

COAL AGE

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Rid Mines of Convict Labor

NO ONE who has employed prison help in coal mines is an enthusiast for that class of operative. Nowhere is the employee less under observation and control than in a coal mine, yet nowhere, every miner will admit, is discipline more needed for the safety of the individual himself and for the security of everyone else in the mine.

The job of coal miner is one calling for loyalty and willingness to labor. True some miners have neither quality but there is always a fair admixture in any aggregation of men. With prison labor, loyalty and industry are notably absent, though probably even in prison mines, they are not invariably lacking. Unfortunately, convicts usually come into their regrettable condition by reason of the fact that they have neither of those qualities and are at war with the rest of humanity. They often are as insufferable in their own homes as they are to their neighbors.

It is useless to call on the coal industry to rid itself of prison labor. The coal industry is not to blame. Only those who enter into such contracts and such states as permit it are responsible. The appeal must be to the public in states which harbor such institutions.

Mining is not so dangerous inherently as to make the employment of convicts a crime. It is at best an act of folly, but this it certainly is and for that reason it should be condemned.

Is This What Was Meant?

PUZZLING indeed is the attitude of certain inspectors in regard to the disaster in No. 1 mine of the Mount Jessup Coal Co. A big fall of rock occurred in that mine, due, it is said, to the presence of 30 ft. of loose sand in the roof. This loose sand is not uncommonly found in the northern anthracite field. Where it occurs, precautions should be taken against it.

We are not clear that the inspectors were in any way amiss in demanding that workings in coal likely to be covered by such treacherous overburden be provided with unusual safeguards. That they should be drilled and that the areas of sand and its depth should be determined is a reasonable suggestion followed by one company at least. That the inspectors should be informed as to its presence is not a startling proposal. Faults also may have to be taken into consideration as possible causes of sudden roof collapse.

However, so much granted, one cannot understand the advisability of compulsory testing of the roof by boreholes in areas where loose sands and gravels are never found or when found are covered with thicknesses of firm deposits amply adequate to protect the workings.

The greater part of the coal in the State of Pennsylvania, including practically the whole of the bituminous coal field, is free of glacial drift. Only in the first basin are faults found except a few unimportant ones near the coal crop. No safety is to be gained by drilling such measures. We can only assume that the inspectors in making their report referred to areas such as that on which they were reporting and not to the many areas where loose sands and gravels, true faults and extensive fractures are entirely unknown.

Keep Moving

CONTINUITY of operation is the test of machine loading. Many machines already on the market load ample tonnage per minute to satisfy the operators who buy them, but unfortunately they can be expected to maintain that tonnage through the day only when cars are delivered steadily through the whole course of the shift. The question, therefore, is one of transportation. Only one car ordinarily can be delivered in a room at a time.

With a good roof and some cribbing or heavy posting, a trip can be loaded at a longwall or a pillar face, but cribbing and heavy posting is expensive to maintain and remove and may be inadequate in the control of the roof, as it interferes with its prompt collapse and therefore with the relief of pressure consequent thereon. This consideration reduces the length of the trip, and with a short string of cars the efficiency of the machine loader is greatly reduced. A conveyor leading to the roadway is a solution, but with many rooms equipped with many conveyors, congestion in the heading is inevitable. A heading conveyor can be placed on the roadway, as is advocated by the author of the article "Modernize," printed in this issue. Such a conveyor will meet this difficulty.

If there is more than one heading delivering to a single main entry, however, and these headings are close by one another there will be congestion on the entry and more trouble. Another conveyor, one on the entry, is the solution. This conveyor may profitably be extended so as to eliminate the use of cars altogether, except for supplies. Consequently the author of the article, recognizing this fact, makes conveyors serve for the transportation of the coal from the face to the tipple. Who shall say that he is not justified?

The face must be cut and shot, however, and meanwhile the room is not working. By moving the machine loader and its men to another room this difficulty is met at least in part. The loaders and cutters do not have far to go, and only the room conveyor is idle while the face is cut and shot and while cutter and loading machine are maneuvered into place. A machine that cuts as it

loads would enable operations to be continuous, especially if the coal does not have to be shot down.

Large changes are coming. Mines will become smaller and the work in them more concentrated and the expenditure per acre under operation will be increased. At the same time the capital outlay per ton of daily output will be lowered.

Narcotism

STRIKES have restricted output, and car shortages have aided in preventing the shortage of coal from being immediately replenished. Thus prices which have fallen to abnormally low levels have been raised to levels abnormally high. Naturally, companies facing bankruptcy or a severe depletion of resources have not viewed strikes and car shortages with any great degree of regret. One cannot much wonder at that as they present another chance to correct an unfavorable balance. But nothing has done more to bring an excess of new mines than this same condition.

Among these new operations are many so inadequately equipped that they cannot face the pressure of competition when the shortage of coal ceases. The fly-by-nights, or snow-bird, mines promptly close down when the flurry in coal comes to an end.

All new mines, however, are not of this class. Others there are equipped up to the minute and well able to drive the older mines to the wall. Some of these old operations with all their new equipment are so inherently out of date as far as layout is concerned that they cannot be operated in competition with mines designed with all the advantages of modern engineering. Not only are their roadways and airways badly planned and impossible to improve but they are unduly long. The new mines have all the advantage, and the last state is worse than the first. After the flurry conditions are more unbearable than before the strike or car shortage.

In fact the strike is like an opiate. When the drug's effects are expended, nothing but a second shot of the hypodermic will ameliorate the patient's condition. Narcotism is not popular among medical men because it leaves the patient weaker than before the application. Neither is a strike to be advocated as a means of renewing the vigor of the coal industry. Safe and sane business is based on full-time operation, not on spasms of activity followed by months of quiescent slumber.

As the doctor fears the *sequelae* of a drug, so should the coal industry view with apprehension the prospect of becoming victim to the unfortunate evils which follow in the train of an activity artificially created. If anyone would judge the effect of such temporary stimulants, let him view the course of the copper and machinery industries since the war.

"PLEASE BOIL IT DOWN TO ONE PAGE," begs a Congressman of a coal operator who has a plan for remedying some of coal's ills. Not many Congressmen would take the trouble to ask even that. They are just about like the coal operator—whose name is legion—who does not read the Coal Commission's report; they simply will not dig through reams of verbiage to get people's ideas. The wastebasket and the dusty shelf are ever ready for long-winds. Tell your Congressman what, if anything, you think ought to be done about coal; but beware of verbosity and the wastebasket.

Passing of the Hand Shovel

REDUCTION in the number and character of immigrants is assured if the House Immigration Committee's quota bill is enacted into law. The number of immigrants, already reduced, will be further diminished by almost one-half, and the particular sources of labor that have replenished the coal fields will be decreased in even larger proportion, for the number of men of the type that enters the coal mines will be more largely decreased in all probability than the figures of the new and old quota would indicate.

The United States is determined that America shall continue America. The people of this Republic are determined that the country shall no longer be surfeited with unassimilated labor. The immigration quota being based on 1890 instead of 1910, a large percentage of northern Europeans will be admitted and a small percentage of southern Europeans. The former do not take any more kindly than Americans to arduous labor. Few miners will come here and those who do will be unable to understand why they should produce as large a tonnage as has been the custom of American miners. They thoroughly approve of European standards of production and forget that American conditions of seam and system justify larger tonnages.

