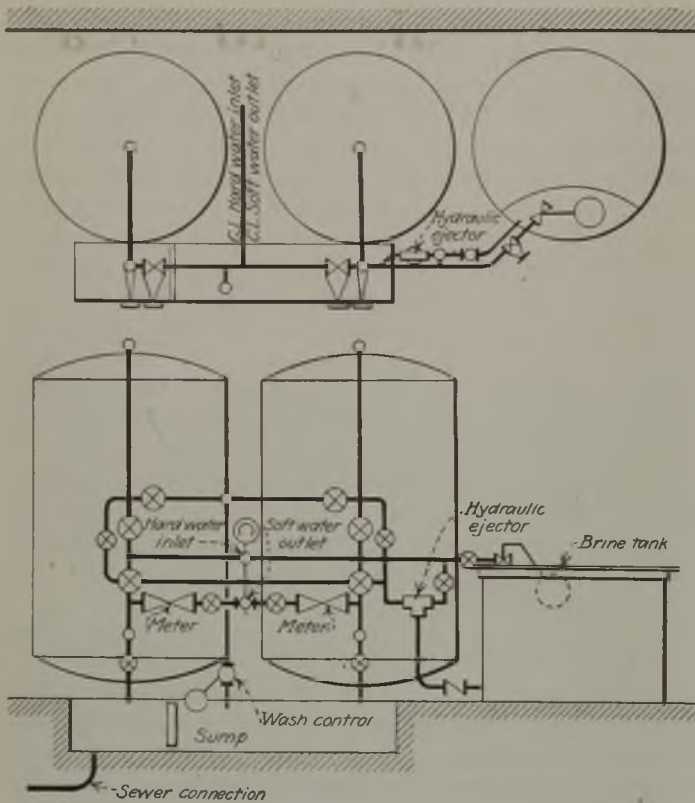
Waters containing undesirable impurities may by several methods of treatment be rendered suitable for boiler use. The water may be treated chemically, in which case the impurities are precipitated, or by preheating, which results in the elimination of carbon dioxide and in the consequent reduction of the power of the water to hold certain salts in solution, thus precipitating the undesirable compounds. The heat treatment is of value only in treating temporarily hard waters. Chemical treatment must be used on those that are permanently hard. Should the water be turbid, carrying much suspended matter, it must be coagulated or filtered.

Feed water may be treated chemically by one of three

<sup>3</sup>"Boiler Chemistry and Feed Water Supplies," J. H. Paul, Longmans, Green & Co., London, 1919.

<sup>4</sup>Water Supply Paper No. 274, U. S. Geological Survey, Washington, D. C.



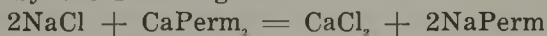


Plan and Elevation of Zeolite Plant

This illustrates the double-vertical type installation of the Permutit Co., of New York. The units may also be placed horizontally.

water is exchanged for the sodium of the permutit which does not form scale:

$Ca(HCO_3)_2 + 2NaPerm = 2NaHCO_3 + CaPerm$ ,  
the calcium compound being insoluble. After twelve hours' use the permutit is covered with a dilute solution of salt and allowed to stand for twelve hours, after which time it is ready to be used again. The reaction is shown by the following:



Only common salt (NaCl), which is inexpensive, is used, the calcium-chloride solution (CaCl<sub>2</sub>) being al-

**Showing Impurity, Effect on Boiler, Remedy and Quantity of Soda and Lime in Pounds Required to Treat 1,000 Gal. of 1 deg. U. S. Hardness**

Impurity	Effect	Remedy	Lime	Soda
Calcium Chloride	Corrosion	Soda	0	0.137
Magnesium chloride	Corrosion	Soda	0.113	0.161
Magnesium carbonate	Scaling	Lime	0.105	0
Ferrous carbonate	Crusting	Lime	0.077	0
Carbon acid gas	Crusting, priming	Lime	0.202	0
Magnesium bicarbonate	Crusting	Lime and boiling	0.068	0
Calcium bicarbonate	Crusting	Lime and boiling	0.015	0
Calcium sulphate	Scaling	Soda	0	0.111
Magnesium sulphate	Scaling	Soda and lime	0.105	0.126
Ferrous sulphate	Scaling	Soda and lime	0.101	0.100
Ferric sulphate	Scaling	Soda and lime	0.126	0.114
Free sulphuric acid	Corrosion	Soda and lime	0.091	0.155

Table based on lime containing 90 per cent CaO, soda 58 per cent Na<sub>2</sub>O. The results are theoretical, however, and to obtain the best results with the treatment suggested the weights of the chemicals should be increased by 10 per cent.

lowed to run to waste. Permutit is effective in removing iron, manganese, magnesium and other elements in the same way. The life of a charge is said to be over twenty years.

Simple tests may be made on a water to determine the presence or absence of injurious compounds by anyone with little or no knowledge of chemistry by following simple directions.<sup>5</sup>

Water treatment and purification, either for domestic or industrial use, should not be undertaken without

<sup>5</sup>Coal Miners' Pocketbook, 1916, p. 428, McGraw-Hill Co., New York.

the advice of one familiar with such work. Avoid all secret preparations; they are either worthless or contain ordinary chemicals for which a higher price is charged under the name of a special preparation. In most cases it is a matter of chance that the compound is suited to the water.

Many large companies make a business of treating impure feed waters, and in the case of a bad water it is advisable to put the problem in the hands of these specialists. The importance of proper water treatment is shown by the extensive systems installed by many large industrial plants and municipalities and is one that deserves attention in isolated localities such as mining camps.

**Should Use Enough Coal on Washing Table for Perfect Stratification**

**D**URING the past several months a study of the washability of fine sizes of coal on tables, with particular reference to Washington and Alaskan coals, has been conducted, in co-operation with the University of Washington, at the Seattle station of the Bureau of Mines. A coal from a Washington mine, presenting unusual washing difficulties, has been studied in considerable detail, using a particular commercial-size table. Float-and-sink tests of zonal products, supplemented by screen-sizing tests and chemical analyses, have given valuable information as to the workings of a coal table. This work is not yet completed but several conclusions of general application to any tabling operation may be drawn from the work to date.

There is a definite relationship between the tonnage of feed to a coal table and the maximum size of particles in the feed which will separate well on the table. The coarser the feed to the table, the greater must be the tonnage fed to obtain a good separation. A certain depth of material is required on the table to permit good stratification, this depth varying with the coarseness of the feed. On the other hand, there is an upper limit to the depth of material that can be separated on the table. These two factors will determine the maximum size that the table can handle.

The table used in the Bureau of Mines tests has a remarkable sizing action on all material that is properly stratified, that is, on all material that is not too coarse to stratify in the depth of coal on the table, and at the same time is not sufficiently fine to slime. The coarsest particles of any given specific gravity are discharged from the table first, and the finer the material the farther it will be carried out on the table before it is discharged. Materials of all specific gravities follow this same law. The result of this sizing action of the table is to make it impossible to obtain a clean separation between materials near in specific gravity when using an unsized feed. On the other hand, a separation using a classified feed will be favored by this action of the table.

The efficiency of the washing operation on tables is low when attempting to make a low-ash washed coal, and increases rapidly with higher allowable ash content in the washed coal. The explanation of this fact seems to lie in the fact that the largest proportion of the impurities is near in specific gravity to that of coal. The sizing action of the table previously mentioned causes an overlapping between material of different specific gravities, and the effect on the efficiency is more pronounced where the proportion is large.



# Dividing the State of Pennsylvania Into Areas Having Coal of Equal Volatile Content

How These Areas Were Mapped—Their Form and the Reasons for It—Why Irregularities Exist and How Oil and Gas Are Found Only in Places Where Coal Contains Both

WITH A FEW exceptions the quantity of volatile matter in the coal of the Eastern half of the United States is determined by its geographical location. In consequence it is possible to draw lines that show where in the state the coal has a certain percentage of volatile matter. The lines so drawn are termed "isovols" from the Greek word *isos* and the English word volatile. These lines looking like contours separate areas of coal having a higher volatile content than those having a lower.

For several years the Pennsylvania Geological Survey has been co-operating with the U. S. Bureau of Mines in sampling and analyzing Pennsylvania coals. These analyses will be published later in bulletins of the Bureau of Mines. From the analyses thus collected it has been possible to construct a map showing the isovols of the State of Pennsylvania in greater detail than ever attempted before.

It was originally intended to obtain and analyze samples of coal taken from every mine in the state, but inadequate appropriations seriously curtailed the work. For the most part, the samples taken were obtained by making a cut from roof to bottom, at a number of points in a coal seam, the impurities being rejected or included according to specifications furnished by the bureau. These samples, after being reduced by crushing and quartering in the customary manner, were packed in airtight cans for shipment to the laboratory where they were analyzed by the bureau engineers.

In addition to this, car samples were taken from coal shipped to Pittsburgh for testing purposes. Definite quantities of coal were taken from a car as it was being unloaded. The quantity taken was reduced to a convenient size, say about 50 lb., and this gross sample, being again reduced by crushing and quartering as before, the resulting sample was packed in airtight cans and sent to the laboratory for analysis.

## FOR SOME PARTS NEW ANALYSES NOT AVAILABLE

A third method employed was to analyze samples taken both at the mine and at points of delivery by persons not employees of the government. These, naturally, may vary in moisture and ash content, because of the drying out of the coal in transit or the inclusion of impurities loaded with the coal. For many outlying districts having no authoritative analyses, reports of the Second Pennsylvania Geological Survey and private companies were used. These analyses, of course, are less accurate than those made by the U. S. Bureau of Mines under ideal conditions.

In its routine of work, the Bureau of Mines had already analyzed a large number of commercial samples of coal taken for various departments of the government, particularly during war times. Many of these samples were shoveled from mine cars and the coal crushed and quartered before being shipped to the

laboratory in airtight cans. Other cars were sampled at their destination.

In compiling the isovol map shown in the accompanying figure approximately 1,500 analyses were made from samples of coal taken from 606 mines. These together with analyses of approximately 7,500 car samples, received from 75 mines throughout the state, were used as a basis, for determining the position of the isovol lines. Table I shows the number of mines sampled in each county:

Table I—Number of Samples Obtained for Drawing Map

Allegheny.....	20	Groene.....	21
Armstrong.....	40	Huntingdon.....	5
Beaver.....	6	Indiana.....	33
Bedford.....	5	Jefferson.....	26
Blair.....	2	Lawrence.....	3
Bradford.....	2	Luzerne.....	2
Butler.....	17	Lycoming.....	1
Cambridg.....	92	McKean.....	2
Cameron.....	1	Mercer.....	5
Center.....	13	Somerset.....	77
Clarion.....	22	Sullivan.....	4
Clearfield.....	59	Tioga.....	9
Clinton.....	2	Washington.....	31
Elk.....	8	Westmoreland.....	44
Fayette.....	54		
			606

It should be explained here that, for the purpose of reducing the results of the analyses to a uniform basis, three forms were adopted: 1. Coal "as received" represents samples of coal received at the laboratory and assumed to represent the coal as it was cut in the mine, or taken out of the car as the case may be. 2. The "moisture-free" analysis represents the relative composition and heating value of dry coal and is used primarily for comparing similar coals of variable moisture content. 3. The "moisture-free and ash-free" analysis, known as the "pure-coal basis," represents approximately the relative composition and calorific value of the dry organic or combustible matter.

## MAP IS CONSTRUCTED "ON PURE COAL BASIS"

The percentage of volatile matter, on a "pure-coal basis," is obtained by the following formula:

$$\frac{\text{"As received" volatile matter}}{100 - (\text{ash} + \text{moisture})} = \frac{\text{Volatile matter in "pure coal"}}{\text{"pure coal"}}$$

In compiling the data for determining the position of the isovol lines on the map, the results of all the analyses were reduced to the pure-coal basis, although this is only an approximation; because ash does not have the same weight as the inorganic or incombustible matter in the coal. However, the maximum error is less than 1.5 per cent in comparing coals of about the same physical character and corresponding in ash-and-sulphur content. The greater the percentage of ash and sulphur, the greater the error in the pure-coal basis of rating.

Volatile matter on a "pure coal" basis is higher than on the "as received" basis which ordinarily is used in discussing the composition of coals. In coals having 20 per cent or less volatile matter on the "as received" basis, the volatile matter in the "pure coal" is approximately 1 per cent higher than in the coal on the former

NOTE—Adapted from Bulletin No. 81 of the Topographic and Geologic Survey by James D. Sisler.



basis and increases in direct ratio of 1 per cent to every 10 per cent of volatile matter on the "pure coal" basis.

Referring to the map, it will be readily recognized that the isovol lines there shown are necessarily generalized, although in the main they are accurate to a degree that is only limited by the lack of reliable samples in various localities. As would be expected, some analyses will appear anomalous, probably due to local variations of pressure in the folding of the strata. Naturally, such anomalies would have to be disregarded on a small-scale map.

The curtailment of the work for lack of adequate appropriations proved a serious handicap. In areas where the coal has been eroded, isovol lines are dotted and their position is more or less hypothetical, being based on the extent of folding and faulting in the district.

#### STATE HAS FEW COALS OF OVER 42.5 VOLATILE

Pennsylvania has few coals having in excess of 42.5 per cent of volatile matter. As indicated on the map, in small areas in the western part of Greene County and the southwestern corner of Washington County, together with a small area in the northwestern part of Washington, the southern part of Beaver County and the extreme western extremity of Allegheny County the volatile matter exceeds that percentage.

In general, however, the 42.5 isovol line marks the northwestern limits of the bituminous coal field in the state. Beyond this line to the northwest, only the lower beds of the Allegheny group and those of the Pottsville series are found, the overlying measures having been eroded. These lower beds cover but a small area, and their future value is negligible.

A careful study of the isovol map will show that Pennsylvania coals are generally and progressively less and less volatile from northwest to southeast. For example, the area containing coals ranging from 37.5 to 40 per cent of volatile matter, it will be observed, follow a general north-and-south direction along the valleys of the Monongahela and Allegheny Rivers to Redbank Creek, extending thence in a northeasterly direction in the vicinity of St. Marys and Coudersport. In the region of New Geneva and Lambertson, in Fayette County; Fredericktown and Millsboro, in Washington County; Herminie in Westmoreland County; Freeport, Johnetta, Manorville and Eddyville, in Armstrong County; and Summerville and Knoxdale in Jefferson County several small local areas have over 40 per cent of volatile matter.

In like manner, following the several isovol lines in regular order, the same gradual decrease in volatile matter continues in a southeasterly direction, till the Allegheny front is reached as indicated by the isovol showing 5 per cent of volatile matter, running through northern Schuylkill, southern Columbia, southern Luzerne and northern Carbon County is reached.

#### THEORIES OF ORIGIN AND FORMATION OF COAL

A brief reference to the origin and formation of coal will assist a clearer understanding of the isovol condition to which reference is here made. Recent work by Thiessen, Jeffry, Turner and Randall on the microscopy of coals has proven conclusively their organic origin. Two general processes are responsible for the formation of coal. These are biochemical and the dynamo-chemical; the former referring to the

chemistry of organic life and the latter to the chemical agencies resulting from dynamic forces acting within the earth.

The former of these two processes does not carry the original organic matter farther than the formation of peat. On the other hand, the latter is the greatest factor in the alteration of the coal-forming material, involving changes both physical and chemical in their character. The action in the latter case is twofold, being the result of both heat and pressure incident to the movement of the strata in folding and faulting, causing gradual dehydration, whereby the volatile matter, including combined oxygen, hydrogen and nitrogen is progressively eliminated.

The origin of the dynamic forces that have resulted in mountain building and been accompanied with much folding and faulting of strata, in Pennsylvania, is generally attributed to an abnormal thrust that originated somewhere southeast of the state, its energy being dissipated in a generally fanshaped northwest direction. It is not commonly assumed that the action of this force was sudden, but rather that it extended over a long period of geologic time. However this may be the ultimate result was the upheaval of the Allegheny front, the effect extending northwesterly to the limits of severe folding in Fayette, Westmoreland, Indiana and Jefferson Counties.

The most anomalous variation in the gradual increase in volatile matter in the coal beds, from the Allegheny front northwesterly, occurs in the vicinity of Windber, in northern Somerset County, where the percentage of volatile matter is 15 per cent and less, though surrounded by areas ranging from 15 to 20 per cent. Though the cause of this local variation is unknown, it is Mr. Sisler's belief that beds of sandstone and limestone in the vicinity, by their greater resistance to the dynamic forces caused an undue devolatilization of the adjacent coal beds. David White believes that coal is more responsive to pressure than the enfolding strata, which would help to account for this local condition, which is found also at other local centers.

In southeastern Clearfield County, in the vicinity of Smoke Run and Osceola, the coals range from 20 to 22.5 per cent volatile matter, although surrounded by large areas of coal containing 22.5 to 25 per cent of the same. The rocks in eastern Clearfield County are much folded and faulted, though the faults are small, thrust faults predominating. The displacement here is generally less than 50 ft., vertically. Mr. Sisler's belief is that the areas low in volatile matter, in each of these cases, have been subjected to a greater pressure, because of the higher resistance of the adjacent rocks. In the latter case, however, the pressure has been somewhat relieved by numerous faults and the buckling of the beds.