Consequently we may before long cease to find the coal fields populated beyond the labor demand, as they have been too generally in the past. Incidentally it may be remarked that we shall find it difficult to open new fields. Old fields will draw on the present surplus and perhaps for a while obtain men from other industries surrounding the coal fields, but new regions will have recourse only to transported native labor and to the sparse populations already occupying the neighborhood of the new mines.

Some time back when the loader was still new and portable conveyors fed by hand labor seemed likely to hold for a while the mining field, a superintendent was asked what he thought of these new-fangled devices. He replied that he preferred the "Franz Josef shovel," meaning the hand shovel in the hands of the subjects of the Emperor Francis Joseph. Many were then arriving, and splendid workers most of them proved to be.

Today the "Franz Josef shovel" is decreasingly present. We have to find a substitute, and the mechanical loader promises to serve the purpose. It inevitably must come, for the modern laborer takes but unkindly to arduous toil. The power loader is the only way to meet the problem.

Many an operator does not want to have to employ any more men. They take too many houses. No longer are any single men available or men having wives and children in Europe. Bunk houses accordingly will no longer aid in filling the needs of the operator. Good homes must be built, and with rents what they are—and they do not promise to be increased—the building of houses is unprofitable. The stores no longer pay an exorbitant profit. So the cry is "More coal without more men" or "with less men," for the single men are becoming married or bringing over their families and demanding suitable housing.

For this reason the power loader is becoming essential, and the mines must be worked more and more by machines. The pressure is economic and it cannot fail to be met. Only loading by machine and by face and room conveyors will meet it.



Coal-Strip Enterprises Grow in Western Kentucky

Sunlight Mining Co., of Madisonville Led Field with First Plant Opened About Three Years Ago—Twelve Pits Now Running and Three More About to Open — Operators Face Many Problems

By A. W. WILLIAMS
Louisville, Ky.

STRIP mining in western Kentucky has made such forward strides of recent years that it is much in the spotlight in the coal industry of that region. Although the first stripping operation is only three years old there are now no less than twelve strip pits operating, three more are actively preparing to run and other companies are interestedly scanning the field for a chance to get into the game. During the month of November a total of 1,800 cars of strip coal were moved out of the field. This represents at least 10 per cent of the production of the western Kentucky field and is therefore already an important factor.

"And the best thing of all that can be said about stripping," says a strip operator who has heard much comment from shaft-mining interests about the doubtful future of stripping, "is that out of 340 underground mines in western Kentucky, including potholes and all, during early December only 150 were active and most of these got only part time, whereas every stripper that is ready to run was running. Coal can be mined more cheaply by the strip method, and naturally strip mines were underselling deep mines."

Development of strip operations in the field during 1923 was especially rapid. It was so rapid, in fact, that prospective operating companies made mistakes. It is always easy to figure on paper that there is a given tonnage of coal underlying a certain acreage, that the cover is of a certain depth and that the cost of removing it will be exactly such and such; but strip-

ping often is fraught with many surprises and much heartbreak.

Companies hastily opening stripping land have found that the overburden was not uniform, that it was spotted with hard formations expensive to move, that the coal seam varied astonishingly in thickness and often turned out to be shot full of "rust" in spots that lowered the uniform quality of the deposit, that drainage became difficult and expensive when the coal didn't lie right, that breakdowns of the few big expensive machine units upon which the pit depended were vexing and expensive, all of which doubled or trebled the paper cost of stripping coal. And finally, market fluctuations upset the roseate preliminary calculations. Some western Kentucky operators struck all of these difficulties.

SPENT \$25,000 YET DID NOT BUY COAL LAND

Some mighty careful studies were made by certain of the prospective stripping companies before any machinery was bought. One concern is reported to have spent \$25,000 in a thorough drilling of every part of a 450-acre tract and then to have declined the lease. It was a costly venture in prospecting, but the cost was nothing compared to what might have been wasted had the first few drill cores been accepted as adequate basis for going ahead. It is an expensive thing to erect a tipple with all the coal-cleaning and sizing equipment necessary to prepare strip coal for the market, and then to buy and assemble a big steam shovel and spend a few months encountering the unforeseen.

The industry being new in western Kentucky, the development companies have a lot to learn. Kentucky's first important stripping plant was opened only about

Cleaning is one of the serious problems of the stripper. The headpiece shows the picking table of the Sunlight Mining Co., near Madisonville, Ky. No less than fourteen men are on duty at one time taking out the refuse. Washers also are employed at some of the properties.



RIPPING THE OVERBURDEN FROM WESTERN KENTUCKY COAL WITH A MAMMOTH SHOVEL
 Most of the big shovels in the rapidly spreading stripping movement of that section of Kentucky are steam-operated. Central-station electric service is none too general yet. The cover on this coal varies at most strip plants between 25 and 35 ft., but in spots runs up as high as 50 ft. West Kentucky as a stripping field was only lately discovered.

three years ago by the Sunlight Mining Co., of Madisonville. The Western Collieries Co. and the Magic Collieries Co., at Ilesley, followed closely. Subsidiary organizations of underground mining companies began to appear along with outright stripper outfits. The number of them steadily increased through 1923. During November two new strip pits were opened by the Morrison Coal Co., and the Curshaw Coal Co., both of Centertown. It is reported Birmingham (Ala.), interests are behind the Morrison company.

Within the three years fifteen developments started, including three which have not yet produced coal. These companies are now in the active class: Sunlight Mining Co., of Madisonville; Western Collieries Co., with two plants at Ilesley and Crabtree; Magic Collieries Co., of Ilesley; Hawley McIsaacs Co., of Carbondale; D. B. Gore & Co., of Providence; Harris Coal Co., of Island; Kentucky Washed Coal Co., of Nonell; Midstate Coal Co., of Morton's Gap; Dempster Construction Co., of the same place; Morrison Coal Co., of Centertown, and Curshaw Coal Co., also of Centertown. Strip pits are now being started by the Hawley McIsaacs Co. (No. 2 mine) at Lewisport, by the Dawson Daylight Coal Co., at Dawson Springs, and by Boddie & Powell, of Earlington.

It is known that at least two strip operations are located on properties belonging to the St. Bernard Coal Mining Co., of Earlington, shaft-mine operators.

The new Dawson Daylight Coal Co. is controlled by K. U. Meguire, of Louisville, Ky., and associates. For years they have been active in the eastern Kentucky field, but only recently started their first western Kentucky development. This strip-mine plant is to have a capacity of 5,000 tons daily, with complete washer, crusher and five-track steel tippie with picking tables and loading boom. It is planned as the largest coal-loading plant in the state. It has been delayed through failure of the Illinois Central R.R. to reach the plant with the new branch line that is now under construction.

The plant of the Sunlight Mining Co., the oldest and one of the best stripping plants in the state, is three miles southeast of Madisonville, on the Louisville & Nashville R.R. This location is 160 miles southwest of Louisville, Ky., and 108 miles northwest of Nashville, Tenn. The company has 500 acres of land and has stripped fifty of these. Its coal lies in two beds on a

1-per cent grade, which makes it easy to drain the pit.

Operations started in August, 1920. The property was carefully prospected in advance. The average thickness of its upper seam, the No. 12 bed, is about 5 ft. This seam is separated from the lower seam, No. 11, by a solid limestone stratum of 3 to 5 ft. The lower, or No. 11 seam, is about 6 ft. thick. Coal from both seams is of good quality for steam or domestic use, measured by western Kentucky standards.