#### RELATION OF OIL AND GAS TO COAL FORMATION

In a paper treating on the relations in origin between coal and petroleum, *Journal of the Washington Academy of Science*, Vol. 5, pp. 189-212, 1915, David White has advanced the theory that there is a direct relation between the rank of oils and the degree of alteration of carbonaceous deposits. He states that oils in regions and formations that have been altered but slightly by dynamic forces, are heavy and of low rank. On the other hand, regions that have been subjected to greater alteration, by dynamic influences, present oil of higher rank and lower specific gravity. Mr. White points out

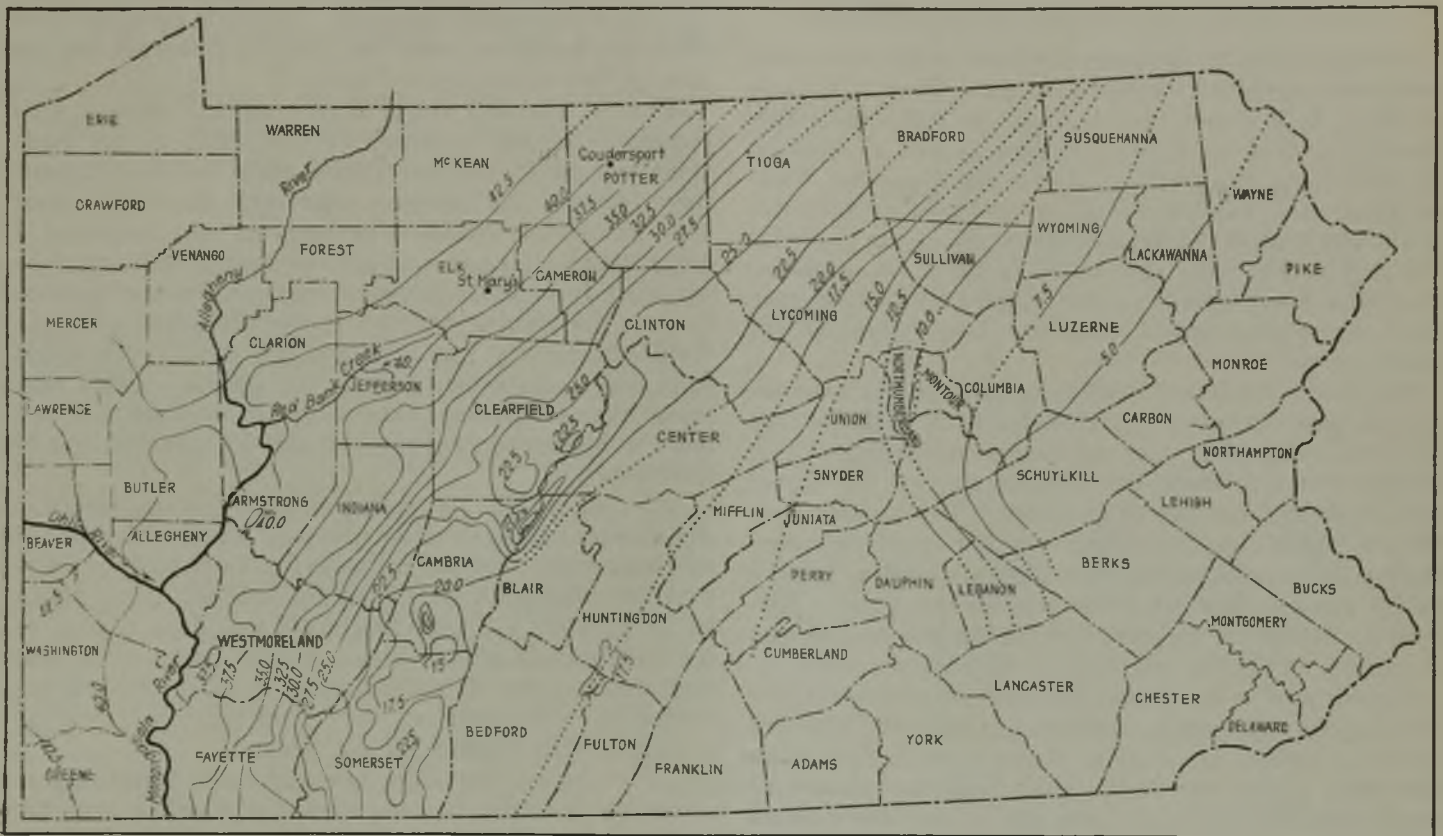


the fact that no pools of oil are present in rocks bearing coals having more than 65 per cent of fixed carbon, whereas in successive underlying formations, or in stratigraphically lower sands in the same formation, the oils are progressively higher in rank.

Applying these facts to the progressive devolatilization of the organic deposits in any formation, it is claimed that when the volatile matter has decreased to 30 or 35 per cent (pure-coal basis), in more provinces, commercial oil pools cannot be expected in that or any underlying formation, although commercial gas pools may occur in the border zone of higher carbonization.

In Greene, Washington and southern Allegheny Counties the oil pools lie on or west of the 40-isovol line, which cuts through the center of the gas fields in Greene, Washington and Allegheny Counties. In northern Allegheny, Butler and Armstrong Counties the oil pools lie on the 40-isovol line. In the northwest counties all of the oil pools lie west of the 42.5-isovol line. In Butler County, the gas fields are scattered, some of them being even west of the 42.5-isovol, whereas in Armstrong County the gas wells are east of that line.

The extensive gas pools of Greene and Jefferson Counties lie west of the 37.5-isovol, with the exception of



Map of Pennsylvania Showing Lines of Equal Devolatilization

In those sections where coal is absent, the direction of the lines is indicated by dots and has been roughly determined by a consideration of the probable stressing of the measures in the period of folding and from indications afforded by the nearest adjacent coal fields. The map was made

by using 1,500 analyses made of coal from 606 separate mines, spread somewhat evenly over the country. In some sections it was necessary, however, to take analyses made when the art was not standardized as at present and was not conducted as it is today. This introduces a slight inaccur-

acy which is unavoidable. The isovols, or lines of equal devolatilization, are in some places detached from the main lines and irregular. This is believed to be the result of unequal folding or of unequal resistance to rock pressures which caused a variation in the heat developed.

Table II, which is extracted from a paper by Myron L. Fuller, summarizes Mr. White's conclusions.

Table II—Relation of Volatile Matter (Pure-Coal Basis) to Oil and Gas Accumulation\*

Volatile Matter in Coal	Type of Oil Production
Under 30	Practically no oil and gas.
30 to 35	Small shows but no commercial production.
35 to 40	Isolated gas wells common, commercial oil pools rare, but of high rank.
40 to 45	Principal fields of light oil and gas of the world.
45 to 50	Principal fields of medium oil of Ohio, Indiana, and mid-continent.
Over 50	Fields of heavy Coastal Plain oils and of unconsolidated Tertiary or other formations.

\* Fuller, Myron L., Relation of Oil to Carbon Ratios of Pennsylvania Coals in North Texas; Economic Geology, Vol. XIV, pp. 536-42, November 1919.

OIL AND GAS POOLS IN PENNSYLVANIA

The hypotheses advanced by Mr. White hold true in the coal fields of Pennsylvania. The principal oil and gas pools lie west of the 35-isovol line. The principal oil pools lie west of or in the area containing coals having 40 per cent volatile matter. The 25-isovol line appears to be the eastern limit of the small commercial oil and gas pools.

a few near Punxsutawney, which lie between the 35- and 37.5-isovols. The gas fields of Forest, Elk, McKean and Potter Counties lie on or west of the 40-isovol. The Cameron gas field, which has not been extensively developed, lies on the 35-isovol, which appears to be the eastern limit of large commercial oil and gas pools. It may happen, however, that in areas east of this line where the alteration of organic material is great, some small wells may be found, but the oils will be light and of sporadic occurrence. Mr. Sisler suggests that wildcatting in eastern Pennsylvania should cease unless competent geologists or petroleum engineers consider the location favorable.

The percentage of volatile matter in coal affects its burning and so determines its suitability for various uses. The bituminous coals of Pennsylvania vary considerably in their composition and their adaptation to different uses. On this account, a coal must be chosen according to its type, if its use is to prove efficient.

The coals in northern Somerset County, particularly in the vicinity of Windber, and in Cambria Counties



are low-volatile, smokeless, steam coals. They are particularly valuable for railroad use and bunker fuel, besides being in great demand for domestic use. An excellent smithing coal occurs in the vicinity of Friedens, Somerset County, and in the vicinity of Lilly, Cambria County, these coals forming the upper Freeport seam. Lying to the east, the coals in the Broadtop field, in Bedford and Huntington Counties, average about 17½ per cent volatile matter and are highly prized for domestic fuel. Much of this coal is also used by the railroad and it has been coked with varying success, for many years.

#### COKING COALS VARY IN STRUCTURAL STRENGTH

Turning again to the west, the coals in the Johnstown region are mixed with other coals for coking. The coals on Black Lick Creek further west, in Indiana County, have been coked with much success as well as those in the vicinity of Bennington. The coals of eastern Westmoreland and Fayette Counties are used entirely for steam and domestic purposes, and those of the Connellsville basin, occupying the center of these two counties, have long been known as the Pittsburgh coking coal, from which high-grade coke has been produced for many years.

The coke from this district is unexcelled and has been used in blast furnaces since 1841. It is probable that this area of coking coal extends southwestward into Greene County, where the Pittsburgh bed lies under deep cover and has yet to be tested. The western portion of these two counties, together with northern Greene and southeastern Washington counties, form a typical gas-coal district. The coal in this area is particularly suited for making illuminating gas and is used extensively in the manufacture of byproduct coke.

Passing now to the north, the coals of northern Cambria County, Clearfield, Jefferson, Cameron, Elk and Clinton counties, are typical steam coals. They have been coked locally for use in blast furnaces. Clearfield County includes the area underlaid by the long-famous Moshannon coal, which has been highly valued for steam and domestic purposes, the coal being of the so-called smokeless type. The coals of Indiana County, on the west, are now almost entirely used for steam purposes. Some plants are coking this coal, which will probably be more extensively coked when the typical coking coals of southwestern Pennsylvania have been exhausted. They will at least be valuable in the near future for mixing with other coals for coking.

#### ARMSTRONG'S AND CLARION'S COMING GAS COALS

On the south and west, the coals of Washington, Allegheny, Beaver, Mercer and Butler counties are almost entirely used for steam and domestic purposes. Though containing a large percentage of volatile matter, these coals are much in demand as railroad fuel and much of it is also shipped to the Lakes. The coals in Armstrong and Clarion counties are high-volatile gas coals. Though now being used chiefly for steam and domestic purposes, these coals will undoubtedly gain an unexcelled reputation as unusually high-grade gas coals within a few years when the Pittsburgh bed, in the Irwin basin, becomes exhausted. In areas where the coal is high in ash and sulphur, however, it will be necessary to install picking and washing machinery to eliminate these factors.

The great variety of Pennsylvania coals offers the purchaser a wide field of choice.

## The Miner's Torch

### A Case of Conscience

MANUFACTURERS of equipment always feel beholden to employees of mining companies who help them make a success of experimental installations and occasionally such gratitude finds expression in terms of rather substantial presents. Without question such gifts are proffered with the best of intention on the part of the manufacturer, but—

While I was still young in the mining game I once recommended the purchase of equipment to my superiors and finally almost against their better judgment they followed my advice. Although there had been little precedent available to back up my judgment I made definite promises about the results that could be expected from the equipment and pinned my faith to them. The results obtained in the beginning were far from satisfactory and it is possible they never would have been satisfactory but for my efforts. (This may sound like self applause but it is not so intended.) I had more at stake than anyone else and I conducted myself accordingly.

After all of the "kinks" had been straightened out the general manager of the company that had furnished the equipment sent me a check for \$100 just to show that the company appreciated the interest I had taken in its problem. I kept the check two days trying to convince myself that I had a perfect right to it and then decided that I had no right to accept it, and returned it. "No man can serve two masters" was the argument that I could not get around.

I often recall that little adventure and sometimes it seems to me that in returning the check I was too jealous of my honor, but more often I feel just the other way about it. Just now it has been brought back to mind by a bit of gossip that I picked up concerning a man who was associated with me at that time. He was much disgusted with my decision and derived no small amount of pleasure from telling my friends about the incident; he generally wound up by quoting Shakespeare to this effect: "Conscience does make cowards of us all."

We drifted apart and I had lost track of him. Today a salesman mentioned his name and when I told him that I had not been in touch with him for a number of years he talked to me for more than an hour about my friend's "rise and fall," as he expressed it.

I learned that he rose rapidly and for a time seemed destined to reach a high place; then faltered in his climb and shortly began to drop back down the ladder. For the last few years he has never remained in one position long and each time the change has meant a smaller salary. "And how do folks account for this change in his fortune," I asked. "They say," said the salesman, "he has always had his hands out behind, if you know what that means, and in spite of his recent experiences he has not yet learned his lesson."

Well it hasn't helped him to know that "Conscience does make cowards of us all." Wonder if he ever heard this one: "If the camel once gets his nose in the tent his body will soon follow."





## News Of the Industry



### Competition from Ruhr May Force British To Prepare Coal Less Carefully

Loading by "Dustpan" to Keep Down Dirt and Breakage Restricts Quantity—Varieties From Same Bed Parted and Analyzed Separately—Americans Favor Practice Here

By PAUL WOOTON  
Washington Correspondent of *Coal Age*

Americans who made the tour of British coal mines in connection with their attendance at the World Power Conference, at London, were impressed particularly in all the British fields with the care exercised to prevent breaking the coal. A degree of care is exercised that is entirely precluded in this country by high labor cost. Similar care is exercised to keep coal clean. In South Wales, for instance, there is universal use of a sort of exaggerated dustpan for loading coal in mine cars. The mine owners admit that the use of this "box," as it is called, restricts the amount of coal the men can load, but they explain that the use of regular shovels would result in dirt being dug up from the bottom.

South Wales continues to pay by the ton of "large" coal. At the tippie the coal passes over 1½-in. bars and is screened, weighed and recorded. One of the reasons why they use so little powder is the fact that they do not wish to break up the coal. Fortunately most British coal comes down easily. The desire to prevent breakage has become inborn. The British regard our mechanical trimmer as all but a criminal device. They are in no way interested in installing this "Yankee notion." They are convinced that their reputation in international trade is built largely on size. With the release of the Ruhr many Americans will not be surprised to see the competitive situation become such as to force the abandonment by the British of some of these practices which add to the cost of their coal.

#### Separate Coal from Same Seam

Another practice which astounds visitors from the United States is the separation of coal coming from the same seam when there is a difference in its physical character. In Great Britain there frequently is a stratification within the seam such as is rarely encountered in the United States. The famous Barnsley bed, in Yorkshire and the Midlands, for instance, carries an extremely hard steam coal in one part of the seam and a much favored house coal in another. As this coal is loaded the steam coal is put in one car and the house coal in

another. The steam coal is dumped on one set of screens and the house coal on another. Pickers re-sort any lumps that may have been classified wrongly by the loaders underground. It is contended that the sorting adds very little to the cost of the coal, but does add very materially to the sales realization.

This rather common sharp difference of qualities in the seams has led to an interesting practice in sampling. We think of a coal seam as a homogeneous thing. Our approved method of sampling is to cut a channel through the seam from top to bottom and quarter the coal until the sample has reached a size that can be handled conveniently. In England, however, separate analysis are made for each layer composing the bed. They frequently reveal marked variations in the value of the coal. In one bed, for instance, this practice revealed that a coal which formerly was penalized because of its sulphur content was getting all of its sulphur from a narrow band in one part of the seam, which could be picked out easily. With that band removed the coal was marketable for metallurgical coke.

#### Americans Favor Scheme

Some of the returning Americans think there might be some application of this practice to some of our coal seams. The suggestion will be made to the Bureau of Mines that some investigation be made.

The Americans found the British immensely interested in low-temperature carbonization. They are striving to attain a smokeless fireplace fuel which can be burned readily in the type of grate found in practically every room of a British residence. Byproduct coke and gas coke usually are not suitable. The best fuel to furnish the Britisher with his much-prized "cheery fire" is a coal only partly coked so that enough of the volatile content is left to produce the flame. This accounts for the intensive research in connection with low-temperature carbonization, where coking is not carried as far as in the byproduct oven.

This work also is being encouraged by the demand for motor spirit. The British are anxious to render them-

### Northwest Rate Changes Save from South Illinois Suspended Till Jan. 8

Investigation was ordered by the Interstate Commerce Commission Sept. 9 into new rates proposing to increase and reduce rates on coal from points in northern and central Illinois to points in Michigan, Minnesota, North and South Dakota and Wisconsin. The changes were to have become effective Sept. 10, but were suspended until Jan. 8, 1925, pending the result of the investigation.

The rates from southern Illinois, however, went into effect Sept. 10, as per schedule, incidentally causing much confusion. This leaves the other fields with a distinct advantage over the southern Illinois district. From the Linton field of southern Indiana, for instance, to the Twin Cities, the rate on lump coal is \$3.22 and on screenings \$3.05, while southern Illinois rates are \$3.75 and \$3.56.

selves less dependent on the outside world for motor fuel. Some of the low-temperature processes claim a larger yield of motor spirit than is obtainable as a result of byproduct methods. No less than six large semi-commercial plants are being operated on low-temperature processes. Another half dozen methods are in various stages of promotion, but have not reached the point of erecting an experimental plant.

In the opinion of the Americans who looked over the low-temperature situation a commercial success has been attained for no one of the processes. They do produce a fine coke which burns freely without smoke. Considerable amounts of tar and oils are recovered, but the recoveries are not sufficient to meet the capital charges.

The London Coke Committee, a co-operative body on which all the gas companies are represented, has succeeded in meeting the situation by designing an open grate which will burn gas coke. By introducing fluted channels in the grate and at the back of the fire box just enough draft is provided to burn this coke at the proper rate. As a result of this device, supplemented by attractive advertising, the London coke companies practically have solved the problem of finding a market for their coke and breeze. A portion of it, however, is being used successfully under boilers.



## Lewis Lambasts Stone For Not Paying Scale In Union-Owned Mines

The Coal River Collieries Co., which operates coal mines in West Virginia and Kentucky and is owned by members of the Brotherhood of Locomotive Engineers, is condemned by President Lewis, of the United Mine Workers, because it still refuses to sign a union scale agreement. The mines are shut down because they cannot break even by operating under union demands, according to Warren S. Stone, head of the locomotive engineers and chairman of the board of the coal company. Mr. Stone's statement was contained in correspondence over the situation, with Mr. Lewis, made public by the miners' head in Indianapolis Sept. 9. Since last April the mines have been closed.

In a letter to Mr. Stone, dated Aug. 23, Mr. Lewis states that the employees of the Coal River company have been engaged in a strike since April 1, and declares that the company has assumed the same attitude as other operators in the field attempting to force the union men to take a wage reduction. "The Coal River Collieries Co., while not a member of the Kanawha Coal Operators' Association and while not utilizing the eviction instrument, is in all other respects apparently co-operating with the coal operators. This is an intolerable position for a coal company whose stock is largely owned and whose affairs are directed by union men to occupy."

In reply, Mr. Stone said that the miners' union failed to carry out its agreement with his company while it was operated on a union basis and that his company desired to continue operations last April, offering to continue existing wages until an agreement was worked out and to pay the increase if one was decided on. His company, he said, suffered loss of large contracts by being forced to close when the men refused an offer. He declared the mines had been closed rather than operate non-union. Mr. Stone denied that the miners of his company are on strike, declaring that they are ready to return to work now.

Calling attention to aid given by his brotherhood to the miners' union in cases of need, Mr. Stone's letter continued: "The members of the Brotherhood of Locomotive Engineers, who have invested over \$3,000,000 in these properties, are entitled to some return on their investment. I think you will concede this, and yet at the present price at which coal is selling, and the cost of mining under the Jacksonville agreement, it is impossible for the union mines to break even." Under the Jacksonville agreement, he said, labor costs for loading a ton of coal were \$1.63 and the ton sells for only \$1.50.

In reply, Mr. Lewis denied that his union had broken any of its agreements with the collieries company. "Your company occupies no different position in this matter than any other of the thousands of coal companies which have agreements with our organization. The United Mine Workers cannot be responsible for problems of

## Utah Gives Brotherhood Mine a Black Eye

The State of Utah does not think any too well of the Coal River Collieries of Kentucky and West Virginia, owned largely by the Brotherhood of Locomotive Engineers, and operated by a company headed by the head of the engineers' union, Warren S. Stone. Utah's Public Utilities Commission has denied the application of the company for the right to sell \$100,000 worth of its securities in Utah. Secretary Hicks, of the commission, said the company is operating at a loss. The commission refused to have the property of the company examined or appraised.

management in which they have no voice. The question of efficient management and low-cost production to enable you to remain in the market with competing companies is one that must be dealt with by your corporation. It is a problem that forever confronts one who elects to become a coal operator."