The overburden, which averages from 25 to 35 ft. in thickness but runs up to as much as 50 ft. because of the irregularity of the land, consists of clay and shale. The clay is a little difficult to dig when saturated, but for the most part it is easy to handle.

WORK THE BIG SHOVEL NIGHT AND DAY

A big shovel with 85-ft. boom and 6 cu.yd. dipper started stripping in August, 1920, and has been going steadily since that time, operating with three shifts of eight hours, or twenty-four hours per day part of the time, moving about 120,000 cu.yd. of earth each month. It opened the northwest side of the property with a short cut, following an outcrop. Other cuts were made parallel to this in a gradually increasing curve, so that eventually a complete circle was made around the property to such a distance that the haul from the pit to the tippie is now somewhat more than a quarter of a mile long, the cut being about a half mile long and 100 ft. wide.

Other equipment used includes two smaller loading shovels, working one shift of eight hours a day each. Coal is loaded in ten-car trains, all the cars being of five-ton capacity and fitted for side dumping. Four trains are operated, pulled by 18-ton locomotives. A standard gage locomotive also is used in switching standard railroad coal cars back and forth from tippie to main line. It is reported that the company has not found it necessary to use explosives in moving overburden, but some 40 per cent powder is used on the coal parting. Six drills are kept in operation.

The tippie has a capacity of 2,500 tons daily. Coal from the workings is run over shaker screens, which sort out the 3x6-in. egg and 6-in. block for loading direct to cars, while 3-in. stuff is handled by a belt conveyor to the washing plant, where it is washed and elevated to revolving screens and rescreened to 3x2-in.

Loading Out Strip Coal

Small shovels like this are used for most of this work. Generally the coal is loosened by light shots but in some cases it is lifted by the shovel alone. In this particular plant the overburden was removed in long cuts each 100 ft. wide, following around the edge of the outcrop, the depth of the coal below the surface becoming progressively greater.



egg, 2x1½-in. nut, 1½x3 in. and ¾ in. down. Each size passes under the spray and is loaded into railroad cars, the breakage and slack being flumed back to a settling tank or sump. As many as fourteen men are used at the picking tables, for strip coal must be clean to meet competition.

The company maintains its own machine shop, equipped with forge, welding equipment, etc., to take care of breaks in equipment.

Another feature of the plant is a rock crusher with a capacity of 1,000 cu.yd. a day, operated by the Sunlight Crushed Stone Co., an affiliated concern. The limestone blasted from between the two seams of coal, and lifted by the two loading shovels, is prepared in the crusher for road building, concrete work and the like.

Much interest has been manifested in the Sunlight operations due to the fact that the company was the pioneer in western Kentucky, and it has had enough experience to be an authority, while its methods have been steadily improved upon.

One of the big interests of the stripper people today is to clean their coal so as to counteract the strong prejudice against it. In several western Kentucky operations the top surface of the coal is carefully swept by hand after the overburden has been removed and before the coal is shot up. In at least one instance tractors are employed to drag heavy, four-wheeled rotary steel brushes over the coal. Washing plants and well-manned picking tables also are playing their part, so that western Kentucky strip coal can continue to hold its market.

Find Good Coal on Peace River Canyon

THE first authentic account of the Peace River Canyon coal field since the completion of any important exploration appears in Part B of the Canadian Geological Survey's Summary Report for 1922, recently published. The account is written by F. H. McLearn, who spent the full season of 1922 in the district.

The coal field is situated at the junction of the 56th parallel with the 122nd meridian, a few miles west of Hudson's Hope. Those who are not acquainted with the location of this field will be interested to know that it lies 125 miles distant in a direct line northward from the Grand Trunk Pacific R.R. between Edmonton and Prince Rupert, and 324 miles, as the crow flies, from the nearest point on the Pacific Coast. It is about 475 miles due north of the United States boundary. Like the productive coal fields on Vancouver Island and southeastern British Columbia it is of Cretaceous origin. The measures over the area of seven square miles which was examined minutely have a thickness of 1,250 ft. and contain fifty known coal seams, ranging from a few inches up to 4 ft. in thickness. Eleven seams are more than 2½ ft. thick, one is more than 3 ft. and three expand in places to more than 4 ft. Several of the smaller seams are close enough together to be worked as one.

The grade of the coal varies, much of it being excel-

lent. The Milligan seam, from which the best coal is obtained, averages 2 per cent moisture, 22.5 per cent volatile combustible matter, 73 per cent fixed carbon, and 3.5 per cent ash. The Trojan seam averages about 1 per cent moisture, 26 per cent volatile combustible matter, 63 per cent fixed carbon, and 10 per cent ash.

While admitting that as yet insufficient exploration has been done to enable geologists to make an accurate estimate of the coal content of the field, Mr. McLearn says that sufficient evidence exists to suggest the presence of a total reserve of 84,000,000 tons within an area of seven square miles, and that it is possible that the area and tonnage may be doubled by further exploration.

The field, therefore, is undoubtedly an important one, but cannot be exploited until some better form of transportation than now exists has been provided. At present the nearest railway, the terminus of the Edmonton, Dunvagen, & British Columbia Ry., at Spirit River, is 125 miles distant to the east. This line has been graded to the Alberta-British Columbia boundary, which is 75 miles distant, and the Canadian Pacific Ry. Co. is said to be considering the extension of the line to the coal field and possibly to the Pacific coast. A trial shipment of 42 tons was recently sent down the Peace River to Peace River Crossing, a distance of 300 miles, where its steam-raising qualities will be given a practical test on the Canadian Pacific Ry. engines.

Unusual Hoisting Equipment at Huge German Headframe

Guides Independent of Main Structure and Can Be Adjusted in Case of Subsidence—Protection Against Destruction by Overwinds

BY W. BENEDICT
Duisburg, Germany

DURING the past months, when the occupation of the Ruhr brought coal production in that district to a complete standstill, advantage has been taken of the opportunity to make necessary alterations to many colliery installations. A remarkable plant and headframe, the latter being the largest in Germany, and perhaps in the world, has been erected by the Orange Iron Works in Gelsenkirchen for shaft No. 9 of the Consolidation Mining Co. (Bergwerks Actien Gesellschaft "Consolidation"). It is arranged for hoisting in two compartments from a depth of 4,920 ft. (1,500 m.). The rope for hoisting from these profound depths has a calculated breaking strength of 380 tons. The superstructure, 173 ft. 10 in. high, is built in gantry form, with two stays placed opposite each other.

The guide frame, standing between the stays, is so arranged at the top of the structure that it is adjustable independently of the rest of the building. Consequently it is not influenced by the tension of the rope or any possible subsidence of the surface. This arrangement of the guide frame, by which it serves only for the guiding of the cages and is independent of the

stays and the top of the structure, offers a further advantage in that the structure cannot be injured should the rope be broken by an overwind. Furthermore, it provides that damages to the guide frame can be quickly repaired.

On the lower part of the guide frame, immediately below the pit mouth, a runway is constructed, on which are two hand-operated overhead traveling cranes, one behind and the other in front of the structure, which provide for the attachment and detachment of the cages. An ascending and descending platform, 13 ft. above the collar, aids in the quick transference of workmen when changing shifts. In case of a fire and when work is being done over the shaft the opening can be closed by fire trapdoors, these being raised and lowered by means of bracket winches arranged laterally on the structure. A large platform is provided above the roof on which the ropes can be spliced together when being renewed. Below the platform, as far down as the collar of the shaft, the structure is closely covered with plates, so that snow and rain cannot be driven in from the sides. Only water which falls vertically can fall into the shaft.

On the upper part of the guide frame, just beneath the bottom sheaves, a girder structure with platform is arranged, from which repairs can be made and the ropes put in place. The sheave parts can be hoisted up to the height of the sheave platform by a 10-ton crane which is placed above each pair of sheaves. By this means they can be rapidly brought to place in the superstructure. In consequence, interruptions of work when placing ropes on the sheaves and hoisting the latter into place, are reduced to a minimum.

Giant Head Frame with Two Back Stays

Standing nearly 175 ft. above the collar, this Consolidation Mining Co.'s No. 9 headframe provides for hoisting from a depth of nearly 5,000 ft. Novel provisions are made for the removal and replacement of the rope and sheaves and for the caging of the men. The guides are independent of the structure, so that in case of subsidence they can be adjusted to line with the guides in the shaft.



Modernize!—Some Revolutionary Suggestions with Practical Possibilities in Actual Practice

System of Mining by Room-and-Pillar Method with Conveyor Belts from Coal Face to Tipple—Tracks Only for Delivery of Supplies on Storage-Battery Trucks or Locomotives

BY WALTER M. DAKE*
New York City

IN ITS release to the public press of Sept. 24, 1923, the U. S. Coal Commission makes this fundamental statement regarding the necessity of the coal industry cleaning house and lowering the cost of coal to the consumer: "The commission realizes that the largest opportunity and the largest responsibility for putting the coal industry in order lies with the industry itself. Self-determination is the ideal."

It also makes the further statement in exemplification of the foregoing: "Not through governmental coercion but through the enlightened self-interest of producers and consumers the real remedy is to be sought. The coal industry can reform itself from within."

This truism is the essence of the final report and to it need only be added the obvious corollary that the coal operator, while receiving a fair return on his investment, should produce a clean product in sufficient quantity and sell it at a price, regulated by normal competition, such as will give the consumer cheap fuel.

The coal industry is reaching the point where improperly financed and poorly equipped properties operating intermittently and at high cost will be succeeded by financially sound organizations mining immense tonnages at low cost, and this will be accomplished only by the application of modern engineering methods.

Modern engineering has done much for the metal industry. Compare the methods of the early placer mines with those of today. In one the mineral was separated by hand panning or by the use of the cradle and sluice. In the other it is collected and concentrated by a powerful, high-tonnage dredge. Compare also the underground methods of earlier days with the more modern methods. In former years narrow seams of high-grade ore were drilled by hand, blasted and the product treated by stamp mills and amalgamation, only a small percentage of the gold content being recovered. In present-day mines the mineralized rock is obtained by stope mining and concentrated by large-tonnage cyanide mills which make high recoveries at low cost.

In like manner the methods of producing copper, lead and zinc have been improved. Steam shovels, caving systems, fine grinding, flotation and modern methods of smelting and electrolytic refining have been developed and put in operation, showing conclusively the effect of engineering management on mining costs.

Nor is this all; the iron ranges have seen equally startling improvements which have decreased the cost per ton mined and increased the daily tonnage. These changes, with all the subsequent steps of the steel-making process, are the direct result of concentrated engineering effort.

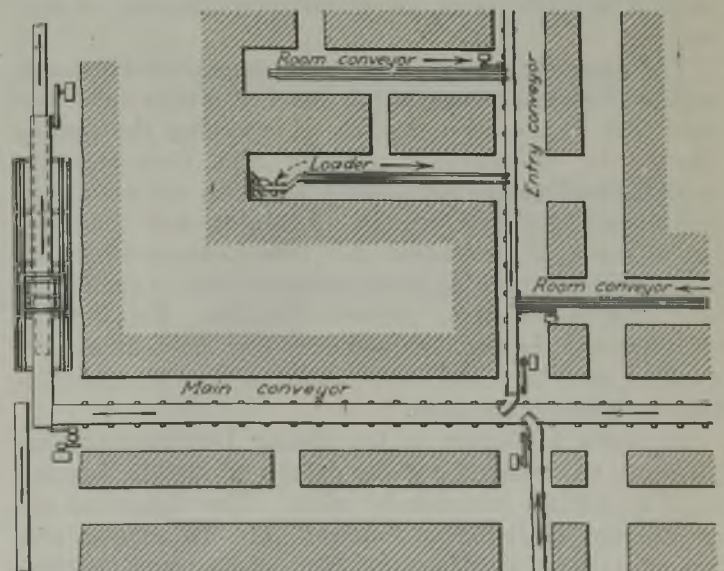
Because an intensive competition is to be anticipated in the coal industry, operators somewhat belatedly are realizing that better engineering is becoming essential in the conduct of their operations. Increased tonnage has lowered the cost of product in industries allied to coal mining and a like increase in output is possible in the production of coal through the extensive use of mechanical labor-saving devices in mining and transportation.

Some such changes already have taken place in coal mines, of which the introduction of coal-loading machinery is among the more recent. These loaders were the subject of an extensive study by the engineering staff of the Coal Commission and observations of performance have been tabulated which show an actual output of 353 tons per eight hours with a loading time of 56 per cent, the remaining 44 per cent being time lost in changing cars, moving loader and incidental delay.

It is understood that one type of loader is being sold under a guarantee of one ton per minute, and this promise of performance is justified by the calculations made from loading records in the field.

Comparing machine and hand loading, an increase of approximately 90 per cent in tons per man per day is noted. This increase is shown with the approximate 44 per cent lost time of machine loading included. The details of these studies were released under the heading, "Underground Management in Bituminous Mines," under date of Oct. 31, 1923.

Taking these facts into consideration, the next improvement in modern coal production must include the loading machine, and its effect on the present system of



A MINE RUN WITHOUT CARS

Locomotives are used solely for taking in timber and supplies, and sometimes running the conveyor backward will take the lighter material to its destination.

*Engineer associated with Sanford E. Thompson in making report on "Underground Management in Bituminous Mines" for U. S. Coal Commission.

TABLE I—ESTIMATED COST OF INSIDE PLANT AND EQUIPMENT

Cutting	
2 Heading machines	\$50,000
9 Chain shortwall machines	34,200
9 Air drills with steel	2,350
	\$86,550
Loading	
10 Loading machines	45,700
Transportation	
8,000 lineal feet room conveyor	\$64,000
3,000 lineal feet auxiliary conveyor	45,000
2,120 lineal feet main-line conveyor	42,400
30 Room drives	15,000
4 Auxiliary drives	4,000
3 Main-line drives	5,000
Control system	12,000
	\$187,400
Drainage	
Pumps, motors and pipe lines	12,000
Ventilation	
Fan, motor and house	3,000
Power distribution	
Cables and terminals	\$30,000
Transformers	5,000
	\$35,000
Communication	
Telephones installed	900
Small tools	1,500
Safety	
Lighting	\$2,000
Spray lines	7,000
	\$9,000
Service	
3 Storage-battery locomotives	\$18,000
12 Supply cars	3,600
Supply track	15,000
1 Repair fit	7,500
	\$44,100
Development items	
Preliminary grading	\$4,000
Mine openings	5,000
	9,000
Total	\$434,150

mining and underground transportation already is the subject of engineering thought and discussion.