Mr. Lewis ended his letter by demanding that the collieries company negotiate an agreement with the union on the basis of the Jacksonville agreement. To this letter Mr. Stone did not reply and the correspondence is ended with a telegram from Mr. Lewis to Mr. Stone on Sept. 3 again asking Mr. Stone to reply to the letter asking that his company make an agreement with the miners' union.

## Huff Quits Presidency of Victor-American Fuel Co. In Shake-Up of Officials

The Victor-American Fuel Co., in Colorado, has changed officers. On Sept. 9 it was announced in Denver that W. H. Huff, president; G. F. Bartlett, vice-president, and S. I. Heyn, secretary, had resigned. The affairs of the company are in the hands of J. C. Osgood, of New York, principal stockholder and chairman of the board. He becomes the new president. Ben W. Snodgrass, former general superintendent, is made vice-president and general manager, and C. C. Deiter, treasurer, also takes the secretaryship.

No reasons for the resignations were assigned in the announcement but Mr. Huff has been in bad health for a long time. Mr. Osgood, who went to Denver about a month ago, was quoted in the Denver papers as saying: "I will take over a large part of the work of the three men and the remainder will be divided up among the other officers of the company. There will be no change in the company's policy. I have been the real manager of the company all along and I am now merely taking over the active management."

The Victor-American Fuel Co. is one of the largest operating coal companies in Colorado, having mines in Las Animas, Huerfano, Fremont and Routt counties. No important property changes are contemplated.

## Pennsylvania to Buy Control Of Norfolk & Western

A move by the Pennsylvania R.R. to acquire control of the Norfolk & Western Ry. by the purchase of common stock instead of by lease, as indicated some months ago, is reported to be definitely under way. This is the first definite information concerning the plans of the Pennsylvania since the announcement during the summer that the two committees of the roads, formed to consider possible merger terms, had abandoned further meetings for two or three months.

Two propositions, both involving the purchase of the Norfolk & Western stock and the formation of a new coal company, were outlined. The first plan provides that payment for the stock be made in 6 per cent bonds, together with one-fifth of a share in the new coal company for every share of Norfolk & Western. The price of the Norfolk & Western shares would be \$150 each.

### May Accept Counter Proposition

The counter proposition included the payment of a 20 per cent dividend and a guarantee of 8 per cent of Norfolk & Western stock and one share in the new coal company for each share of Norfolk & Western now held.

Of the two propositions the latter was generally considered to be the one that would prove more acceptable to the Norfolk & Western stockholders. In either case the announcement is considered as putting an end to the vague rumors of a possible lease to be obtained by the Pennsylvania.

The new coal company, according to the announcement, would be formed to take care of large holdings of the Norfolk & Western in the Pocahontas coal region of Virginia and West Virginia and would probably also include some holdings of the Pennsylvania. At present the Norfolk & Western owns all the capital stock, except directors' qualifying shares, of the Pocahontas Coal & Coke Co. This company does not mine or sell coal, but makes leases on royalties to operating companies. About 178,000 acres of its lands and rights were being so leased on Dec. 31, 1922, the last figures available.

### Has Coal Holdings in Kentucky

Under agreement with various coal companies, the road operates lines into other coal sections of West Virginia, including Mingo County. Eleven hundred acres of coal land in Pike County, Kentucky, formerly leased by the Pond Creek By-Products colliery became the property of the Norfolk & Western in 1921, representing an investment of approximately \$370,562.

One reason believed likely to influence the purchase of the stock instead of the lease of the line by the Pennsylvania is seen in the fact that the Pennsylvania already owns a large block of the Norfolk & Western common. On Dec. 31, 1923, the par value of the stock amounted to \$38,757,700, and at the present selling price would represent an investment of nearly \$50,000,000.



## Strikers Suffering Some In Western Kentucky

With cold weather close at hand it is believed that there may be some breaks in the ranks of the union miners in sections of the western Kentucky field around Central City, where the strike has now been absolute over an area of about 20 square miles for nearly five months. So far there have been no breaks in the Central City territory, and miners took it as a joke when the companies tried to resume at reduced wages Aug. 25.

The Central City field has been organized for more than 25 years, and is firm in its belief in the union. Union benefits have been small, however, and unless increased, the workers won't be able to go very far into the winter. Eviction suits may be started in that section before long, as has been the case in the lower fields. Over the summer the miner can get along with his garden and small benefits, but the pinch of winter is different.

Already there has been some breaking into stores and stealing of food-stuffs. One operator recently had some of his own workers arrested, charged with storehouse robbing, which indicates that workers are getting more desperate.

The Norton Coal Mining Co., at Nortonville, recently reached an independent non-union agreement with workers and resumed operations. During the night of Sept. 4, four notices were posted about the camp, signed "Herrin," West Frankfort, Ill., "Muhlenburg," and "Indiana," these notices bearing "Quit Scabbing" in crude lettering, and amateurish drawings of coffins.

## July U. S. Soft-Coal Exports Largest of Year

Exports of bituminous coal from the United States during July, 1924, amounted to 1,630,849 gross tons, a notable increase over the 1,424,194 tons shipped during June, which had been the largest monthly shipment during the current year, according to the Coal Division of the Department of Commerce. Overseas exports amounting to 418,500 tons, against 317,325 tons in June, likewise were the largest of the year. Exports to Canada during July amounted to 1,202,400 tons, as compared with 1,096,467 tons in June, topping all other monthly shipments during 1924.

One of the reasons for increased overseas shipments in July was the heavier movement to Italy, totaling 115,055 tons, against 71,848 tons in June. Only during the past two months has any coal been exported to Germany during the present year, 3,743 tons being shipped in June and 8,227 tons in July. Of particular interest is the 5,542 tons of bituminous coal destined for Austria during July.

Exports to all countries of South America were the second largest monthly shipments during 1924, amounting to 39,098 tons, as compared with 84,302 tons during June. The 104,959 tons of coal shipped to Brazil



C. E. Lawall

Assistant professor of mining engineering in the University of West Virginia, who has been designated acting head of the department with the rank of associate professor. He succeeds A. C. Callen, now dean of mining at the University of Illinois.

during July represent a large increase over the 66,078 tons exported in June and take second place in monthly shipments to that country during the current year. To Argentina exports totaled 19,104 tons, also an increase over the June shipments, and while there were no exports to Uruguay during June, 5,014 tons were shipped during July.

Two unusual features of the exports during July were shipments of 5,745 tons to the Philippine Islands and 6,590 tons to British Oceania.

Exports of anthracite during July totaled 290,097 tons, against 349,134 tons in June, Canada receiving 279,088 and 335,154 tons respectively in the two months. Coke exports amounting to 48,983 tons, against 48,238 in June, are the highest since March. Of the total coke exports, Canada received 40,438 tons in July compared with 39,691 tons in June.

## Lackawanna Not to Merge, Says Truesdale

William H. Truesdale, president of the Delaware, Lackawanna & Western R.R., denies that his road is involved in the merger plans of the Van Sweringen or will be part of any other system. "The Lackawanna is going into no system," he declared, when attention was drawn to the report that the continued strength of the stock reflected buying by Van Sweringen interests.

Mr. Truesdale was unwilling to make any statement in reference to the \$60,000,000 of Glen Alden Coal Co. bonds now held in the treasury of the Delaware, Lackawanna & Western. Recent rumor has it that these bonds were slated for distribution among stockholders of the road.

## Railroads Make New Record In Efficient Use of Coal

Railroads of the United States made a new record in the economical use of coal during June of this year, according to records of the Interstate Commerce Commission, following urging by the American Railway Association and the International Railway Fuel Association that greater care be exercised in the use of fuel.

Freight locomotives in road service consumed 135 lb. of coal per 1,000 gross ton-miles in June, 1924. The nearest approach to this record since statistics have been kept was 141 lb. in June, 1922. The fuel consumed per passenger car mile in June was 15.6 lb., as compared with the previous record of 15.8 lb., made in June, 1922.

The fuel consumption in June of this year was 11 lb. less per 1,000 gross ton-miles than in June, 1923. In the first six months of this year there was a reduction of 13 lb. of coal used per 1,000 gross ton-miles, making a total saving of approximately 3,371,500 tons of coal at an average price of \$3.17 per ton, meaning a saving of about \$10,688,000 for the six months' period.

In passenger service the first six months of the year showed a reduction from 19.2 to 17.7 lb. per train car-mile, resulting in a saving of about \$4,235,000 in cost of fuel. In the first six months of the year, therefore, the total saving resulting directly from fuel economy in both the freight and passenger services amounted to almost \$15,000,000.

This economy has been brought about largely through the concerted and persistent efforts of the railroads to impress upon their employees the importance of fuel economy. Men concerned with the handling and use of fuel have been educated through the medium of meetings, posters and the moving picture. Some roads have set up "bogies" and have checked performances against these standards set.

A number of other reasons have contributed to this increased fuel economy. The railroads have been gradually retiring from service the older locomotives and substituting for them improved and more efficient types. Also during the recent comparatively slack period, the roads naturally stored their older locomotives and kept in service their more efficient ones.

## Cash Balance in Coffers of Miners' Union Gains

The auditor's report of the International union, United Mine Workers, for the six months ending May 31 last shows that the income for this period was \$1,320,861; expenditures, \$867,325, leaving a balance on hand of \$1,630,557, which includes \$961,900 of Liberty bonds.

Dues and assessment yielded \$1,257,051 among the income items. Salaries and expenses consumed \$369,332, publication of the *Miners Journal* cost \$79,565, attorney fees amounted to \$65,560 and El'is Searles was paid \$10,897 for "publicity." The balance on hand exceeded the balance of Dec. 1, 1923, by \$443,536.



### Alberta Miners Again Refuse 12½ Per Cent Cut

Overtures for the settlement of the coal miners' strike which has been in effect now for four months in eastern British Columbia and the Province of Alberta were made recently by James Murdock, federal Minister of Labor, but were rejected. He proposed a 12½ per cent reduction. W. A. Sherman, president of District 18, United Mine Workers, speaking for the miners' conference committee, said that it had been concluded, after careful deliberation and consideration, that the basis for settlement proposed was unjust and "cannot be conceded by our organization, and such is our decision." Mr. Murdock's suggestion was that the strike be settled on the basis of one-eighth reduction of wages existing as at March 31 last.

Commenting on the attitude of the miners' officials the minister said: "I think they have not a proper regard for the rights and interests of the public in the matter. I asked them to submit a referendum vote to the striking miners, but they declined to do so and I think they should have done that."

Mr. Murdock observed that common above-ground labor at the mines was striking for 82c. an hour while the current or fair wage for such labor was established in the government's fair wage policy as 45c. an hour. Mining carpenters were asking for better than \$1 an hour while the current and fair wage for carpenters in various parts of Canada was 80c. an hour, running, of course, somewhat lower and in some cases a little higher. A similar comparison, he said, might be made with other classes of labor.

"One reason for my suggestion," said Mr. Murdock, "was that in the Central Competitive region, upon which the miners in this territory base their claim, the miners' day is eight hours from face to face while the day in District 18 is eight hours from bank to bank. That means that the total elapsed period in

### Illinois Central Places Big Coal-Car Order

An order for new equipment, which railroad circles estimate exceeded \$16,000,000 in value, has been placed by the Illinois Central R.R. This order was for 6,200 new freight cars, of which 4,000 are to be gondolas, and follows closely upon an order of the same railroad for twenty-five mountain-type locomotives.

The order for 6,200 freight cars was distributed as follows: 1,000 gondolas each with the General American Tank Car, the Pullman Car & Manufacturing and the Western Steel Car & Foundry companies; 500 gondolas each with the Mount Vernon Car & Manufacturing and the Ryan Car companies; 1,000 box cars with the Standard Steel Car Co. and 1,000 box and 200 stock cars with the American Car & Foundry Co.

which a miner in the Central Competitive field required to complete a day's work is at least nine hours, for the reason that there is one hour reduction for the lunch period in the middle of the day, and to this time should properly be added such time as was necessary for the miner in the Central Competitive field to go from bank to face and return from face to bank before and after completing his day's work.

"Personally I regret the attitude of the miners' committee and it is unfortunate and entirely unfair that these workmen should be engaged in a strike which has now lasted for four months for the purpose of insisting upon the retention of a war-time bonus which amounts to approximately \$1.17 per man per day. It is, I think, conceded that other classes of labor generally, farmers and business men, have been compelled to relinquish peak war-time bonuses."

### Matthew Addy Co. Goes Into Hands of Receiver

The Matthew Addy Co., Cincinnati, jobbers and brokers in iron, coal and coke, went into the hands of a receiver Sept. 11, dissension among officers and directors having defeated the efforts of a creditors' committee, which for three weeks had been working with a view to reorganizing the company.

"Frozen" assets and the uncertainty of pending litigation, for and against the company, in the state and federal courts, were blamed by attorneys for the company's present financial embarrassment.

The receivership proceedings were brought by the Old Dominion Coal, Iron & Coke Corporation, of Virginia, which charged it was a creditor for \$7,656.70 for coke sold and delivered. Through mutual agreement between the company and a committee representing a number of the larger creditors, John H. Dickerson, former president of the Business Men's Club of Cincinnati, was appointed receiver by Judge Stanley Struble, under \$10,000 bond.

The company, a \$600,000 corporation, is said to have done an annual business of several millions of dollars. The creditors' committee had been working harmoniously toward bringing about a reorganization of the company and to avoid the receivership proceedings. Internal dissension, however, made it impossible to work out an amicable agreement and it was decided at a joint meeting of creditors and officers and directors to allow the company to go into a receivership.

A preliminary audit of the books of the company, attorneys said, showed assets of approximately \$960,000, while its merchandise liabilities were approximately \$525,000. While the books of the company indicate that it was solvent, its actual solvency depended upon what it was able to realize from the sale of its coal and fluorspar properties and the outcome of the pending litigation, it was said.

## Output and Value of Coal from Alabama and Arkansas Mines in 1923

(Compiled by U. S. Geological Survey)

State and County	Loaded at mines for shipment (net tons)	Sold to local trade and used by employees (net tons)	Used at mines for steam and heat (net tons)	Made into coke at mines (net tons)	Total quantity (net tons)	Total value	Average value per ton		Number of employees		Average number of days worked	
							Underground	Surface	a	others		
<b>Alabama</b>												
Bibb.....	1,192,795	5,338	28,938	.....	1,227,071	\$3,345,000	\$2.73	1,174	498	392	2,064	207
Blount.....	257,007	1,508	5,000	.....	263,515	667,000	2.53	358	57	99	514	165
Etowah.....	128,118	1,864	2,173	.....	132,155	366,000	2.77	161	25	50	236	302
Jefferson.....	9,410,779	113,367	170,221	55,502	9,749,869	24,562,000	2.52	7,338	3,921	2,288	13,547	254
St. Clair.....	772,016	4,617	26,648	.....	803,281	1,984,000	2.47	503	206	85	794	271
Shelby.....	660,113	4,990	11,374	.....	676,477	2,198,000	3.25	872	339	234	1,445	251
Tuscaloosa.....	974,009	22,577	17,238	203,403	1,217,227	2,742,000	2.25	1,028	423	294	1,745	258
Walker.....	5,898,200	211,965	38,903	.....	6,149,068	15,011,000	2.44	5,619	1,781	1,894	9,294	205
Winston.....	19,736	2,100	.....	.....	21,836	66,000	3.02	44	15	15	74	112
Other counties b.....	169,851	2,428	6,861	.....	179,140	598,000	3.34	207	65	50	322	215
Total, excluding wagon mines..	19,482,624	370,754	307,356	258,905	20,419,639	51,539,000	2.52	17,304	7,330	5,401	30,035	232
Wagon mines served by rail....	38,010	.....	.....	.....	38,010	85,000	2.23	.....	.....	.....	.....	.....
<b>Grand Total.....</b>	<b>19,520,634</b>	<b>370,754</b>	<b>307,356</b>	<b>258,905</b>	<b>20,457,649</b>	<b>51,624,000</b>	<b>2.52</b>	<b>.....</b>	<b>.....</b>	<b>.....</b>	<b>.....</b>	<b>.....</b>
<b>Arkansas</b>												
Franklin.....	246,487	1,791	5,763	.....	254,041	845,000	3.33	272	99	241	612	105
Johnson.....	174,110	1,542	4,139	.....	179,791	898,000	4.99	330	170	235	735	78
Logan.....	79,535	3,820	1,171	.....	84,526	521,000	6.16	248	83	44	375	104
Sebastian.....	620,960	1,583	20,174	.....	642,717	2,197,000	3.42	1,180	456	243	1,879	94
Other counties c.....	60,668	4,109	7,450	.....	72,167	524,000	7.26	94	38	21	153	189
Total, excluding wagon mines..	1,181,700	12,845	38,697	.....	1,233,242	4,985,000	4.04	2,124	846	784	3,754	97
Wagon mines served by rail....	63,650	.....	.....	.....	63,650	207,000	3.26	.....	.....	.....	.....	.....
<b>Grand total.....</b>	<b>1,245,350</b>	<b>12,845</b>	<b>38,697</b>	<b>.....</b>	<b>1,296,892</b>	<b>5,192,000</b>	<b>4.01</b>	<b>.....</b>	<b>.....</b>	<b>.....</b>	<b>.....</b>	<b>.....</b>

(a) Includes also loaders and shotfirers. (b) Franklin and Marion. (c) Pope, Scott and Washington.



## Standardization Conference To Be Held at Meeting of American Mining Congress

A feature of the annual convention of the American Mining Congress, Sacramento, Cal., Sept. 29 to Oct. 4, will be the National Exposition of Mines and Industrial Equipment. Exhibits will be made by manufacturing concerns from all parts of the country and by the Bureau of Mines, California State Mining Bureau, and county mining organizations of California. The exhibits will include a demonstration of the mine rescue and safety work.

The Pacific Coast office of the Bureau of Mines will stage a demonstration of the effective work which the Bureau is doing in training miners in mine-rescue work and in carrying on a campaign of education for greater safety in mining. A complete cross-section of a mine will be built, which will enable spectators to see a demonstration of a mine explosion and the rescue crew going into the stokes and bringing out injured comrades. In the mine there will be displays of different types of mine equipment and adjoining the working demonstration will be displayed the newest safety devices.

There will be 100 exhibits of the latest types of labor-saving and cost-reducing mechanical equipment.