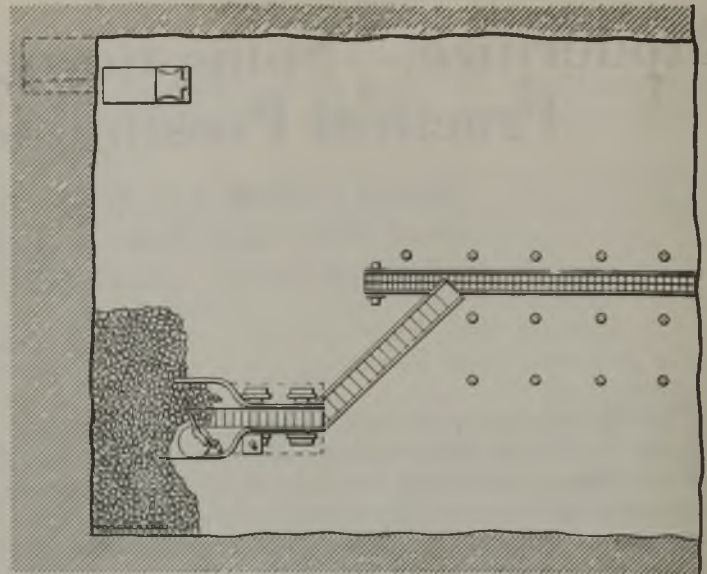
At a recent session in a national congress of mining men the chief engineer of a large mining equipment manufacturing concern placed himself on record as follows: "The biggest obstacle in the way of the loading machine is the failure of operators to devise a scheme for getting cars to it fast enough"

This defect has been emphasized wherever the operation of loaders has been studied, and as an efficient system of handling the output of machines calls for drastic departures from recognized procedure and old methods, the operator has been loath to attempt its solution. However, just as the cutting machine, the air and electric drill, permissible explosives, haulage locomotives and rotary car dumps have been gradually adopted as the demand for tonnage has grown so will the loading machine and revised methods of underground haulage come out of an intensification of that demand.

The determining factor of their employment depends on the economic necessity for meeting competitors' lowered cost in the open market. Foreseeing the coming change in underground mining and transportation methods and gathering ideas from both the metal and bituminous fields, a system of mining and transportation for coal production had been devised which indeed embodies nothing new, except in the co-ordination of mechanism already proved effective. This system will increase the tonnage per employee, concentrate the working territory and lower costs to figures unobtainable by present methods.*

Raymond A. Walter, of the Walter Engineering Corporation, has worked out the details of installation and made a primary estimate of costs. The objects of the system may be listed as follows: (1) To adapt a system of cutting, blasting, machine loading and continuous transportation to the type of coal-mining method

*Application for patent was made jointly by the author and R. A. Walter, Aug. 16, 1923.



CONVEYOR RUNNING STEADILY KEEPS MACHINE BUSY
The conveyor is set in the center of the room so that the machine can the more readily deliver coal to it. Not a moment is lost till the last pound of coal is loaded from the cut.

now generally employed; (2) to effect the application and co-ordination of already proved equipment to continuous, large tonnage production; (3) to provide automatic control of the continuous system; (4) to provide suitable storage between mine and preparation or loading plant so as to eliminate the usual delays incident to tipple disability and temporary car shortage; (5) to devise equipment installation of sufficient flexibility and durability and at a cost per ton of annual output which will compare favorably with present systems and methods; (6) to effect a saving in cost per ton of output.

In order to accomplish these results the following are necessary in addition to the usual mining equipment, buildings, housing facilities, etc.: Heading machines, undercutters, air or electric drills, loading machines, portable, extensible room conveyors with electric drives, standard conveyor installation, also electrically driven; modern storage bins with reclaiming conveyors and standard tipple or loading equipment.

In order to visualize a continuous operation, the following plan of a mine, opened in a 4-ft. seam under heavy cover, is employed for illustration:

Main and back entries are driven into the seam by heading machines, the product from which is loaded directly onto standard portable extensible conveyors until a sufficient distance has been opened to turn entries to right or left. Portable extensible conveyors are then replaced by standard conveyor belts each mounted on a steel sectionalized base and of sufficient size and speed to carry the desired ultimate output of the mine.

The heading machine then commences operation on the entry and opens sufficient territory to permit seven or eight rooms to be turned on approximately 120-ft.

TABLE II—ESTIMATED COST OF OUTSIDE MINING PLANT AND EQUIPMENT

Tipple and Accessories	
Storage bin with head and tail conveyor (partial)	\$50,000
Tipple (temporary)	50,000
Railroad yard (partial)	125,000
Switch locomotive	20,000
	\$245,000
Other Buildings	
Machine shop and tools (temporary)	\$50,000
Cost of supply-line transformers and other purchased power equipment with power house	20,000
Supply house (temporary)	5,000
Office and laboratory (temporary)	12,000
Supplies	40,000
	\$127,000

centers. Portable extensible conveyors in the entry are then replaced by a standard conveyor belt mounted on a steel sectionalized base of sufficient size and speed to carry the desired ultimate output of the entry.

Cutting machines are then used to open rooms 40 ft wide on 120-ft. centers. These are followed by loading machines and standard portable extensible conveyors. With the aid of this equipment the rooms are driven to the desired length.

For illustration, the model mine is operated as follows: Cutting machines are sumped into the coal and a cut is taken across the face. After this cut has been completed, drills are used for placing the holes, which are loaded and shot. Machines mounted on tractors are then moved to the face of the broken coal, and loading commences. The output of the loading machine is continuously discharged onto a portable extensible room conveyor, which in turn delivers to the standard conveyor located in the entry. The entry conveyor in turn delivers the product to the main haulage conveyor, which carries the coal to a distributing conveyor placed above a storage bin of sufficient capacity to receive the entire daily output of the mine.

As each room face is loaded out a cutting machine is moved forward immediately and the operation is carried forward in cycles of cutting, shooting and loading, one cutting machine and one loading machine serving two faces. The conveyors are automatically controlled, so that should the main-line conveyor break down, all others delivering coal from the faces and from the entries are shut down. In case of stoppage of an entry conveyor, only the room conveyors feeding it will be stopped. The stoppage of a room conveyor will affect only that particular operation.

The continuousness of the system is at once apparent, and with a storage bin of sufficient capacity between the mine and tippie there will be no intermittency of mine operation due to delays in preparation and loading disability.

The feasibility of the system can be judged from the performance of cutting machines and mechanical load-

TABLE IV—PRODUCTION AND COST ESTIMATE LOADING MACHINE AND CONVEYOR MINING

For a 4,000-ton daily output in 4-ft. coal

2 Entries working, three shifts each	1 Entry advancing, three shifts each	2 Heading machines	8 Chain shortwall machines 6-ft. cutter bar
Number 1 Working Entry		Number 2 Working Entry	
4 Chain machines cutting 520 lin.ft. each.	4 Advancing 40-ft. rooms @ 2½ cuts per shift for 3 shifts..... 1,252 tons	4 Chain machines, cutting 520 lin.ft. each.	4 Advancing 40-ft. rooms @ 2½ cuts per shift for 3 shifts..... 1,252 tons
3 Retreating 80-ft. pillars, @ 1½ cuts, per shift for 3 shifts..... 886 tons		3 Retreating 80-ft. pillars, @ 1½ cuts per shift for 3 shifts..... 886 tons	
7 Working faces..... 2,138 tons		7 Working faces..... 2,138 tons	
		4,276 tons	
2 Heading drivers, heading 12 ft. width @ 20-ft. advance per driver per machine for 3 shifts.....		278 tons	
		4,554 tons	

ers under the present method of delivering coal to mine cars.

The practicability of continuous conveyor haulage can be estimated from the performance of standard sectionalized steel extensible trough conveyors, which have been in use for a number of years and can be purchased in any desired lengths with complete drive from manufacturers of coal equipment. These conveyors will be used for all entry advance and retreat, for room and crosscut extension and for pillar work

An estimate of the performance of standard conveyor belts may be obtained from the coal properties where installations are in use and from the record of tonnages of a more abrasive material than coal being carried over great distances—in metal mines and mills. The belts will be mounted on standard troughing and return idlers attached to light steel self-aligning foundation frames which will permit the replacing of temporary steel trough conveyors by the addition of the necessary number of foundation frames and of an extra footage of belting and by the moving of the tail pulley to the desired point in the main slope to reach newly opened right or left entries, or in entries to permit the discharge of tonnage from newly opened rooms.

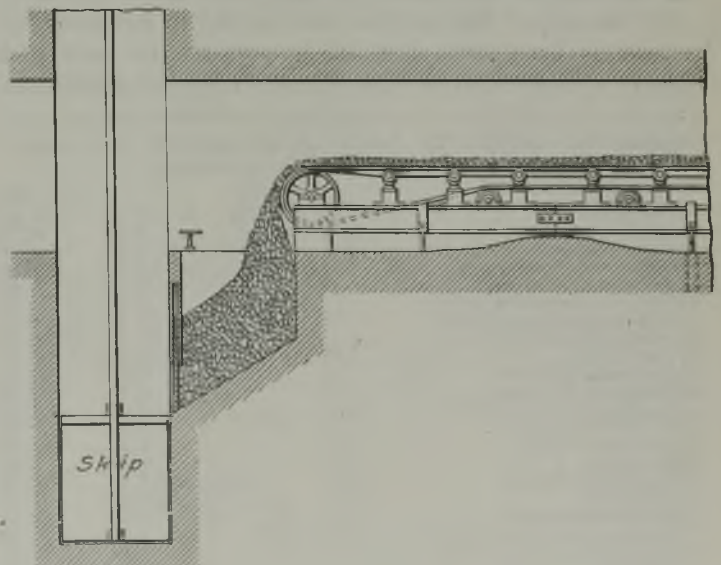
The retreat from destination crosscuts and from room- and chain-pillar operation is accomplished by the reversal of the advancing method of installing conveyors. All semi-permanent conveyors are suitably an-

TABLE III—ESTIMATED COST OF TOWN AND ACCESSORIES

Houses		
100—3 Rooms and bath.....	\$150,000	
100—4 Rooms and bath.....	220,000	
35—5 Rooms and bath.....	98,000	
10—6 rooms and bath.....	33,000	
8—7 Rooms and bath.....	36,800	
1—8 Rooms and bath.....	12,000	
		\$549,800
Other Improvements		
Stable, livestock, harness, wagons.....	\$12,000	
Planing and saw mill.....	20,000	
Bank and post office (temporary).....	20,000	
Hospital (partial).....	20,000	
Community building (temporary).....	20,000	
Street work (partial).....	10,000	
Park.....	0	
School houses (temporary).....	20,000	
Churches (partial).....	10,000	
Store and stock (temporary).....	60,000	
Railroad station.....	0	
Water supply and sewerage (partial).....	20,000	
Lighting system (partial).....	5,000	
Hotel (partial).....	40,000	
Telephone system (temporary).....	2,000	
Laundry.....	0	
		\$259,000
Total.....		\$808,800

SUMMARY OF ESTIMATES

Inside plant and equipment.....	\$434,150
Outside plant and equipment.....	372,000
Town and accessories.....	808,800
Total.....	\$1,614,950
Add for contingencies.....	129,045
	\$1,743,995
Carrying charge until on operating basis and operating fund.....	250,000
	\$1,993,995



CONVEYOR DISCHARGES TO BIN AT SKIP

The skip, working steadily, lifts the coal almost as rapidly as it arrives. It could be arranged so that, should it stop, it would de-energize the conveyors.

TABLE V—ESTIMATED GENERAL OFFICE ORGANIZATION SHOWING NUMBER AND EARNINGS

	Per Month
1 General manager	\$1,200
1 Chief engineer	700
1 General superintendent	600
1 Mine superintendent	500
1 Outside superintendent	400
1 Mechanical superintendent	400
1 Auditor	350
1 Chief clerk	300
1 Supply clerk	200
3 Engineers @ \$175.00	525
2 Draftsmen @ \$175.00	350
3 Payroll clerks @ \$150.00	450
6 Clerks @ \$150.00	900
2 Supply clerks @ \$150.00	300
2 Stenographers @ \$150.00	300
1 Janitor	150
28	\$7,625

chored in slopes and entries. Temporary conveyors are quickly movable, extensible or contractible.

The application of the conveyor system to rolling and pitching seams is obvious, and where shaft openings are necessary to reach the beds, shaft pockets, skips and a surface storage bin are utilized.

Storage bins are used at metal properties throughout the world for stabilizing the delivery of product at the mill and concentrator and will correct irregularities of

TABLE VI—ESTIMATED OUTSIDE ORGANIZATION DAYMEN SHOWING NUMBER AND EARNINGS

	Per Day	Per Day
1 Tipple conveyor man	\$9.00	\$9.00
2 Bin-chute conveyor men	7.50	15.00
4 Slate pickers	7.50	30.00
1 Tipple oiler	7.50	7.50
2 Boom operators	9.00	16.00
6 Railroad car droppers	7.50	48.00
2 Laborers	7.50	15.00
1 Tipple foreman	12.00	12.00
1 Locomotive engineer	10.00	10.00
1 Locomotive fireman	8.00	8.00
2 Railroad brakemen	8.00	16.00
1 Railroad weighman	10.00	10.00
1 Railroad helper	7.50	7.50
1 Railroad yard repairman	8.00	8.00
2 Railroad yard laborers	7.50	15.00
2 Carpenters	8.00	16.00
2 Blacksmiths	8.00	16.00
2 Blacksmiths' helpers	7.50	15.00
4 Machinists	8.00	32.00
4 Machinists' helpers	7.50	30.00
3 Electricians	8.00	24.00
3 Electricians' helpers	7.50	22.50
48		\$379.50

operation where either the car or conveyor method of underground transportation is in use.

Through the use of this system of mining the working faces can be concentrated to such a degree that it will be possible thoroughly to supervise their operation.