The program of the fifth national standardization conference, to be held in conjunction with the convention, will include reports on the progress of the Coal Mining Branch of the Standardization Division, American Mining Congress, Warren R. Roberts, national chairman, and of the Mining Correlating Committee, American Engineering Standards Committee, Dr. E. A. Holbrook, chairman. Committee reports by the Coal Mining Branch will include the following: "Underground Transportation," C. E. Watts, Berwind-White Coal Mining Co., chairman; "Mining and Loading Equipment," D. J. Carroll, Chicago, Wilmington & Franklin Coal Co., chairman; "Mine Drainage," Charles H. Matthews, Westinghouse Electric & Mfg. Co., chairman; "Mine Ventilation," C. H. Trik, Jeffrey Mfg. Co., chairman; "Outside Coal-Handling Equipment," James Needham, St. Paul Coal Co., chairman; "Power Equipment," F. L. Stone, General Electric Co., chairman; "Underground Power Transmission," A. B. Kiser, Pittsburgh Coal Co., chairman; "Mine Timbering," R. L. Adams, Old Ben Coal Corporation, chairman.

## Westmoreland Company Starts Big and Modern Mine

A large modern mine, planned for a daily output of 3,500 tons, is being opened up by the Westmoreland Coal Co., Irwin, Pa., in the last large tract of undeveloped Pittsburgh coal in Sewickley Township (Westmoreland County), a holding of 3,000 acres. Many of the details, such as the choice of equipment, are yet pending.

Work has commenced on a three-compartment hoisting shaft, inside dimensions 12 x 34 ft., which will be completely lined with concrete. This shaft, which will be 300 ft. deep, has already been sunk to a depth of 100 ft. Simultaneously with the sinking of the shaft a 12 x 15-ft. two-compartment slope with an upper deck for man travel and a lower deck for materials, has been driven a distance of 200 ft.; its total length will be 900 ft.

In addition to the tippie and other buildings outside construction work will include the erection of a modern mining town for housing all the men to be employed. This new mine will be in operation some time next year.

## C. C. & O. Approves Lease

Directors of the Carolina, Clinchfield & Ohio R.R. approved on Sept. 12 the signing of the joint lease with the Atlantic Coast Line and the Louisville & Nashville for 999 years, as revised by the Interstate Commerce Commission. The lease previously had been approved by the boards of directors of the Atlantic Coast Line and the Louisville & Nashville.

Apparently the Department of Justice has placed the entire controversy with regard to trade-association statistics in cold storage until after the election. While it is regarded as practically certain that the department will take no exception to the association which collects statistics of production and stocks, and communicates only aggregates to its members, it is thought certain that no statement with regard to trade associations will be forthcoming at this time. The strong stand taken by the American Federation of Labor opposing undue limitation of trade-association activities is expected to discourage any demagogic attacks on this type of business activity.

## Sproul Interests Absorb Three Independent Firms In New Anthracite Merger

Special to *Coal Age*

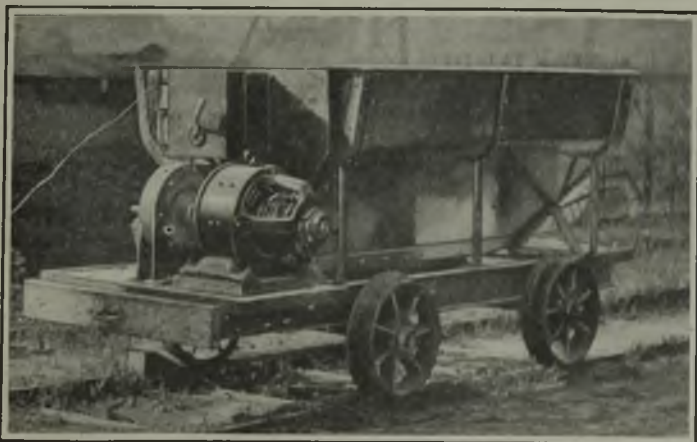
Scranton, Pa., Sept. 16—The Von Storch Collieries Co., the Legitts Creek colliery and the West Ridge colliery, three large independent producers with operations near this city, are to be consolidated to form a new anthracite coal company under the merger planned by former Governor William C. Sproul and a syndicate of financiers, it was learned from authentic sources today. Reports had it that the consolidation would be completed by October, but this was not confirmed by officials of the companies concerned, who said that the merger was now in process of negotiation.

Warren Acker, of Scranton, and associates are the owners of the Von Storch Collieries Co. The Legitts Creek Company is owned by J. P. Burton and Hartman, of New York, and the West Ridge colliery is owned by Frank M. Vandling and others, of this city. Miller-Lynch Company, of New York, and Brown Brothers, of Philadelphia, are handling the negotiations, it is stated.

## Alberta Coal Cannot Go East

Coal from the Province of Alberta will not be marketed in eastern Canada this winter. This announcement was made recently after a conference between Premier Greenfield, of Alberta; Charles Stewart, Minister of the Interior in the Dominion Government, and Sir Henry Thornton, president of the Canadian National Rys. Sir Henry Thornton was unable to meet the joint proposals of the province and the Dominion, contending that the freight charges the operators were prepared to meet, together with the assistance the federal subsidy would insure, were not sufficient to justify the number of cars necessary for the handling of the business, particularly as these cars were urgently required to move grain.

Sir Henry argued that the railway could not move the coal under \$9 a ton, though government experts declared that it could be transported for \$7 a ton. The Dominion Government's subsidy proposed to guarantee the railway against any loss on the \$7 rate. The latter was impossible in the opinion of the Canadian National Ry. and Sir Henry suggested that the boards representing the railway and the government get together with a view to ascertaining whose figures were correct. Subsequently Sir Henry was interviewed by coal operators at Drumheller, and to them he said that, even should the \$7 rate be made effective, the Eastern American coal interests would put up a big fight to retain their market. Why, he asked, could not Drumheller coal be sold in Montana, Oregon and Washington? He was told that what was wanted were steady customers in Ontario.



Rock-Dusting  
Car

This car with 5-hp. motor and blower has been built for the Westmoreland Coal Co., for use at its Criterion mine. It will be noted that it is built of steel and is of permanent rather than experimental construction.





## Practical Pointers For Electrical And Mechanical Men



### Electric Lights for Inside and Outside Service at the Mines

Voltage Drops Should Be Kept as Low as Possible So That Lamps  
May Operate Efficiently—Ways to Connect  
Lights to Three-Phase Systems

**I**N THE past few years the tendency has been more or less to standardize the voltage used for lighting service in and about mines, using the same voltage underground as on the surface. Something of course may be said in favor of standardization, but to use indiscriminately any equipment either above or below ground, without regard to the many different conditions prevailing, is not the way to obtain the best results, neither is it conducive to safety, especially in mining work. Underground lighting systems as a rule are subject to extremely onerous conditions. The chances of leakages and the possibility that fires will result therefrom, are much more numerous than with surface lighting.

When electric light was first introduced into coal mines, the generating plants usually were of small dimensions, and the voltage was low compared with what has become common practice today. One of the principal reasons for employing low pressure, was to guard against leakage, though on account of the inferior character of many of these earlier installations, the danger nevertheless was considerable, and minor outbreaks of fire often occurred. Improvements in wiring methods, equipment and insulation however, soon led to better practices, and engineers gained confidence and so were led to introduce higher voltages.

On the whole these installations despite their higher voltages were safer because, granted suitable insulation was provided, there was the advantage that the current employed varied inversely with the voltage, and therefore reduced the possibilities of heated connections—a frequent source of trouble in the earlier low-voltage lighting installations.

The old carbon-filament incandescent lamp required much more power per candlepower than incandescent lamps of modern type. The original carbon-filament lamps consumed anywhere from 3.5 to 4 watts per candlepower, consequently, when a 16-cp. lamp operated on a 50-volt circuit the current was quite large. In contradistinction the so-called half-watt lamp available today consumes only about one watt per candlepower.

In connection with low-voltage lighting, an important point which must be remembered in laying out an instal-

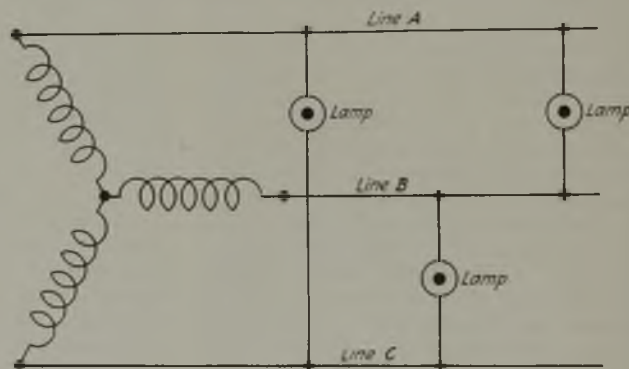
lation is that a comparatively small reduction in voltage causes a marked decrease of candlepower. A small increase in voltage will seriously overrun the rating and reduce the life of low-voltage lamps. Thus a reduction of two volts in the pressure of a 220-volt supply would result in a loss of about 0.8 cp. with a 25 cp. or 30-watt metallic-filament lamp. The same voltage reduction on a 110-volt circuit would reduce the candlepower by over 1.5, and a similar reduction in the pres-

allow a definite drop in volts between the point of supply and the lamps so that a cable of moderate size may be employed without causing undue loss of voltage at the point where the lamps are connected. Thus, assuming that 110 volts are required at the lamps, there is no reason why after calculating the current which will be required, the cable installed should not be of sufficient resistance to allow a reasonable drop of voltage along its length.

Alternating-current lighting systems are far more common today than direct-current, due to the extended use of alternating current for power purposes, which makes it convenient also to employ it for lighting. The use of transformers permits the tapping of power cables at points where lights are required and avoids the necessity for running long lengths of cables carrying

FIG. 1  
Without  
Neutral Wire

When the lamps are supplied from a Y-connected transformer without neutral wire, should the fuse in any wire blow, two-thirds of a previously balanced load will try to take power through the two remaining line wires.



sure of a 25-volt circuit would result in a loss of nearly 7 cp.

Thus the need for maintaining a constant pressure on a low-voltage lighting system will be appreciated. Moreover, from the foregoing figures it will be obvious that these circuits must be calculated from the source of supply to the last lamp if disappointment is to be avoided when a new installation is first lighted. The voltage of a generator supplying a small lighting system may be varied as required within certain limits, but alternating-current lighting circuits, which as a rule are tapped from the main power supply, have to operate at constant voltage, no variation being permissible beyond that provided by connections on the transformer. In this connection reference might be made to instances of low-voltage lighting where for some reason, the supply transformer is at some distance from the lamp.

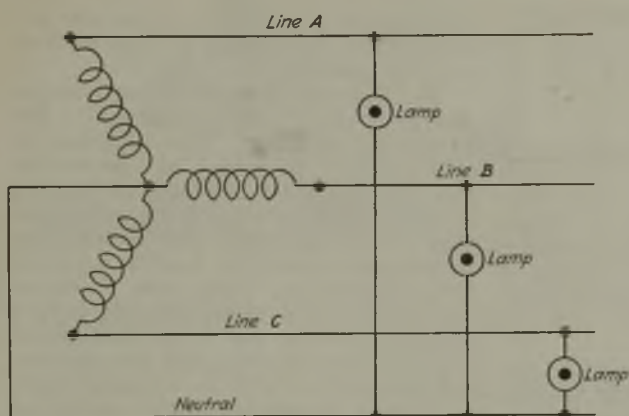
Fortunately most groups of mine lights are controlled by one main switch, and therefore the load on the transmission line is constant. This being so, the circuit may be arranged to

low-voltage current. Alternating-current lighting for underground use is really more suitable—from an insulation standpoint—than direct current.

It is well known that the negative conductor of a supply has an attraction for moisture and the positive conductor repels it. This is why insulation breakdowns more often occur on the negative wire when it is not directly connected to ground. The advantage of alternating current is that neither conductor attracts moisture, and therefore both conductors can be kept more efficiently insulated. On the other hand, for a given voltage a shock from a direct-current circuit is actually of a lower potential than with alternating-current. Voltages are measured in root-mean-square values and therefore a nominal alternating-current voltage is only about 70 per cent its maximum voltage.

A shock from, say, a 220-volt alternating-current circuit would be more severe than from a direct-current circuit of 220 volts. However, when it comes to using comparatively very low voltages this disadvantage of alternat-





**FIG. 2**  
**With Neutral Wire**  
When the loads are connected between a line wire and a neutral with a perfectly balanced load the neutral wire carries no current to the transformer. If a fuse blows in any line wire only one-third of the lighting system is out of service.

ing-current which is deserving of consideration when the voltage of a lighting circuit reaches 220 or over, need not be taken into account.

If a lighting load represents a considerable proportion of the three-phase circuit from which it is drawn, the system must be balanced, so that the energy taken from each main of the high-tension supply is approximately the same. Consequently, it is necessary to install three-phase distributing lines and to balance the lights on the secondary side of the transformers. This may be done in a number of ways. Fig. 1, represents the connections of a three-phase transformer star-connected; the lamps being connected across the lines A, B, and C. The primary side of the transformer has been omitted to simplify the diagram. The first lamp should be connected between A and B, the next between B and C and the third between A and C; this sequence of connections being preserved throughout each lighting circuit.

If such a system has the same number of lights connected between each pair of wires A and B, B and C, and A and C, will be balanced. The currents in all three mains on the secondary as well as on the primary side of the transformer will be equal. There is however, one objection to this method in that, should, for instance, the fuse blow in main B, the lamps connected between A and C, will remain lighted with their usual brilliancy, and those connected between A and B and B and C will be in series across A and C as they will have no supply from B. The same, of course, applies in case a fuse should blow in mains A or C. The effect is to maintain every third light on the circuit at full brilliancy, while the others are merely glowing.

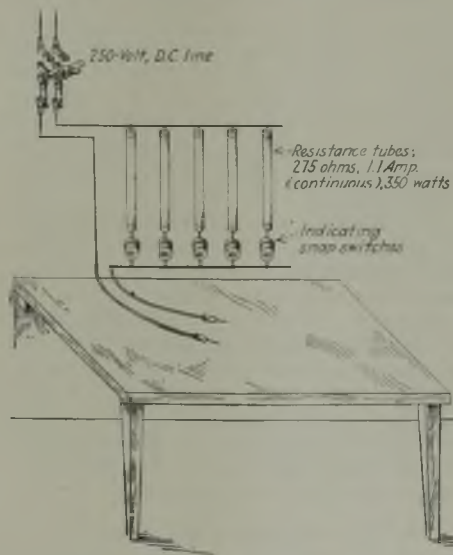
The drawbacks of a circuit such as that shown in Fig. 1 may be overcome by employing four wires; one each from wires A, B and C coming from the transformer, and one from the neutral point as shown in Fig. 2. The quantity of copper in the neutral will need only to be as large as that of the mains, because of the interactions of the three currents in the mains, which are displaced from each other by 120 deg. With this circuit, if a fuse blows, only those lights on the particular supply wire are affected, and if the lamps are consecutively connected from mains A, B and C throughout the system as indicated in Fig. 2, every third light only, will be affected.

If the lighting system is an extensive one, it might be conveniently split into

three separate circuits, each with one main and a neutral wire. In that case, of course, the blowing of a fuse would cut out completely a whole section. This is an obvious disadvantage compared with the systems shown in Fig. 1 and 2 in which the blowing of a fuse would not cause complete darkness in any section.

### Resistance for Testing And Charging

The accompanying sketch illustrates an arrangement of resistance tubes which is a substitute for the familiar



### Resistance Tubes Mounted On Wall

Carrying capacity and ohms resistance of the separate units should be such that a short-circuit of the test points or charging chips will not cause overheating.

lamp bank, now so often used when charging repaired cells of battery

locomotives and also radio and automobile batteries.

This form of resistance has several advantages over the lamp bank. The chief reason why it has found favor is that it eliminates the trouble and high cost of replacing lamps. In most lamp-bank installations no method of locking is used and as a consequence the group of lamps often serves as a supply; sometimes even the sockets are removed, all resulting in considerable irritation to the mine electrician. Even if locked the lamp replacements will be frequent, for if used twenty-four hours per day the life of a tungsten lamp is but a few months at best.

Satisfactory resistance tubes can be purchased for approximately \$2.50 each, this being cheaper than sufficient sockets and lamps to provide an equivalent current capacity. The use of 275-ohm units having a capacity of 350 watts each tends to make the resistance foolproof. A single tube or all tubes can carelessly be left shorted across the line and no damage will result. When charging one- to three-cell batteries or testing low-resistance electrical equipment the outfit will supply approximately one ampere for each tube connected into the circuit.

### Here's a Lamp Rack That Saves Time

The business of checking out electric cap lamps to miners going into a mine in the morning and of checking in the lamps again in the evening is rather complicated at some coal mines. All sorts of schemes have been evolved but most of them consume time, because, in most cases, the lamps have to be handed out one by one through a window by one or two clerks. It is different at the Bon Carbo mine of the American Smelting and Refining Co., a few miles back in the hills from the company's big coke plant at Cokedale, Col. There, each man takes his own lamp. He can do it on the run.

A long pair of lamp racks was built on either side of a runway going through the check house near the mine mouth. As the batteries are charged, the lamps are put on this rack, as shown in the accompanying picture. When the miners go through the check house on their way to work, the lamps are so effectively spread out that there is no congestion to speak of and no time is lost over lamps. Each man takes his own.

### Lamp Rack at Bon Carbo Mine

Every man can take his own lamp here, as he goes through the check house on his way into the mine, and there is no delay. He returns the lamp to its place when he checks out in the afternoon. In the foreground we see C. R. Garrett, mine superintendent.





## Book Reviews

### Pulverized Fuel

SO RAPID has been the progress in the United States of the use of pulverized fuel that we are prone to regard it as a practice devised and developed wholly in America. A little book on "Pulverized Fuel" by W. F. Goodrich may serve to correct that impression. The British, he claims, originated the idea, though he does not appear to have made any examination of American patents. However, we may concede that if he did he would probably only confirm his present conclusions. Nevertheless, it is clearly proved that it remained for the United States to bring the use of pulverized fuel to its present state of relative perfection. This is so clearly recognized by the author that pages 17-92 are given up to United States practice and indeed many other pages in other parts of the book, so that it may be said safely that Mr. Goodrich's volume will find favor in America as it furnishes adequate information about American practice. French and British practice—we use the author's own arrangement—is given secondary place.

#### GOODRICH NOT OVERSOLD

Mr. Goodrich is not to be regarded as an uncritical enthusiast, for he prefaces his book with the statement that "pulverized-fuel firing is not faultless" nor has "every problem in its successful and economic application been solved." He says however that "the principal defect—the emission of fine ash from the chimney—does not present an insuperable difficulty, nor is the discharge of dust from the chimney peculiar to this system of firing; it is in fact an all too common trouble, even with some of the most modern mechanical stokers."