By the use of this method such speed in advance and retreat is obtainable that it is possible to open and recover a higher percentage of coal from any given area

TABLE VII—ESTIMATED MINE ORGANIZATION DAY MEN SHOWING NUMBER AND EARNINGS

	Per Day
6 Heading drivers	@ \$9.50
6 Heading-driver helpers	8.00
24 Cutting-machine operators	9.00
24 Cutting-machine helpers	8.00
12 Drillers and shooters	8.00
12 Drillers and shooters' helpers	7.50
24 Loading-machine operators	10.00
48 Loading-machine helpers	7.50
12 Timbermen	8.00
12 Timbermen's helpers	7.50
24 Room-conveyor men	8.00
6 Heading-conveyor men	8.50
3 Main-conveyor men	9.00
6 Conveyor helpers	7.50
1 Electrician	9.00
3 Electrician's helpers	7.50
3 Supply men	7.50
3 Machine repairmen	9.50
3 Machine repairmen's helpers	7.50
3 Distributing-conveyor men	9.00
3 Firehoses	10.00
3 Inside foremen	12.50
1 Mine foreman	15.00
242	\$2,014.50

TABLE VIII—ESTIMATED MISCELLANEOUS OUTSIDE ORGANIZATIONS SHOWING NUMBER AND EARNINGS

	Per Day
Chargeable to Camp Maintenance	
1 Camp foreman	@ \$8.00
1 Carpenter	8.00
1 Painter	8.00
1 Plumber	8.00
4 Laborers	7.50
5	\$62.00
Chargeable to Health Service	
2 Doctors	@ \$12.00
3 Nurses	5.00
1 Janitor	7.50
6	\$46.50
Chargeable to Commissary Operation	
1 Store manager	@ \$12.00
1 Assistant manager	10.00
1 Bookkeeper	5.00
1 Butcher	7.00
1 Butcher's helper	5.00
3 Clerks	5.00
2 Delivery men	5.00
20	\$64.00

than by any other method, thus avoiding the usual sloughing and caving accompanying slower extraction. When the model property used for illustration is opened sufficiently to allow the continued work in seven rooms, four rooms advancing and three pillars retreating on two entries, 666 tons per shift can be delivered from approximately 960 ft. of entry in 4-ft. coal. This gives a total tonnage per lineal foot of entry approximately twice as great per shift as can be produced by the usual method of room-and-pillar mining.

As the system calls for the elimination of all contract labor and the substitution of employees of higher quality for a completely mechanized operation from face to railroad cars, all workmen are placed on a daily wage basis. With this accomplishment it will be possible to operate the property three shifts per day, thereby multiplying the tonnage per lineal foot of entry produced by the usual method of room-and-pillar mining by a factor of approximately six. This also will lower the equipment cost and interest charges per ton of annual output by two-thirds over the present method of single-shift operation.

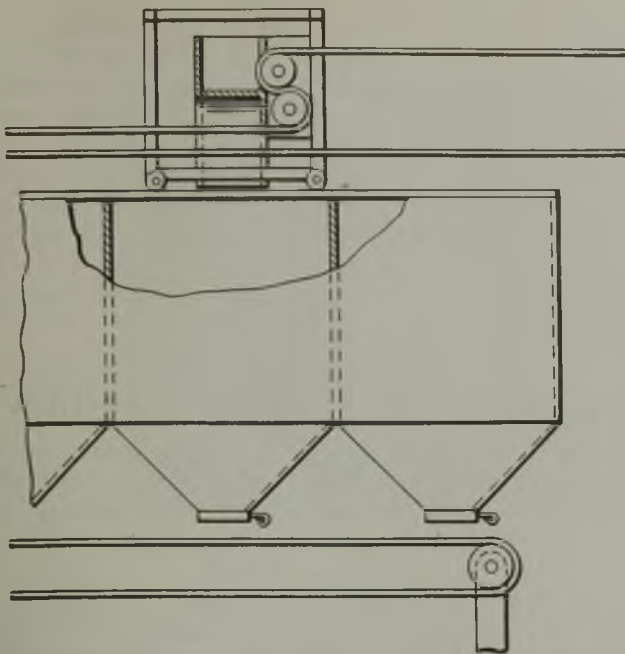
By the use of the system all car dumps, cars, rails, bonds, switches, ties, electric locomotives, trolley wires and rope haulage are eliminated in the actual transportation of coal from the face. Light track and storage-battery locomotives can be installed for the handling of heavy material or storage-battery trucks can be utilized where conditions are favorable. For light material the room conveyors may be reversed and used for carrying supplies to the face.

As it will not be necessary to remove cutting and loading machines from a particular section of the mine until rooms have been driven and pillars pulled, the delay caused by the present method of shifting these units almost hourly from one part of the mine to another also will be eliminated.

In order to carry out the comparison of present and

TABLE IX—ESTIMATED TOTAL ORGANIZATION EARNINGS AND COST PER TON OF 2,000 LB.

	Daily production 4,000 Tons		
	Employees	Earnings per Day	Tons per Employee
Administration and office, salaries	28	\$306.00	
Outside organization, day men	48	379.50	\$0.0760
Inside organization, daymen	242	2,014.50	16.5
			0.5036
Total production	318	\$2,699.00	12.5
Other than mining	24	172.50	
All employees	342	2,871.50	11.7
Absentees estimated 8 per cent.	26		
Total on roll	368		



HOW COAL IS DUMPED INTO STORAGE BINS

Enough storage is provided to satisfy a day's run. At the mines much time is lost because one operation waits on another leading up to it or following from it. The bin smooths out these delays.

proposed systems of mining to a more definite point an estimate of the complete cost of installation for a property producing 4,000 tons daily from a 4-ft. seam of coal is given; see Tables I, II and III.

Provided the property is leased instead of purchased \$2,000,000 will finance its development and operation at a daily output of 4,000 tons. To attain this low investment temporary buildings and equipment are substituted for the permanent ones. Taking the flat figure of \$2,000,000 for total estimate of plant, equipment and carrying charge until full operation and basing the production on a 4,000-ton daily output for 250 days per year, a total annual output of 1,000,000 tons is indicated. This gives a figure of \$2 per ton of annual output, which compares most favorably with the lowest investment cost of the lowest present-day operation.

Estimating further, the detailed cost of operation is given in Table IV.

The commissary should show a profit to absorb the loss on house rentals. Table X is the suggested cost.

The profit from commissary operation is then thrown into the camp fund, Table XI, which is self-explanatory.

Referring to the estimated total organization, it is to be noted that the number of employees on the roll is 368, or approximately one-third the number necessary for present-day operation of the same tonnage output. The inside organization produces 16.5 tons per employee per day, which figure has been equalled, but is decidedly unusual in present-day practice. For total employees on production an output of 12.5 tons is indicated and for total employees 11.7 tons per day.

For the purpose of this estimate it is to be noted that

TABLE X—PROFITS AND COSTS OF OPERATION OF COMMISSARY

Estimated at \$300,000 gross sales annually.		
Gross profit at 20 per cent		\$60,000
Less—		
Salaries	\$19,968	
Licenses and taxes	1,600	
Insurance	1,280	
Depreciation	500	
Rental for building	2,400	
Heat and light	1,000	
Interest	1,900	
	\$28,648	
Net profit		\$31,352

TABLE XI—ESTIMATED OPERATIONS OTHER THAN MINING PER ANNUM

Income from:		
Rentals	\$36,000	
Collections for medical and hospital service	11,040	
Collections for school	3,000	
State aid	3,000	
Commissary profits	31,352	
		\$84,392
Less expense for:		
Camp maintenance	4,464	
Medical and hospital service	16,972	
Fire insurance	4,000	
Taxes	5,000	
School expense	12,000	
Depreciation	40,000	
		\$82,436
Annual profit		\$1,956