He says in a chapter on the future of pulverized-fuel firing that "it has been suggested by some enthusiastic advocates in the United States that no other fuel or system of firing can compete with pulverized fuel and that existing systems must be quickly superseded. With this the author is not in agreement. There are reasons why under certain conditions and to meet particular requirements, coal will continue to be used on grates. For similar reasons it is extremely unlikely that pulverized fuel will supersede oil firing." We are not certain that Mr. Goodrich is correct, and perhaps this negative attitude, too common in Great Britain, may prevent rapid development in that country. We, in the United States, ride our hobbies energetically—a practice which makes for rapid progress.

The first patent, Mr. Goodrich tells us, was taken out in 1831 and Europe made many attempts to accomplish the objects desired, but wet fuel, poor refractories, incomplete mixing of air and fuel, imperfect pulverization and difficulties with slag seem to have retarded progress, though the Claude Bettington boiler achieved quite a measure of success.

The subjects treated in this little volume are Pulverized Fuel—its origin and history; United States practice; French and British practice, design of equipment and operation; fuels suitable for use in pulverized form and the future of pulverized fuel.

The coal operator should be interested in pulverized fuel systems because they are likely to extend further the use of fine coal. Its economies serve to make the use of the smaller sizes still more profitable and hasten the day when the larger sizes are used no longer for steam boilers. Mr. Goodrich's book is one of the Griffin series of Technological Handbooks and is distributed by J. B. Lippincott Co., of Philadelphia. It measures 5 x 8 in. and has 223 pages.

### The Coal Industry

"DEDICATED in the public interest to the coal industry" or better "dedicated to the public interest in the coal industry." A. T. Shurick has produced a well-rounded, fairly conceived book of a character long desired by the general public, entitled "The Coal Industry." It is not a mass of statistics except in the appendix, but a popular treatise covering a somewhat larger range than the report of the U. S. Coal Commission.

Mr. Shurick has done his work well. He describes the coal industry neither with panegyric or censure. He contents himself with being simply informative. Nothing in the 371 pages of this book suggests propaganda. It is, therefore, the better entitled to the public's favor and acceptance. If the average reader wants to get a clear idea of the industry as a whole he cannot do better than follow Mr. Shurick's review of it in this volume.

#### A FEW HISTORIC BEGINNINGS

A long series of precedents, however, require that the reviewer recite the points in the book reviewed with which he finds himself at issue, even though these shortcomings do not in any measureable way mar the book. We may say, therefore, that in the story of the early beginnings of coal mining, the "embryonic stage" as he terms it Mr. Shurick has passed over most of the states and regions, even of those areas regarding which records are fairly easy of access. In his discussion Mr. Shurick tells us the well-known and romantic story of the opening of the anthracite mines; he gives us details of the early exploitation of the Georges Creek fields and then shifts to West Virginia regarding which, however, he gives an extremely short and fragmentary history.

We are aware that it was his duty to be brief, but to pass over central and western Pennsylvania, Ohio, Illinois, Indiana, Iowa, the Rockies, Washington and Alabama, not to mention

other fields is to fail to cover the history of the beginnings of coal production adequately.

Mr. Shurick on page 54 says of the world-wide advances in mining in the nineteenth century: "The progress in this century, in terms of the results achieved in output, methods of mining, mechanical improvement, etc., relegates that of the preceding centuries to the accomplishments of a merely preparatory stage" and then adds "Certain refinements and improvements in the existing practice are to be anticipated in the course of time, but the succeeding generations will be engaged more in picking up and perfecting the loose ends left over from the sweeping changes of the nineteenth century, and there will never be a recurrence of the revolutionary developments of that time."

From these passages you would judge the author to be an old man with a natural regard for the developments that took place largely under his eye, but he is not. One cannot understand therefore why he belittles the century that has seen almost his entire labors or having seen such revolutionary changes since the beginning of the century has lost faith that there will be more like them. Since January, 1901, what truly remarkable advances have been made! Mr. Shurick might have accumulated a few dates that would have given him assurance as to the progress that has occurred since that time.

#### NO END TO LANE OF PROGRESS

We may add, also, that there is no sign that the industry has come to the end of the long lane. Mr. Shurick himself has given evidence that this gloomy prophecy of his slipped from his pen unawares, for he writes on page 131: "The civil engineer of today would not contemplate the possibility of moving a few hundred tons of dirt without the aid of machinery; what then can be said of an industry that hand shovels seven hundred million tons of coal a year?" Later he adds, "A more difficult problem will be the one of working out a method for the combined mining and loading of the coal. These successive steps suggest to the reader the ideal towards which the industry is striving—the mechanical extraction and transportation of coal from the working face to the railroad car on the surface with human agencies confined to installing, repairing and directing the machinery." He terms these revolutionary ideas and prophecies their accomplishment, yet this is the man who a few pages back said that the age of miracles was at an end, and that the revolutionary advances of the nineteenth century would never be equalled. Should Mr. Shurick live till January, 2001 we promise him that he will be ready to say about the twentieth century what he has said about the nineteenth, unless war and tumult interfere with progress.

The volume has four parts—The Coal Fields, Mining Methods, Distribution of the Coal Mined and Economic and Sociological Conditions. It measures 6 x 9 in., is bound in cloth and costs \$3.50 net. Its publishers are Little, Brown & Co., Boston, Mass.





# Production And the Market



## Growth of Strength in Bituminous-Coal Market Continues Unabated

Gradually but none the less surely the coal business is climbing out of the slough of despond in which it was buried for so long. Though there is nothing spectacular about the upward movement, neither are there the exasperating reactions that usually characterize that type of market. The price gains of the last few weeks not only are being firmly held but quotations continue to show an upward trend. Though resumption of operations at mines that have been idle have not been so numerous during the last week, production is increasing at those that are running, particularly the larger plants. The general revival of business has not developed the vigor expected by many enthusiastic prophets, the increases in many instances being little more than the seasonal fall gains, but more conservative observers take comfort in the belief that the more gradual upturn is certain to be more lasting.

### Railroads Placing Heavy Equipment Orders

One of the most encouraging recent developments is the large volume of orders for new equipment being placed by the railroads, the latest being one for 4,000 open tops by the Illinois Central. This follows closely on the heels of contracts for 1,000 gondolas each by the Chesapeake & Ohio and the Philadelphia & Reading.

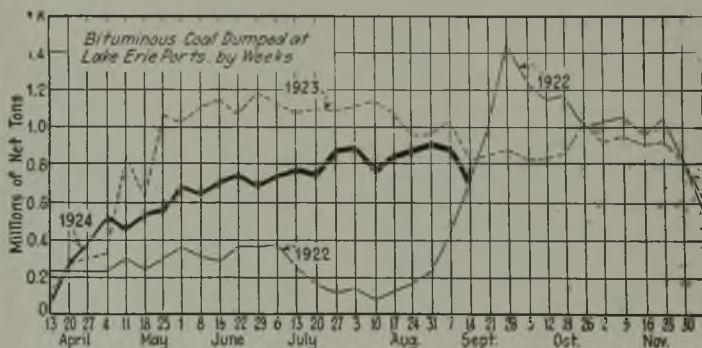
Coal Age Index of spot prices of bituminous coal registered a further advance of one point during the week, standing on Sept. 15 at 167, the corresponding price for which is \$2.02, compared with 166 and \$2.01 respectively on Sept. 8.

There was a slight gain in activity at Hampton Roads last week, dumpings of coal for all accounts for the seven days ended Sept. 11 totaling 338,432 net tons, compared with 327,133 tons handled during the preceding week.

Movement to the lakes, on the other hand, declined, dumpings at Lake Erie ports during the week ended

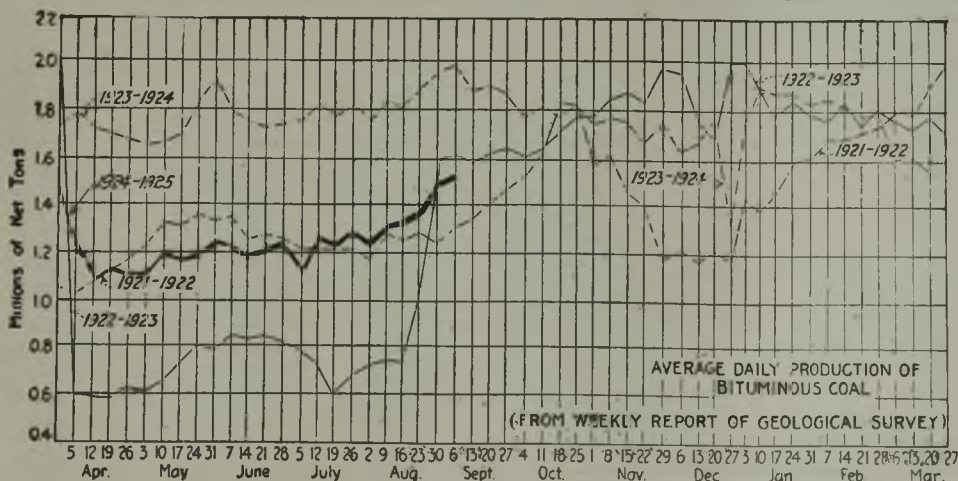
Sept. 14, according to the Ore & Coal Exchange, being as follows: For cargo, 705,606 net tons; for fuel, 42,598 tons, compared with 850,865 and 47,228 tons respectively for the previous week.

Production of bituminous coal declined sharply during the week ended Sept. 6, when, according to the Geological Survey, 7,941,000 net tons was produced, a falling off of 778,000 tons from the week ended Aug. 30, when 8,719,000 tons was the yield, according to revised figures. The decline was due to the observance of Labor Day, so that the average daily output actually gained despite the decrease in total production. A number of



mines operated despite the holiday, the day rating as about one-quarter of a normal Monday. Anthracite output likewise receded, 1,451,000 net tons having been produced, compared with 1,837,000 tons during the previous week.

Increasing strength continues to pervade the anthracite market, orders steadily gaining in volume, though actual business is by no means keeping pace with inquiries. Stove leads the demand, as usual, followed by egg and nut, but pea is showing increased strength and the steam sizes are showing renewed signs of life. Prices are holding firmly.



### Estimates of Production

(Net Tons)		
<b>BITUMINOUS</b>		
	1923	1924
Aug. 23.....	11,383,000	8,313,000
Aug. 30 (a).....	11,737,000	8,719,000
Sept. 6 (b).....	10,485,000	7,941,000
Daily average.....	1,997,000	1,510,000
Cal. yr. to date (c)...	376,834,000	302,555,000
Daily av. to date.....	1,790,000	1,433,000
<b>ANTHRACITE</b>		
Aug. 23.....	2,165,000	1,711,000
Aug. 30.....	1,893,000	1,837,000
Sept. 6.....	3,000	1,451,000
Cal. yr. to date.....	68,360,000	62,238,000
<b>COKE</b>		
Aug. 30 (a).....	333,000	110,000
Sept. 6 (b).....	345,000	112,000
Cal. yr. to date (c)...	13,478,000	7,094,000

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



Midwest Prices Higher

The lively demand for lump and egg coal in certain of the Midwest fields has had the inevitable result: Prices are increasing. The Franklin County (Ill.) producers increased their lump, egg and large nuts 25c. this week, so that the 6-in. lump quotation is now \$3.50, egg is \$3.25 and No. 1 nut \$2.90. Saline County followed suit and is trying to get the same price. A few more mines of the region are opening. This is in spite of the fact that weather is warming up and screenings are moving sluggishly at \$1.50@1.75. There is, however, already a suggestion of car shortage in the southern Illinois field. This may maintain the new price. With cars widely scattered just now, with domestic demand exceedingly brisk and with dealers' stocks low in the face of rapid business, it is predicted by some that the region is going to develop car shortages about every two weeks the rest of the autumn.

Central Illinois and the Standard district near St. Louis are both feeling the domestic pick-up. Standard lump already has increased from \$2.35 to \$2.50 and a further jump to \$2.75 is expected if the cool weather holds out. Mt. Olive lump has not been able to pass the \$2.75 price maintained there for several weeks. However, it is strong at that. Nut coal and screenings are hard to move. Standard

screenings are now down to 90c.@\$. Indiana production has increased a little but prices remain unchanged except for a slight depression of screenings quotations. West Kentucky coal is not getting in on the burst of domestic business in the West and Northwest but east Kentucky, in the Midwest markets, is doing fairly well at \$2.75 for lump though a shortage of flat-bottom cars is a distinct handicap. Prices have to be shaded 25c. in some cases to move the coal in hopper bottoms.

Smokeless coal from West Virginia in the Midwest feels the pick-up too. Lump and egg has moved up a quarter to \$3.75@\$. Mine run has lifted its bottom price from \$1.75 to \$1.85 but the top remains steady at \$2. A great volume of this coal saturated the market during the summer.

A little cold wave at St. Louis after a spell of warm weather made the householder wake up and order coal. Orders are mostly for high-grade with a little intermediate grade and very little demand for the cheaper coals. Anthracite, smokeless and coke are moving fairly well. Most of the dealers have a good supply on hand. Wagonload steam picked up this week, but carload steam is slow. The demand is far below the supply. Country domestic is unusually good on account of the change in weather, and this is going to be the cause of higher prices as the result of a demand for lump everywhere. Country steam is quiet.

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

Low-Volatile, Eastern				Midwest			
Market Quoted	Sept. 17 1923	Aug. 30 1924	Sept. 8 1924	Market Quoted	Sept. 17 1923	Aug. 30 1924	Sept. 8 1924
Smokeless lump	Columbus	\$5.95	\$3.60	\$3.60	\$3.50@	\$3.75	
Smokeless screenings	Columbus	3.00	3.00	2.00	1.85@	2.15	
Smokeless mine run	Columbus	2.35	1.20	1.20	1.15@	1.30	
Smokeless lump	Chicago	6.10	3.60	3.60	3.75@	4.00	
Smokeless mine run	Chicago	2.85	1.85	1.85	1.85@	2.00	
Smokeless lump	Cincinnati	6.10	3.75	3.75	3.75@	4.00	
Smokeless mine run	Cincinnati	3.00	1.85	1.85	1.75@	2.00	
Smokeless screenings	Cincinnati	2.25	1.35	1.35	1.25@	1.50	
*Smokeless mine run	Boston	5.05	4.15	4.10	4.10@	4.20	
Clearfield mine run	Boston	2.15	1.90	1.90	1.45@	2.35	
Cambria mine run	Boston	2.85	2.30	2.25	1.90@	2.60	
Somerset mine run	Boston	2.35	2.05	2.05	1.75@	2.35	
Pool 1 (Navy Standard)	New York	3.25	2.70	2.75	2.50@	3.00	
Pool 1 (Navy Standard)	Philadelphia	3.25	2.40	2.40	2.35@	2.50	
Pool 1 (Navy Standard)	Baltimore		2.65	2.60	2.35@	2.85	
Pool 9 (Super. Low Vol.)	New York	2.50	2.15	2.10	1.90@	2.35	
Pool 9 (Super. Low Vol.)	Philadelphia	2.65	2.15	2.15	1.95@	2.35	
Pool 9 (Super. Low Vol.)	Baltimore	2.45	1.85	1.85	1.80@	1.90	
Pool 10 (H.Gr. Low Vol.)	New York	2.15	1.95	1.80	1.65@	2.00	
Pool 10 (H.Gr. Low Vol.)	Philadelphia	2.20	1.75	1.75	1.65@	1.90	
Pool 10 (H.Gr. Low Vol.)	Baltimore	2.25	1.55	1.60	1.55@	1.70	
Pool 11 (Low Vol.)	New York	1.85	1.65	1.60	1.40@	1.85	
Pool 11 (Low Vol.)	Philadelphia	2.10	1.45	1.45	1.35@	1.60	
Pool 11 (Low Vol.)	Baltimore	2.00	1.45	1.45	1.40@	1.50	

High-Volatile, Eastern				South and Southwest			
Market Quoted	Sept. 17 1923	Aug. 30 1924	Sept. 8 1924	Market Quoted	Sept. 17 1923	Aug. 30 1924	Sept. 8 1924
Pool 54-64 (Gas and St.)	New York	1.75	1.50	1.50	1.40@	1.65	
Pool 54-64 (Gas and St.)	Philadelphia	1.85	1.50	1.50	1.40@	1.60	
Pool 54-64 (Gas and St.)	Baltimore	1.75	1.35	1.35	1.35@	1.40	
Pittsburgh acid gas	Pittsburgh	2.95	2.40	2.40	2.30@	2.50	
Pittsburgh gas mine run	Pittsburgh	2.50	2.10	2.10	2.00@	2.25	
Pittsburgh mine run (St.)	Pittsburgh	2.25	1.85	1.85	1.75@	2.00	
Pittsburgh slack (Gas)	Pittsburgh	1.50	1.30	1.30	1.30@	1.40	
Kanawha lump	Columbus	3.15	2.10	2.10	2.00@	2.25	
Kanawha mine run	Columbus	1.90	1.40	1.40	1.30@	1.55	
Kanawha screenings	Columbus	1.25	1.05	1.10	1.00@	1.10	
W. Va. lump	Cincinnati	3.60	2.25	2.35	2.15@	2.50	
W. Va. gas mine run	Cincinnati	1.60	1.45	1.50	1.35@	1.60	
W. Va. steam mine run	Cincinnati	1.60	1.35	1.35	1.25@	1.50	
W. Va. screenings	Cincinnati	1.05	.90	.90	1.00@	1.10	
Hoeking lump	Columbus	3.10	2.40	2.40	2.25@	2.55	
Hoeking mine run	Columbus	1.95	1.55	1.55	1.45@	1.65	
Hoeking screenings	Columbus	1.20	1.05	1.15	1.10@	1.25	
Pitta. No. 8 lump	Cleveland	2.60	2.40	2.35	2.00@	2.60	
Pitta. No. 8 mine run	Cleveland	2.05	1.80	1.85	1.80@	1.90	
Pitta. No. 8 screenings	Cleveland	1.25	1.10	1.20	1.10@	1.25	

Current Quotations—Spot Prices, Anthracite—Gross Tons, F.O.B. Mines										
	Market Quoted	Freight Rates	Sept. 17, 1923		Sept. 8, 1924		Sept. 15, 1924†			
			Independent	Company	Independent	Company	Independent	Company		
Broken	New York	\$2.34				\$8.00@	\$9.25		\$8.00@	\$9.25
Broken	Philadelphia	2.39				9.15			9.15	
Egg	New York	2.34			\$8.50@	\$9.40		\$8.50@	\$9.40	
Egg	Philadelphia	2.39			9.00@	9.70		9.00@	9.70	
Egg	Chicago*	5.06			8.17@	8.27		8.17@	8.27	
Stove	New York	2.34			9.25@	10.00		9.25@	10.00	
Stove	Philadelphia	2.39			9.35@	10.00		9.35@	10.00	
Stove	Chicago*	5.06			8.63@	8.75		8.63@	8.75	
Chestnut	New York	2.34			8.75@	9.45		8.75@	9.45	
Chestnut	Philadelphia	2.39			8.85@	9.80		8.85@	9.80	
Chestnut	Chicago*	5.06			8.26@	8.40		8.26@	8.40	
Pea	New York	2.22			5.00@	5.25		5.00@	5.25	
Pea	Philadelphia	2.14			5.75@	6.25		5.75@	6.25	
Pea	Chicago*	4.79			5.13@	5.45		5.13@	5.45	
Buckwheat No. 1	New York	2.22			2.25@	2.70		2.25@	2.90	
Buckwheat No. 1	Philadelphia	2.14			2.50@	3.00		2.50@	3.00	
Rice	New York	2.22			1.75@	2.00		1.75@	2.00	
Rice	Philadelphia	2.14			2.00@	2.25		2.00@	2.25	
Barley	New York	2.22			1.25@	1.50		1.25@	1.50	
Barley	Philadelphia	2.14			1.50			1.50		
Birdseye	New York	2.22						1.50		

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





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

Index	1924			1923
	Sept. 15	Sept. 8	Aug. 30	Sept. 17
Weighted average price	\$2.02	\$2.01	\$1.99	\$2.44

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.

### Heavier All-Round Demand in Kentucky

Chilly weather throughout the Central States and extending well into the South, with light frosts on the night of Sept. 9 at Louisville, has brought about a lot of demand for coal, coming from domestic consumers, retailers and some industrial buyers. Railroad consumption is picking up a bit account of the usual fall increase in tonnage, while gas companies are using more fuel, and longer nights and heavier industrial loads are creating better demand from the power and lighting concerns. Domestic consumers who have been putting off their buying are now coming into the market heavily.

Both eastern and western Kentucky screenings are weaker, \$1 being fairly close to the top of the market for either field. Eastern Kentucky quotes 85c. to \$1, and western Kentucky, from 90c. to \$1 and slightly over. It is understood that some utility business is to be had at 85c., and that it is going to be filled at that figure.

Eastern Kentucky mines are quite busy in some sections, and it is said that additional train crews are being put on by the Louisville & Nashville R.R. in the Harlan, Hazard and Elkhorn sections, due to increased running time of mines generally and the fact that a number that were idle have recently resumed.

Peak prices on quotations range as high as \$3 by some eastern Kentucky operators on fine grades of block coal, but not many are asking over \$2.75, and there is not much movement at over \$2.50. It is believed in some circles, however, that best coal in both eastern and western Kentucky will be at \$3 before the end of the month.

### Northwest Comes to Life

A better movement of coal to the docks from lower lake ports and a continued firmness in prices characterize the market at Duluth. The anthracite market is strong, and the soft-coal market, while it has not as yet proven sensational, is gaining surely. Prices are firm but unchanged.

Shipments from the Head-of-the-Lakes docks were better in August than in July. In all 18,589 cars went out, as compared with 15,301 in July and 23,914 in August of last year. Dock receipts in August were 1,537,190 tons, of which 351,320 were hard coal and 1,185,870 were soft coal. Total receipts until Sept. 1 are 949,470 tons of hard coal and 4,099,843 tons of soft coal. The hard coal showed an increase over July for last month's receipts of 112,000 tons. For the season until Sept. 1 hard coal shows an increase of 35,152 tons and the bituminous coal a decrease of 2,878,316. It must be taken into consideration that this year started with 4,000,000 tons of coal on the docks whereas last year the docks were bare.

Wholesalers in Milwaukee are in better spirits because of a marked improvement in the volume of orders and consequent acceleration of the movement of fuel from their docks to local bins and to interior dealers. One of the larger dock companies reports orders more than 50 per cent improved over the immediate past.

Receipts of anthracite thus far in September total 25,221 tons and of bituminous coal 99,400 tons. The receipts in Milwaukee up to and including Aug. 31 total 497,223 tons of anthracite and 1,314,210 tons of bituminous coal. Last year the receipts for the same period were 601,462 tons of anthracite and 1,823,193 tons of bituminous coal. Such fluctuations are not unusual.

### Western Markets Active

Kansas coal is moving in steadily increasing volume, and inquiries from dealers are increasing daily. Oklahoma production, however, still is low, partly due to labor disputes and partly to a weak demand. Arkansas semi-anthracite lump is moving well, as householders and institutions begin to lay in their winter's supply, but it has not been necessary to reopen more mines to supply the demand. Screenings, produced in limited quantities, are moving readily. No changes in price have been announced.

A much better feeling pervades the Colorado market due to a noticeable increase both in working time and production. Orders for all sizes are coming in more steadily now and a heavy season is anticipated soon. According to the operators' reports, mines worked on an average of twenty hours last week with only 30 per cent of lost time attributable to "no market." This is 10 per cent less than for any week since May. Prices are unchanged since Sept. 1.

In Utah mines are making better time but are still below 50 per cent of full-time capacity. There is a slightly better demand for coal from industries, and the retail business is in good shape. "Business is better than it was a year ago and so are collections" is the report of practically all of the more important retailers in Salt Lake City. Retail prices are unsettled. The tendency is upward.

### Ohio Markets Brace Up

Cooler weather has helped enormously to brace up the Cincinnati market during the past ten days, putting life in the domestic list that has not been seen in months. Standing orders that have been suspended for weeks suddenly came to life, and while the advance in price was a little slow in some places, brokers and wholesalers who had supplies were able to hold firm on an immediate advance. Smokeless prepared sizes benefited perhaps more than any others. Low-volatile run of mine shows little betterment, but there is a heavier inquiry for screenings. With the upturn in price lake buyers show greater interest in bituminous. This has resulted in a little better position on 2 in. and 4 in., but egg is still inclined to drag. Practically no change has been made in retail prices.

A much better demand for domestic sizes has developed at Columbus. Retail prices are steady at former levels. Steam buying is restricted to immediate needs, but general industrial conditions are improving steadily and buying is expected soon. Some cheap coal is still available but demurrage cargoes are less numerous. Screenings continue strong despite the better output of lump. Lake trade is going along smoothly but the southern Ohio field is not sharing to any extent.



The Cleveland market shows no change—the healthier demand continues more or less in the steam trade, but, if anything, it is not quite so keen as it was a few weeks ago when screenings were 10c. a ton above present quotations. The retail trade, however, is active, but a large part of this trade is confined to smokeless fuels from Southern fields as well as domestic coals prepared in Ohio. Manufacturers and industries in general are laying by some fuel and current requirements are increasing with the improvement in general business conditions.

**Pittsburgh Market Stiffens**

Production in the Pittsburgh district is now averaging above 40 per cent, having increased from less than 20 per cent in June, due to exhaustion of stocks and increased consumption. Further increase is looked for soon in domestic coal. Shipping in general is restricted to the area in which it has distinct freight advantages over the non-union fields, which greatly undersell it on the basis of f.o.b. mine prices. Prices have stiffened slightly.

Business at Buffalo is slightly better. Stockpiles have run down considerably. Slack has started up a trifle, gas slack especially, which usually is 10c. or so higher than steam. Quotations are \$2.25@\$2.50 for Youghiogeny gas lump, \$2@\$2.25 for Pittsburgh and No. 8 steam lump, \$1.75@\$2 for all mine run and \$1.10@\$1.35 for slack.

**New England Sees Improvement**

Although there has not been any conspicuous expansion in sales, the New England tidewater bituminous market has developed a slightly firmer tendency in prices, \$5.35 gross ton on cars now being as low as is openly quoted for strictly pool 1 run of mine coal. Some business has been taken at \$5.25, but only where the business was particularly desirable.

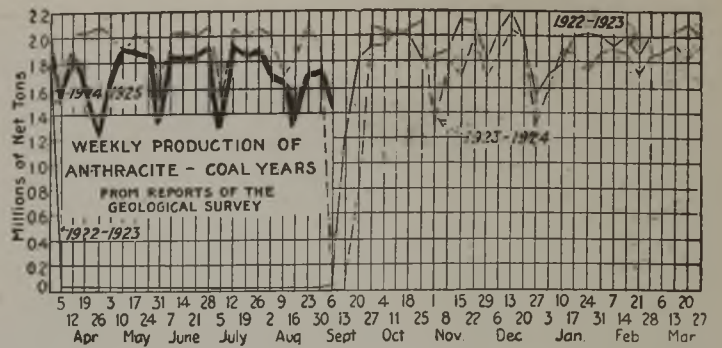
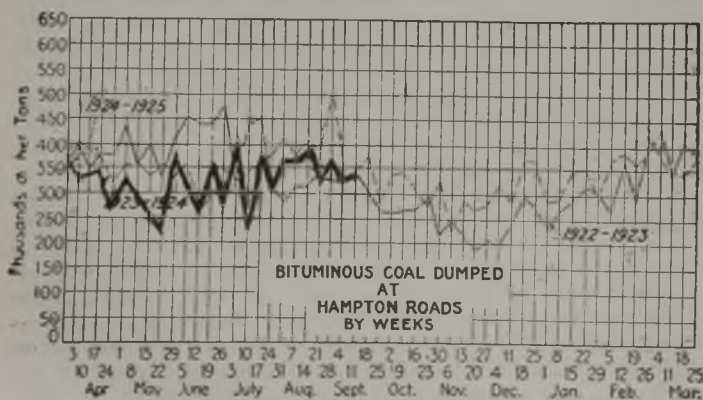
Quotations for strictly navy standard coal at the southern loading piers have been fully maintained at \$4.10@\$4.20 gross ton, f.o.b. Norfolk although some tonnage of "good coal" has been offered at 5c. or so under this low figure. The spot market at Mystic Wharf has improved the past week in that although receipts have been fairly heavy, there has been less coal to dispose of after arrival and this has helped the price situation not a little.

The price situation at Providence also has improved. After some sales to clean up cargoes at \$5.30 on cars, \$5.35 is again the low quotation with some shippers firmly holding for \$5.40.

The all-rail phase of the market offers little new. New orders are practically nil. Wherever a price is quoted, it seems to be at the level that has obtained for many weeks, although so far as New England is concerned Pennsylvania coal is a matter of little interest.

**Atlantic Markets Picking Up Strength**

Demand at New York is slowly improving. More orders are being received, but they fail to keep pace with inquiries. The latter are increasing rapidly. Large consumers are showing a desire to replace their reserves and not a few appear ready to close contracts extending to April 1 next. Business is quickening and operators and shippers are exceedingly optimistic. Local operators report some mines reopening, others being prepared for operation, while still others that have been working part time are extending their working schedule. There is a good demand for high-volatile coals and for slack, the latter being quoted around \$1.25.



The Philadelphia market is holding firmly the slight gains made during the past two or three weeks. The interest of the small consumer seems to be maintained and the occasional cars resulting represents about the entire increase in tonnage moved. There also is definite evidence of improvement in general industry. The railroads are increasing their orders, especially on contracts made earlier in the season.

A better line of inquiry is developing at Baltimore. It has not been pronounced enough to touch prices; as a matter of fact some sales were made last week even slightly below those of previous weeks. Despite rumors of a revival in the export situation the first eleven days of September show a falling off as compared with the same period of August.

**Anthracite Demand Gains Steadily**

Demand for hard coal is increasing at New York, retailers reporting many new orders. Independent operators are easily disposing of output on about last week's price basis, much being sold at the maximum figures. Retail dealers throughout the Greater City last week followed the lead of the operators and advanced their prices, domestic coals ranging from \$14 to \$14.50. Stove is in strongest demand, though egg and nut are moving well. Pea coal is gaining strength and a large tonnage is handled in this market. The steam sizes are in better call. Rice coal is scarce with some producers, while barley is maintaining its strength.

The forward movement continues at Philadelphia. Retailers report that the consumer is ordering lightly, taking only one and two-ton lots. Producers seem to find a market for all sizes, as full time at the mines is now the rule. There has been no change in retail prices, although it is not thought that an increase will be much longer deferred.

Conditions at Baltimore are about seasonal. Following the Sept. 1 raise in price at both wholesale and retail there is a natural period of slow buying until cold weather is almost at hand. Yards are pretty well stocked and there will be no great difficulty in taking care of early demand at least.

Trade is setting in at a fair rate at Buffalo, buying now being much better. The supply is good, but it is not up to the demand for stove.

Toronto dealers have advanced prices from \$15 to \$15.50 per ton, explaining the increase as due to higher prices demanded by producers in the United States. The wholesale price has been rising at the rate of 10c. a ton for some time, but as the volume of business has been small the dealers had up to the present absorbed this increase.

Furnace coke contracting for fourth quarter at Connellsville is lagging. The spot market is quotable at \$3@\$3.10 as formerly, but most of the little tonnage that moves probably goes at \$3. Small lots sales have brought \$3.10 and occasionally in exceptional circumstances \$3.15. Foundry coke continues decidedly dull and there is some coke offered at under \$4, possibly not gradable up to standard. The market remains quotable at \$4@\$4.50.

**Car Loadings, Surplusages and Shortages**

Week ended	Cars Loaded		Car Shortage	
	All Cars	Coal Cars	All Cars	Coal Cars
Aug. 30, 1924	1,020,339	168,584	274	.....
Previous week	982,248	159,814	190	.....
Week ended Aug. 30, 1923	1,092,150	206,578	9,441	4,891

Week ended	Surplus Cars		Car Shortage	
	All Cars	Coal Cars	All Cars	Coal Cars
Aug. 31, 1924	231,677	111,254	274	.....
Aug. 22, 1924	258,271	119,338	190	.....
Sept. 1, 1923	66,559	3,922	9,441	4,891



## Foreign Market And Export News

### Prices Firm in Fair British Market; More Collieries Close

The steam-coal market in Wales is in a fairly favorable position and prices are firmly held, not on account of the number of orders but because available supplies have been materially decreased by the closing down of more collieries, especially in the Monmouthshire district. The other grades of coal are very irregular, and in every case supply exceeds demand. In most cases slight concessions are available for immediate shipment, but operators are holding present prices for forward quotations.

The steam-coal market in Newcastle is fluctuating and is generally weaker, though gas coals are in fair demand. The inquiry from Europe has revived somewhat. The Lithuanian State Railways have booked 60,000 tons of Yorkshire steams for April-September shipment, and the Swedish State Railways have been inquiring for 30,000 tons of best steams for September-December delivery.

Production by British collieries during the week ended Aug. 30, a cable to *Coal Age* states, was 5,113,000 tons, according to official reports. This compares with an output of 5,279,000 tons during the preceding week.

Total output in the first six months of 1924 was 139,062,000 tons, compared with 140,792,000 tons for the corresponding period of 1923.

Coal exports during the first six months of this year amounted to 31,131,000 tons, valued at £38,003,000. In addition to direct exports, 8,698,000 tons of coal was furnished to foreign shipping, making the total quantity shipped 39,829,000 tons, compared with total shipments in the first six months of 1923 of 48,927,000 tons.

#### Hampton Roads Market Holds Fairly Steady

Little change is to be noted in business at Hampton Roads, bunker trade apparently contributing the bulk of business at the piers. The market is

fairly steady and the outlook somewhat better for increased movement.

Brazil and Italy are getting the bulk of foreign movement on contract with a limited number of shippers, but this movement is having little effect on the market. Accumulations at tidewater are slightly on the increase, and reports from the fields indicate a somewhat better production in anticipation of increase in trade.

The tone of the market is not strong, and forecasts of better business hold little hope of material improvement this month.

#### French House Coal in Good Call, Moderate Industrial Demand

The French market is still quiet with only a moderate demand for industrial coals, owing to the slackening of activity in various industries. The sugar plants, however, have large requirements for coal, due to the promising outlook.

Up to now the Nord and Pas-de-Calais collieries have been helped little by the strikes in the Borinage coal field in Belgium, though they are shipping sizable tonnages toward the frontier region. Stocks, on the whole, are not very important.

The trend of sales in house coals is good. The Nord and Pas-de-Calais are establishing their price-list for October. Belgian producers are awaiting for the action of the French collieries to fix their prices accordingly.

Imports of British coals, which had dropped during the first two weeks of August, were larger during the second fortnight. The anthracite grades are nevertheless still too high in price at the shipping docks to attract the attention of buyers. Consequently, the inquiry is meager and few disposals are obtainable from the crushing plants in Rouen.

The Paris market is literally flooded with offerings of German coal for free sale, for which attractive rates are

quoted; for instance, 120 fr. per ton, at pit, for semi-bituminous nuts and cobbles. Even where the cost of transportation to Paris is added—about 66 fr. per ton—the rate is still sufficiently attractive to induce traders to buy.

Output of coal from the Sarre mines totaled 1,047,304 metric tons for the month of June last as against 1,164,904 tons during the month of January. The average daily production dropped from 703 kilogrammes per man in January to 693 kilogrammes per man in June.

#### Export Clearances Week Ended Sept. 13, 1924

FROM HAMPTON ROADS	
For Brazil:	Tons
Br. Str. Willaston for Rio de Janeiro	7,447
Braz. Str. Lages for Pernambuco	5,572
Ital. Str. Salvore for Rio de Janeiro	7,448
Br. Str. Essex Envoy for Rio de Janeiro	6,654
For Canada:	
Ital. Str. Armando for Montreal	7,009
For Chile:	
Amer. Str. Republic for Antofagasta	781
For Italy:	
Amer. Str. West Mahomet for Genoa	5,042
For West Indies:	
Nor. Str. Marita for Curacao	2,595
Br. Str. Athelston for Port of Spain	306

FROM PHILADELPHIA	
For Newfoundland:	
Br. Schr. W. N. Reinhardt, for St. Johns	—
For Brazil:	
Br. Str. Dalworth, for Rio de Janeiro	—
FROM BALTIMORE	
For France:	
Belg. Str. Caledonier, for Dunkirk	7,422
For Chile:	
Br. Str. Trafalgar, for San Antonio (coke)	4,018

#### Hampton Roads Pier Situation

N. & W. Piers, Lamberts Pt.:	Sept. 4	Sept. 11
Cars on hand	1,537	1,757
Tons on hand	93,619	110,648
Tons dumped for week	100,851	101,861
Tonnage waiting	9,000	7,000
Virginian Piers, Sewalls Pt.:		
Cars on hand	1,285	1,300
Tons on hand	92,400	90,600
Tons dumped for week	101,362	112,464
Tonnage waiting	22,048	2,207
C. & O. Piers, Newport News:		
Cars on hand	1,895	2,012
Tons on hand	104,430	107,985
Tons dumped for week	90,763	87,847
Tonnage waiting	2,815	2,150

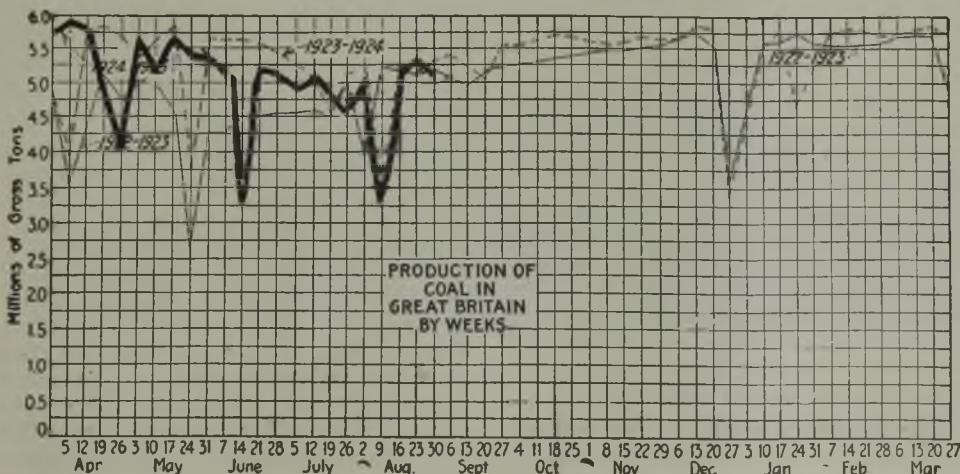
#### Pier and Bunker Prices, Gross Tons

	PIERS	
	Sept. 6	Sept. 13†
Pool 9, New York	\$4.60@ \$5.00	\$4.60@ \$5.00
Pool 10, New York	4.50@ 4.75	4.50@ 4.75
Pool 11, New York	4.25@ 4.50	4.25@ 4.50
Pool 9, Philadelphia	4.90@ 5.25	4.90@ 5.25
Pool 10, Philadelphia	4.45@ 4.70	4.45@ 4.70
Pool 11, Philadelphia	4.30@ 4.50	4.30@ 4.50
Pool 1, Hamp. Roads	4.10	4.00@ 4.15
Pool 2, Hamp. Roads	4.00	3.90
Pools 5-6-7 Hamp. Rds.	3.85	3.85@ 3.90
BUNKERS		
Pool 9, New York	4.90@ 5.30	4.90@ 5.30
Pool 10, New York	4.80@ 5.05	4.80@ 5.05
Pool 11, New York	4.55@ 4.80	4.55@ 4.80
Pool 9, Philadelphia	4.90@ 5.25	4.90@ 5.25
Pool 10, Philadelphia	4.75@ 4.95	4.75@ 4.95
Pool 11, Philadelphia	4.50@ 4.70	4.50@ 4.70
Pool 1, Hamp. Roads	4.20	4.15
Pool 2, Hamp. Roads	4.10	4.00
Pools 5-6-7 Hamp. Rds.	3.95	3.90

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

Quotations by Cable to <i>Coal Age</i>		
Cardiff:	Sept. 6	Sept. 13†
Admiralty, large	28s.6d.@29s.	28s.6d.@29s.
Steam smalls	17s.	17s.
Newcastle:		
Best Steams	18s.@18s.6d.	14s.@19s.3d.
Best Gas	22s.6d.	19s.6d.@23s.
Best Bunkers	20s.	18s.@19s.

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







## News Items From Field and Trade



### ALABAMA

The annual First-Aid meet in Birmingham will be held Oct. 7 at Rickwood Field. An interesting program is being prepared, which will be under the direction of the Alabama Mining Institute and local Bureau of Mines officials.

### COLORADO

The superintendents' club of the Colorado Fuel & Iron Co. held a fish fry at Stonewall, where the company maintains a summer place for its employees, on Saturday, Sept. 6.

### ILLINOIS

General Joseph B. Sanborn, 67, head of the J. B. Sanborn Co., a coal credit agency in Chicago, was married Sept. 4 in Chicago to Miss Willa Weck. General Sanborn served through the World War and has long been a well-known figure in the coal trade.

The Missouri Pacific R.R. is constructing a four-mile spur switch from Benton to Mine No. 1 of the Chicago, Wilmington & Franklin Coal Co., better known as Orient No. 1. The company expects to also extend the line to Orient No. 2 at a near date.

Now that Mine No. 9 of the Consolidated Coal Co. of St. Louis has been abandoned the famous Big Muddy coal is almost extinct. The only remaining mine in the Muddy field of seams No. 1 and No. 2 is mine No. 10 of the same company.

The Jewel Coal & Mining Co. has again reopened its No. 2 mine at Duquoin with prospects of operating steadily throughout the winter. The Gale Coal Co., which is the name of the new strip-mining company recently organized by the Crerar-Clinch interests of Chicago and located at Duquoin, also is running full capacity and within a few months will be producing a large tonnage daily.

According to a recent report of Mine Inspector Edward Flynn, of Perry County, the Paradise Coal & Coke Co. produced the greatest tonnage in his district in the last fiscal year, with a total of 384,048 tons. The Majestic Coal & Coke Co. was second with 354,496 tons, the Perry County Coal Co., third with 231,529 tons, and the Security Coal & Mining Co., fourth with 194,519 tons.

The ballot for the Illinois state miners' election in December is the longest in the history of the organization mainly because the last convention stripped President Frank Farrington

of much appointive power. Candidates for president against Farrington are John Hindmarsh, of Riverton, avowed radical, and William J. Sneed, of Herrin, sub-district president and state Senator.

Two first-aid teams of the Superior Coal Co. won first and second places in the big first-aid meet held at Gillespie on Labor Day. No. 10 team, captained by James Boston, won first with a perfect score, after a play-off with No. 13 team, under James Struthers, which had previously tied it. Third prize went to Team No. 4, Edward Daech, captain, from Maryville. Eighteen teams took part. Cash prizes amounted to \$920, each team receiving at least \$20. The meet was made possible through contributions by coal companies of the region, by citizens of Gillespie and by the United Mine Workers. It replaced the Illinois state meet, which was not held this year because of the failure of coal operators to support it financially.

### IOWA

A new coal mine, southeast of Colfax, known as the Hopkins City mine, will soon be in working order and mining operations begun.

### KANSAS

Two hundred Leavenworth coal miners who had been idle throughout the summer months went to work last week, according to an announcement by C. N. Fish, superintendent of the Home mines.

A move recently started to effect "100 per cent unionization" of District 14 by the United Mine Workers of the district has been halted to await a decision by the international board in regard to giving financial aid to non-union workers who quit open-shop mines to join the organization.

### KENTUCKY

The West Kentucky Coal Bureau, which has not met for a couple of months, was scheduled to resume meetings on Sept. 9.

J. C. Hanna, who has been manager at Louisville for the Scanlon Thompson Coal Co., has resigned to join the sales force of the Atlas Coal Co., Louisville. The Scanlon Thompson interests are installing a Godfrey conveyor and wooden hopper system for handling coal in the local yard.

The Kentucky state banking commission, blue sky department, has author-

ized the sale in Kentucky of a part of the \$13,000,000 of securities of the Old Ben Coal Corporation, of Illinois, under an agreement for financing with the National City Co., Chicago, in which twenty-year 6 per cent first-mortgage bonds and ten-year 7½ per cent debentures are to be sold.

The Empire Coal Co., Empire, recently suffered a fire loss amounting to about \$30,000.

It is reported from Middlesboro that the Congress mines have resumed after a shutdown of seven months, and that the Climax mines, which had been down for some weeks, would resume in ten days, while the Yellow Creek mines are putting on more men. This is due to a good demand from the South and Southeast and the fact that the union has become rather badly disorganized, and labor is now obtainable at a wage which enables the producers to enter competitive markets.

Upon reports that a radical element was replacing a conservative one, aiding striking coal miners in Webster County, Major William A. Clarke, Jr., assistant adjutant general, has ordered two National Guard officers to Providence, Ky., for observation duty. Reports of a tense situation have reached Major Clarke, he said.

The Kentucky Washed Coal Co., Nonell, near Drakesboro, operators of probably the largest strip mine in Western Kentucky, will resume operations in a few days, after being shut down for several months, as a result of clay sliding out from under the tippie wrecking that structure, last spring. A new tippie has been erected, and a temporary washing plant, which will be replaced with a highly modern jig plant before long. The plant has a capacity of 35 to 40 cars a day and operates in the Nos. 11 and 12 seams. W. J. Lester, prominent for some years as a strip operator in Illinois and other states, is president of the company. Arrangements have been made for the Harlan Coal Co., Louisville, jobbers, to sell the production of this plant.

Word from Harlan is to the effect that the Black Mountain Coal Corporation, operating one of the largest coal plants in the Harlan Field, after blowing its whistle each morning for a week to call the workers to the mines, and getting no response, has served notice on all of its workers to vacate company houses now occupied, and that legal possession will be taken, it being a case of work or vacate. The men refused a reduction in wages from the 1920 scale, in spite of the fact that



competing companies have generally reduced wages in that section. The company then closed down, and the mines have been idle since April. The new wage scale is being offered.

The new strip mine of the Dawson Daylight Coal Co., near Dawson Springs, which started operations in August, is running from 20 to 30 cars of coal daily and expects to increase that tonnage considerably as changes are made in equipment and arrangements, which will facilitate production. Removal of overburden also will be faster after the first cut is completed.

## MINNESOTA

The Minneapolis Civic and Commerce Association as well as most similar organizations in the Northwest, has issued a statement to the coal-buying public urging that coal be bought early to avoid interfering with the supply of cars for the grain movement.

A petition for receivership of the Reeves Co. has been filed by creditors. E. T. McDonald, Northwestern sales agent for the Philadelphia & Reading Coal & Iron Co., and G. H. Reeves, president of the Reeves Coal & Dock Co., Inc., were named as receivers. The Philadelphia & Reading claimed that the defendant owed \$43,000 with interest since Jan. 31, and \$58,000 due from Sept. 30 to Jan. 31, 1923. The Reeves company, while denying insolvency, did not fight the receivership.

## NEW YORK

Two young men opened an office at Buffalo recently and advertised to sell \$13 coal two hours for \$10. The attempt at fraud was so plain that they were arrested before business had fairly begun. One was discharged and the other was given a short penitentiary term.

## OHIO

There was closed in Cincinnati on Sept. 12 a contract for the delivery of 100,000 tons of Elkhorn coal for seaboard. It is understood that the seaboard prices were such as to make this business more attractive than the lakes or inland. It is said that this is the first large tonnage to move in that direction over the Chesapeake & Ohio for many months.

E. L. Douglass has accepted a position as vice-president of the Briar Hill

Coal Co. in charge of mining operations. He will have his headquarters at Crawford, Tenn. The Briar Hill company is financed by New York interests and owns and has under development some 40,000 acres at Crawford. Mr. Douglass, for many years, had charge of the operating department of the Jewett, Bigelow & Brooks mines in southeastern Kentucky. During the war he was Fuel Distributor for that territory for the government. He also was one of the vice-presidents of the National Coal Association. He was a co-receiver for the J. B. B. Co. when it was placed under the jurisdiction of the court.

## OKLAHOMA

Following a running fight Sunday, Sept. 7, between a motor-car load of attackers and state troops guarding the Kali-Inla mine, near Cambria, where sporadic clashes between union and non-union miners have been reported in recent weeks, additional national guardsmen have been ordered to the district by Adjutant General Baird H. Markham. No one was injured in this latest move against the mine, which is operating on an open-shop basis.

## PENNSYLVANIA

A strike of seven weeks' duration over alleged excess refuse in coal ended last week at the Weston colliery of the T. M. Dodson Coal Co., Hazleton, when 900 men went back.

Morris Lawrence, formerly chief chemist for the Hudson Coal Co. at Scranton, has left the employ of that company and is now engaged in practice in Scranton as a consulting chemical engineer with offices at 301-302 Mears Building. Mr. Lawrence, who is a graduate of Lehigh University in chemical engineering, will specialize on the chemical and research problems of the anthracite industry and in addition will carry on a general consulting chemical engineering practice.

John B. Gallagher, auditor for District No. 1, United Mine Workers, has issued a statement to the officers and members of all locals in the district warning against dual membership in the miners' union and in the organization sponsored by the Workers' party which has headquarters in Pittsburgh. The warning was prompted by reports of radical activities in the anthracite field, Mr. Gallagher said. John L.

Lewis, president of the Miners' International Union, is known to be in sympathy with the warning that has been sent out, having been active in a campaign against these alleged radicals in the miners' union for several years.

The Rochester & Pittsburgh Coal & Iron Co. has begun the shutting down of its stores and other accessories to its Adrian, Eleanora and Helvetia mines, which it announced a few weeks ago were to be abandoned indefinitely if the union miners would not agree to a reduction of wages. The towns and territory generally affected are trying by holding meetings and other means to avert a proceeding that promises to turn a prosperous Pennsylvania industrial district into a poverty-stricken neighborhood. The union refuses to yield and the operators claim that they cannot, if profit is to be expected.

Because of alleged irregularity in suspending a man named Grabosky, who had been serving in the capacity of checkweighman, for a period of two years after charges had been preferred, the charter of Nant-y-Glo local No. 1347, United Mine Workers, has in effect been suspended. Funds of the local have been tied up by order from the district headquarters. President Brophy stated that the charter was not formally suspended but that such action would be taken in the event Grabosky was not reinstated as his suspension was not in accordance with the rules. Mr. Brophy further states that the Nant-y-Glo organization had taken itself out of the union when it failed to pay its district tax. It was for this reason, Mr. Brophy said, that the funds were tied up pending a settlement.

## TENNESSEE

Miners who had been on strike at the mines of the Tennessee Coal, Iron & Railroad Co. at Whitewell for twenty-eight months have been ordered back to work by the local representative of the United Mine Workers. The first break in the long wage contest came when miners at Palmert and Soddy, in this territory, returned to work late in August under a compromise agreement.

## TEXAS

The Texas Power & Light Co., Dallas, is reported to have taken an option on 1,400 acres of land near Trinidad, containing lignite beds, and probably will build an electric power plant to consume the fuel on the ground.

## UTAH

The Columbia Steel Corporation expects to contract, within a few weeks, for the construction of 25 modern dwellings to be erected in its coal town of Columbia.

R. M. Magraw, of Hiawatha, general superintendent for the United States Fuel Co., has been made chairman of the Carbon County Taxpayers' Association. C. H. Stevenson, of Price, a coal retailer, is vice-chairman. The association, similar to many other taxpayers' organizations throughout the



Junior High School and Grade School at Hanna, Wyo.

One of the Union Pacific Co.'s mining towns. Hanna has nothing but mining on which to rely. Like most western coal-mining companies the Union Pacific takes a great pride in its schools. The nature of the soil makes it impossible to clothe the slopes and levels with verdure.



West, studies questions involving tax-exempt securities, limitation of levies and uniform accounting systems for corporations.

The Great Western Coal Mines Co., in which Jack Dempsey, heavyweight boxing champion, did not invest a cent although he was once heralded as owner, is preparing to mine coal in its property on Gordon Creek in Carbon County. It advertises that it will be able to start in October shipping domestic lump at \$4.85 f.o.b. cars at the mine. Stock sales in the company are said to be progressing and development work is advancing. Three miles of railroad grade have been built. Four miles more remain to be done.

Thomas A. Stroup, superintendent of the Clear Creek mines of the Utah Fuel Co., is running for County Commissioner of Carbon County on the Democratic ticket. He has lived in the county eight years. Previously, Mr. Stroup was with one of the big copper mining companies at Bingham, near Salt Lake City.

The drought of Utah, which has interfered somewhat with the water supplies of various mines, has become so severe since the cloudburst of mid-August—the only rain in the state since Memorial Day—that the head of the Mormon Church recommended that special supplication be made in churches on Sunday, Sept. 7, "for Divine assistance that the prevailing drought be broken."

B. W. Dyer, district engineer for the Bureau of Mines at Salt Lake City, went to Pittsburgh, Pa., for the Sept. 8 conference of Bureau field men. He expected to visit the Old Ben Coal Corporation mines in southern Illinois on his return. Much experimental work in rock dusting has been done there.

The Independent Coal & Coke Co., with headquarters in Salt Lake City and mines at Kenilworth, has filed a motion to dismiss the government's action which was to set aside certain land grants to the company on the ground that the land was of known mineral character before the patents were issued. The company holds that more than six years have elapsed since the issuance of the patents and therefore the action is barred by the statute of limitations.

## WASHINGTON

A report compiled by the Bureau of Mines shows that a total of 1,249,878 tons of coal was produced in 1923 from leased public lands of the United States located in various Western States. The ratio of growth of production is shown by the fact that in 1920 but 109,844 tons of coal was produced; in 1921 350,396 tons; in 1922 805,367 tons. The total production for the first quarter of 1924 amounted to 392,542 tons. Leased lands in Wyoming in 1923 yielded 546,519 tons; Utah, 211,300 tons; Colorado, 206,416 tons; Washington, 64,990 tons; New Mexico, 24,486 tons; Montana, 14,991 tons, and South Dakota, 197 tons.

## WEST VIRGINIA

An extra dividend of \$1 a share in addition to the regular quarterly dividend of \$2 a share has been declared on the common stock of the Island Creek Coal Co., payable Oct. 1, to stockholders of record Sept. 19. These dividends make total payments of \$12 a share on the common stock for the current year, as extra dividends of \$1 a share were paid in the previous quarters. The regular quarterly dividend of \$1.50 a share also was declared on the preferred stock payable Oct. 1, to stockholders of record Sept. 19.

A table prepared by the West Virginia Department of Mines shows that in coal produced in West Virginia in the fiscal year ending June 30, 1923, the Fairmount region led all others with a total output of 17,064,070 tons, the Pocahontas field ranking second with 16,724,010 tons. The table follows:

District	1923	1922
Panhandle.....	5,016,599	3,796,904
Fairmount.....	17,064,070	9,625,112
Preston-Barbour.....	6,694,430	3,066,657
Elk Garden.....	1,999,701	1,080,042
Mason.....	80,203	48,253
Putnam.....	365,047	170,552
Kanawha.....	9,812,000	6,110,150
New River.....	14,099,298	11,900,162
Logan.....	10,984,839	13,904,980
Pocahontas.....	16,724,010	18,354,975
Mingo.....	3,101,211	2,130,416
Small Mines.....	1,000,000	700,000
Totals.....	87,031,408	70,888,203

Having given notice to its employees that on Sept. 2 operations would be resumed at Osage Mines Nos. 1 and 2, on Scott's Run, Monongalia County, on the 1917 wage scale and employees having failed to report for work on that date, the Brady-Warner Coal Corporation has issued eviction notices which became effective on Sept. 11, according to the notice. There are 67 houses at the two Osage plants, 65 of them being occupied by union miners who have refused to accept the reduction in wages proposed by the company.

At the sale of the Gaymont mine, in Fayette County, the highest bid was \$600, notwithstanding the fact that the sale covered a leasehold of 1,000 acres of unworked coal at a 10c. royalty, a fully equipped, going mine, turning out a superior product. The Circuit Court of Fayette County at last accounts had not confirmed the sale. A further effort is being made by the special commissioner to find a buyer.

Progress is being made by the Pocahontas Fuel Co. in installing two large plants on its 30,000-acre lease, obtained from the Frick coal interests in Tazewell County, Va., and McDowell County, W. Va., on Jacobs Fork and Dry Fork, respectively. The cutting, cleaning and loading of coal is to be done by machinery.

The Hatfield Reliance Coal Co., of Cincinnati, proposes to build two piers equipped with coal-loading equipment at Huntington, according to plans on file in the office of the U. S. Engineers at Huntington. The company has for a number of years been shipping coal from its Kanawha mines by barge down the Kanawha River through Pt. Pleasant and from that point to Cincinnati

by the Ohio River. By building piers at Huntington and shipping by rail from the Kanawha field to Huntington—a much shorter distance than by water to Huntington—it will be possible to eliminate the long barge haul, using the river only from Huntington to Cincinnati. There is said to be no connection between the proposed construction of piers by the Hatfield Reliance Company and the Logan Coal & Dock Co., in which Philadelphia people are interested. The Philadelphia capitalists will ship their coal from the Guyan field to Huntington for transshipment to Cincinnati and other down-river markets.

## CANADA

John G. Quinn, mine manager at No. 5 and 6 mines at Comox, Canadian Collieries (D), Ltd., has resigned and will leave for New Zealand to take over the management of a colliery there.

The City Council of St. John, N. B., has had under consideration the dredging of the slip on the west side of St. John harbor occupied by the Colwell Coal Co. for some years. The facilities in the slip will be greatly improved for the handling of coal.

There is no indication of a settlement of the Crow's Nest and Alberta coal strike and a report is being circulated, which is without confirmation, that the Coal Creek Collieries are to be closed permanently and that an effort is to be made to open the Michel Mine regardless of the attitude of the United Mine Workers.

The coal trade has not been as brisk in the Vancouver Island field recently as it was in the month of July. With the exception of the Granby Colliery, Cassidy, and the Nanoose-Wellington Collieries, Lantzville, none of the island mines worked full time during August. There have been no signs of the improvement looked for as winter approaches.

Relieving in a certain measure the coal famine which threatens Alberta as a result of the deadlock between striking miners of District No. 18 and the operators, two mines in the Drumheller Valley are expected to resume operations immediately. It is understood that these Alberta mines have arrived at individual agreements. The mines in the carbon fields, many of which have not yet come within the scope of the United Mine Workers, are now producing more coal than they have for years.

The charter of the Westville local of the United Mine Workers, one of the strongest in Nova Scotia, has been withdrawn by the district executive, La Herly. This local has been entirely dominated by the radical element with Dan Livingston, deposed president of the district, and Alexander R. Stewart, deposed member of the International Board, controlling the situation. They have refused to pay their dues to the district or international organizations. Drastic action was advised by John L. Lewis, president of the International Union.



## Traffic

### Indiana Rate Discrepancies Being Adjusted

A supplementary tariff correcting increases on coal freight rates where reductions should have been made and granting the intrastate rates for shipments between two Indiana points when the route goes outside the state, is being prepared by the coal-carrying railroads of the state, according to George H. Mosser, managing director of the Indiana State Chamber of Commerce. Mosser said the coal rates in the schedule, which became effective Aug. 1 under an order of the Public Service Commission, bore many reductions, but had also increases between points not specified in the order issued by the commission. These discrepancies are being corrected.

## Recent Patents

**Mining Machine;** 1,489,583. Edmund C. Morgan, Chicago, Ill.; Olive E. Morgan executrix of Edmund C. Morgan, deceased. April 8, 1924. Filed Sept. 5, 1914; serial No. 860,369.

**Process for Carbonizing Coal;** 1,490,354. George W. Wallace, East St. Louis, Ill., and Arthur W. Warner, Media, Pa., assignors to the Wallace Coke, Oil & By-Products Co., East St. Louis, Mo. April 15, 1924. Filed Dec. 21, 1921; serial No. 523,910.

**Mining Apparatus;** 1,490,398. Edmund C. Morgan, New York, N. Y., Olive Morgan executrix of Edmund C. Morgan, deceased. April 15, 1924. Filed Jan. 14, 1916; serial No. 72,044. Renewed Oct. 7, 1920; serial No. 415,276.

## Trade Literature

**Putting the Right Steel on the Job.** Taylor-Wharton Iron & Steel Co., High Bridge, N. J. Pp. 22; 5x8 in.; illustrated. Describes the many uses for Tisco steel.

**Thor Electric Drills.** Independent Pneumatic Tool Co., Chicago, Ill. Catalog No. 14. Pp. 25; 7½x10½ in.; illustrated. Electric drills and grinders, electric screwdrivers and electric drill stands are described.

**Centrifugal Pumps.** Morris Machine Works, Baldwinville, N. Y. Bulletin 122. Pp. 19; 8x10 in.; illustrated. Describes the construction and operating details of the Morris double-suction centrifugal pumps with horizontally split casing.

The Celie Products Co., Chicago, Ill., recently published the following bulletins: **The Insulation of Boilers**, bulletin B-6e, describing in detail the method of insulating employed for various types and sizes of boilers; **The Insulation of Industrial Furnaces and Ovens**, bulletin B-8d.

American Blower Co., Detroit, Mich., has issued Bulletin No. 1613 and Bulletin No. 1002, the former describing the **Ventura disc fans** and the latter the **Sirocco fans**. These bulletins are four-page folders and illustrated.

**Origin, Development, Results of Elesco** is the subject of a booklet published by The Superheater Co., of New York and Chicago. It gives a brief history of that company. Pp. 15; 3½x8½; illustrated.

**The Blacker Engineering Co.**, Grand Central Terminal, N. Y., has just published a new catalog describing the various types of blacksmith hammers manufactured by this concern.

**The Osgood Co.**, Marion, Ohio, has just issued a new circular, No. 245, featuring the application of traction wheels to railroad-type steam shovels. This new circular describes the various types of railroad and standard shovel equipment used in stripping operations and colliery yards.

Bulletin No. 390, describing roller bearings for mine cars, has just been published by the **Hyatt Roller Bearing Co.**, Newark, N. J. This book describes in detail the various types of bearings made by this

company applicable to coal mine cars. It also points out the advantages of roller bearings to increase transportation speed, reduce maintenance and upkeep charges and also effect power savings.

**The Oxweld Acetylene Co.**, Long Island City, N. Y., has just published a new 48-page catalog illustrating and describing in detail its extensive line of acetylene generators and oxyacetylene welding, cutting, lead-burning, heating and decarbonizing equipment. The book is full of information for the user, or prospective user, of oxyacetylene apparatus.

## New Companies

**The Tri-State Coal Co.** has been incorporated in Miami, Okla., with a capital of \$10,000, by Hobart L. Cheyne, W. B. Larimore and J. L. Stratton.

**The Rogers Elkhorn Coal Co.** has been incorporated in Virgie, Ky., with a capital stock of \$50,000, by T. T. Rogers and T. E. Rogers, of Virgie, and T. G. Rogers, of Greenville, Ky.

**The Jennie Wilson Coal Co.** has been organized in Owensboro, Ky., with headquarters at 326 W. 7th Street, Owensboro, with Jennie Wilson, president, and George S. Wilson, secretary. The company has 600 acres of coal land under development.

**The Sixty-Eight Mining Co.** has been chartered with a capital of 750 shares, no par value designated, to operate at Jacksonville, in the Hocking Valley district of Ohio. The property was obtained from the Central West Coal & Lumber Co. The incorporators are A. R. Jones, D. H. Armstrong, Elizabeth Voil, D. F. Shafer and F. E. Roth. Extensive improvements will be made to the property.

## Obituary

**William Scott Thomas**, well known in the coal industry in Schuylkill County, Pennsylvania, died in Philadelphia, Aug. 28, in his 79th year. He was born in Nova Scotia, removed to Schuylkill County when quite young and entered the employ of the Philadelphia & Reading Coal & Iron Co., becoming superintendent of the Mahanoy division. Subsequently he was engaged in the coal business under the name of Bright, Thomas & Co., the firm being known later as Donaldson & Thomas. He retired from active business in 1919.

## Coming Meetings

**West Virginia Coal Association.** White Sulphur Springs, Sept. 19. Secretary, W. H. Cunningham, Huntington, W. Va.

**National Safety Council.** Thirteenth annual safety congress Sept. 29 to Oct. 3. Louisville, Ky. Managing director and secretary, W. H. Cameron, 168 No. Michigan Ave., Chicago, Ill.

**Alabama Mining Institute.** Annual meeting, Oct. 7, Hotel Hillman, Birmingham, Ala. Secretary, James L. Davidson, American Trust & Savings Bank Bldg., Birmingham, Ala.

**Illinois Coal Operators' Association.** Annual meeting, Oct. 7, Chicago, Ill. Secretary, C. E. McLaughlin, Fisher Bldg., Chicago, Ill.

**American Institute of Mining and Metallurgical Engineers.** Fall meeting, Birmingham, Ala., Oct. 13-15. Secretary, F. F. Sharpless, 29 West 39th St., New York City.

**American Institute of Electrical Engineers.** Fall convention, Pasadena, Calif., Oct. 13-17. Secretary, F. L. Hutchinson, 29 West 39th St., New York City.

**American Gas Association.** Sixth annual convention and exhibition, Steel Pier, Atlantic City, N. J., Oct. 13-17. Secretary, Alexander Forward, 342 Madison Ave., New York City.

**Canadian Institute of Mining and Metallurgy.** Sixth annual Western Meeting, Oct. 16-18, Blairmore, Alta., Can. Secretary, Moses Johnson, Blairmore, Alta., Can.

**Third National Exposition of Power and Mechanical Engineering.** Dec. 1-6, Grand Central Palace, New York City.

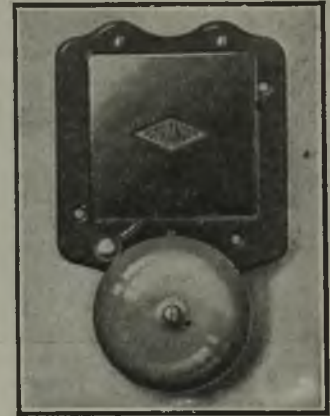
**Coal Mining Institute of America.** Annual meeting, Dec. 3-5, Chamber of Commerce Bldg., Pittsburgh, Pa. Secretary, H. D. Mason, Jr., 909 Chamber of Commerce Bldg., Pittsburgh, Pa.

## New Equipment

### Bell with No Contacts

A transformer-type bell which has no contacts to cause sparking has been developed by W. R. Ostrander & Co., 371 Broadway, New York.

The bell requires only one watt to operate it and is therefore called a one-watt efficiency bell. It consists of a special laminated core and insulated coils mounted directly on a terminal board of bakelite. The armature has



Safe Bell for Mines

Because this little unit has no arcing contacts it is especially suitable for mine service. Neither moisture nor gas can make it dangerous.

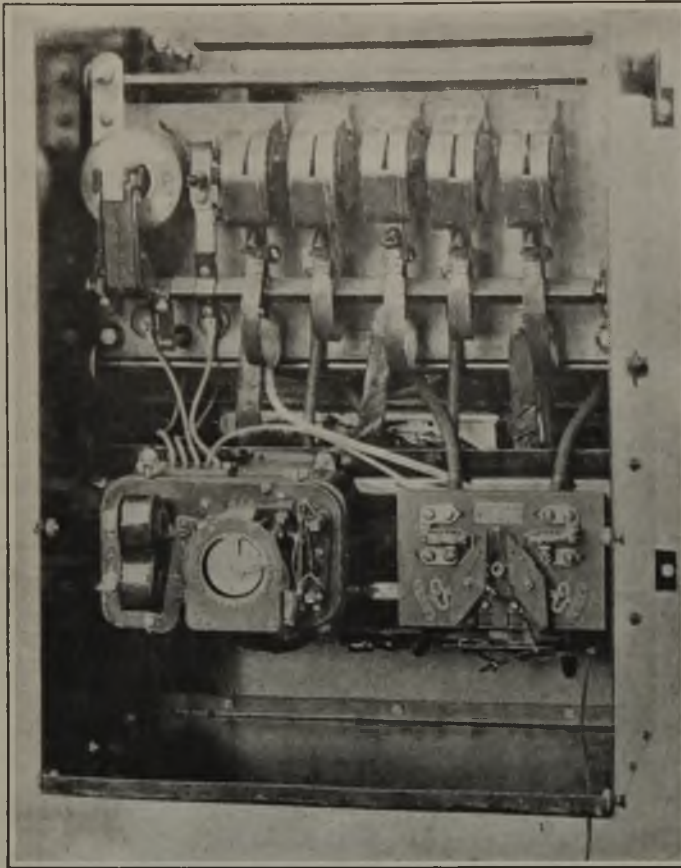
no arcing contacts, and consequently the bell is safe for use in mines or other places containing explosive gases. When the armature operates it vibrates at a natural frequency of about 60 cycles and is adjustable. A cast-brass gong is mounted on the bottom of a frame which supports the transformer element. The standard rating of the bell is 12 volts.

### Starting Compensator Has a Time-Temperature Relay

A new automatic starting compensator for squirrel-cage induction motors will soon be placed on the market. This motor starter is for remote control of constant speed two- or three-phase squirrel-cage motors up to 600 volts for general applications such as driving line shafting, pumps, compressors, blowers, conveyors, etc. With it such equipments may be started or stopped from a distant point by means of one or more small hand-operated push buttons or snap switches located within convenient reach of the operator or automatically operated by a pressure governor, float switch, or thermostat.

The General Electric Co., which manufactures this compensator, has incorporated various new features. Definite and adjustable time acceleration is obtained by means of a new induction-type relay. Positive overload protection of the complete equipment is provided by a double-pole,





### Inclosed Motor Starter

Remote control apparatus makes it easy and safe to start any motor connected to this new compensator. A temperature relay combined with other protective devices prevents damage to the motor. In coal tipples and breakers push buttons may be placed at various points so that the motor may be quickly stopped in case of an emergency. It is always desirable that the operator be in a position where he can see the driven equipment before and during the acceleration period of the motor.

inverse time temperature overload relay. The starting and running magnetic contactors are mounted back-to-back in a sheet-steel inclosing case providing easy access to all parts. Several taps on the auto-transformer provide for adjusting the low voltage

to suit the starting requirements of different motor loads.

All parts are protected by the steel inclosing case and a conduit box at the back has several knock-outs and furnishes entrance for all power and control wires to the starter.

### Dampproofing Material for Concrete Surfaces

The Truscon Laboratories, Detroit, Mich., announce the placing on the market of a new product, known as Super Por-Seal. This material is a transparent dampproofing, intended for application over concrete, stucco, brick and masonry.

Most materials in this class in the past have been made of waxes, petroleum or other mineral-oil substances. The result is that even in the best of them, there was a slight tendency to stain the surface, due to oily nature of the compounds.

#### SEALS ALL MINUTE PORES

Super Por-Seal is a water-repellent compound for dampproofing. Its general composition is much the same as waterproofing paste, except that it is in a clear solution. It is absorbed into the pores of the stucco or masonry, where on evaporation of its volatile solvent it lines these pores with a highly water-repellent compound. Water thrown on such a surface runs off as freely as it would from a duck's back. Some interesting tests have been made of stucco surfaces, treated with only one coat of the material and stucco surfaces without any dampproofing. A bucket of water thrown on the untreated stucco surface immediately darkens the wall indicating water absorption. Water thrown on the treated

surface shows no darkening because it runs off immediately.

Such a material naturally is an excellent protective coating against moisture and frost for stucco, concrete, brick and stone. It doesn't darken or discolor the surface at all.

### Electric Drill Will Work in Concrete and Soft Stone

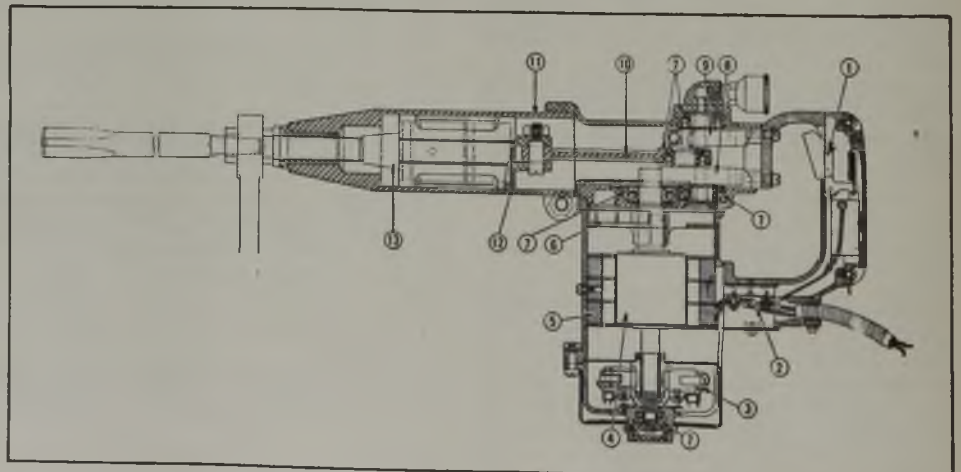
An electric hammer drill, suitable for drilling concrete and soft stone as well as for light chipping of metals, has

recently been developed by the Chicago Pneumatic Tool Co. It is equipped with a universal motor and will operate interchangeably on direct or alternating current. It is necessary merely to have the motor wound for the correct line voltage on which it is to operate.

The hammer blow delivered on the drill steel or chisel is the result of energy stored up by a rapidly moving piston which is mechanically free from the impelling force. The connection between the piston and the driving mechanism is by means of air which, at the instant the blow is delivered, restores energy to the piston through the expansion of the air which formed a cushion at the end of the upstroke. This means that there is no tendency for the electric wires or connections to be crystallized due to incessant jarring.

The essential details of the hammer are as follows: 1. Conveniently located inside trigger pistol grip switch of quick-acting type, so constructed to prevent starting of drill only by operator. 2. Terminal block for cable permitting cable replacement without disturbing other connections. 3. Adjustable brush rigging permitting of shifting brushes for perfect commutation. 4. Armature, drum wound. Heavily insulated coils carried in insulated slots in armature core. 5. Laminated stator structure having distributed pole-face windings. 6. Sheet-steel fan, carefully balanced and reinforced, providing thorough ventilation of motor. 7. Armature and all revolving parts mounted on high-grade ball bearings. 8. Crank gear. 9. Crank counterweight. 10. Connecting-rod. 11. Barrel. 12. Cylinder. 13. Piston.

The tool is well-balanced and when held loosely in the hand has the line of its center of gravity within the barrel of the tool and the operator's hand, thus causing the tool to hang vertically. A convenient trigger switch is located in the handle for the control of the electric current. The release of this switch opens the circuit, and the switch being inside the handle, the motor cannot be started accidentally by a blow from the outside. The bearings are all of the ball type, provision being made for lubrication of all revolving and reciprocating parts. All moving parts, including the gears, which are subject to wear, are hardened.



### Pneumatic-Electric Hammer Drill

Due to the serious vibrations set up in all types of hammers electrically operated units must be carefully designed. This little drill delivers energy through the medium of air. The tool is well-balanced and may be started or stopped easily by means of a trigger switch.