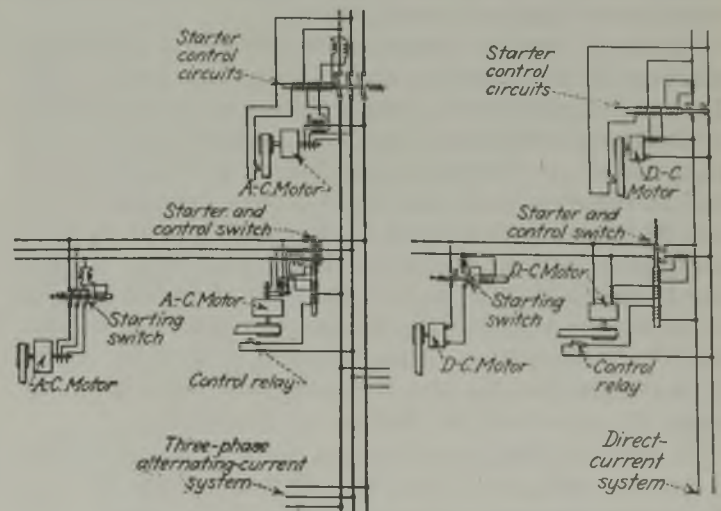
TABLE XII—ESTIMATED COST OF PRODUCTION

Wages and salaries (total mining)	\$0.5984
Supplies	.3000
General Expenses:	
Administration and office	\$0.0760
Insurance (general)	0025
Insurance (compensation)	0150
Taxes (excluding Federal)	1000
Depreciation	0500
Depletion or royalty	0550
	.2985
Total cost	\$1.1969

the minimum day wage for mining operative labor is figured at \$7.50 per 8-hour shift, and that salaried employees range from \$1,200 to a minimum of \$150 per month. Computing from these rates, a total mining cost of wages and salaries equals \$0.5984 per ton. Adding to this amount a flat estimate of \$0.30 per ton for supplies, and a total of \$0.2985 per ton for administration, etc., the remarkably low total cost of \$1.1969 per ton is indicated.

With the production of prepared sizes of bituminous coal at \$1.1969 f.o.b. cars and with selling cost added, coal can be delivered to consumers at prices ranging so far below present average cost that the entire annual capacity output could be sold and a stabilized profit realized at a selling figure much lower than could be attained by competitors. This low price would eventually be reflected to the consumer by the increasing use of low-cost production systems, and the general public benefited through engineering management and modern engineering methods

“Not through governmental coercion but through the enlightened self-interest of producers and consumers the real remedy is to be sought. The coal industry can reform itself from within.”



TWO SYSTEMS—ALTERNATING AND DIRECT CURRENT

In any system arrangements must be made that no conveyor will deliver onto a stopped or stalled conveyor. When a conveyor stops, all conveyors feeding it directly or indirectly must be stopped also.

A Tribute to a Notable Editor

BY R. DAWSON HALL
Engineering Editor, *Coal Age*

C. E. LESHER, till recently editor of *Coal Age*, had in the short time he filled that office given evidence of an unusual fitness for the exercise of that function. His resignation to become assistant to the President of the Pittsburgh Coal Co. came as a surprise to his many friends and associates, for they were but little disposed to believe he would cast aside a profession that fitted him so well and was so in accord with his preferences and qualifications.

He came to *Coal Age* with a wide knowledge of the coal industry acquired in many years of statistical and administrative work in the government service.

For many years he was a geologist in charge of coal statistics, in which work he made notable innovations, including the weekly report. He understood the value of speed in the distribution of the data of operation—a quality of inestimable value in his later practice of journalism.

Mr. Leshner is a native of Colorado and obtained his technical education at the Colorado School of Mines, being graduated in 1908. His two years in the work-a-day metal-mining field, of which he had many fond remembrances, freed him from an aloofness of attitude toward operating problems that government employees are supposed to have. Later he was engaged by the American Nitrogen Co. In 1910 he joined the staff of the U. S. Geological Survey, and, strangely enough, aligned his career with coal and not with the metals. For two and a half years he was chairman of the coal board of the Survey making geological investigations into the coal fields of many states.

On E. W. Parker becoming director of the Anthracite Bureau of Information and leaving the Survey, Mr. Leshner succeeded him. Coal problems becoming acute in 1917, he was detailed to the Fuel Administration, being director of its Bureau of Statistics until June, 1919, and in the exercise of his duties became acquainted with the leading coal executives of the country, who admired his good judgment and his stalwart integrity. Returning to the Geological Survey for a short period he later—during the 1919 strike—became a member of the Central Coal Committee. Then followed in 1920 his period of active service for the National Coal Association, in which he organized its Bureau of Economics.

In April of that year, however, he left the association to become editor of *Coal Age*, during which he made important changes in the character of the paper. His tabulations and curves of coal prices, culminating in his index, his orderly presentation of marketing facts, his news-gathering ability, his editorials, redolent rather

of the field than the office, added to the standing of the publication and made him an outstanding figure in the industry. Thus fortified by talent and experience, a restless but well disciplined mind, a marvelous knowledge of the men and the material of the industry and a diplomacy and *savoir faire* only equalled by his integrity of purpose, he brings to the Pittsburgh Coal Co. constructive qualities which that corporation will not fail to find immensely valuable in the handling of its big enterprises. The good wishes of the staff of *Coal Age* accompany him.



C. E. LESHER

Engineers Study Economy in Fuel Use

DESIGNING, operating and fuel engineers of the railroads, public utilities, manufacturing interests, colleges and coal sales companies of the country met Jan. 15 at the Engineers' Club, Philadelphia, Pa., and discussed economy in the use of fuel.

G. M. Basford, consulting engineer, of New York, read a paper entitled "Recent Accomplishments in the Improvement of Power and Efficiency of Steam Locomotives." Other papers and discussions that followed pointed out how large economies could be effected by the use of better designed locomotives. The latest developments along this line have been more scientific design of boilers, adoption of stokers, superheaters, feed-water heaters and boosters. By the use of these improvements it has been possible to generate energy at the rate of 1.8 lb. of coal per horsepower-hour. It was asserted that about one-fourth of the coal supply of the country is used by the railroads, and the losses amount to about 30 per cent of the total quantity used. They said great savings could be effected by reducing idle time and by more careful firing under operation and while standing idle at the roundhouse or terminal.

The afternoon session was devoted to public utilities and manufacturing plants, when the subject was discussed principally by representatives of power plants and metallurgical interests. At this session Morris L. Cooke, consulting engineer, of Philadelphia, outlined the Pennsylvania giant power survey, the purpose of which is to conserve coal, first, by the development of large power-generating stations located at or near the mines and interconnected into a large system; second, by the development of the byproduct industries, and third, by savings effected by serving small producers of power with energy from a large system.

N. G. Reinecker, of the Pennsylvania Power & Light Co., showed how his company had found that interconnection of power plants had materially reduced the investment, operating and fuel costs per kilowatt-hour of energy developed. The load is so distributed that plants capable of generating energy at lowest costs are generally loaded up as near as possible to capacity. Stand-by charges can be materially reduced, and it is not necessary that generators be started and stopped at every slight indication of an increase or decrease of load.

H. O. Loebell, vice president of Henry L. Doherty & Co., discussed the possibilities of large coal savings in domestic use by the greater appreciation of gas as a heating medium. He asserted that by a careful revision of the law it would be possible for companies to produce gas for heating purposes at efficiencies between 70 and 80 per cent as compared with the operation of domestic furnaces at from 5 to 20 per cent.



Too Much Around a Coal Mine Is Left to Chance

Mechanical Weakness, Improper Design and Haulage Delays Lower Output 10 per Cent at Tipple Capable of Handling 7,390 Tons Daily—Rarely Is Supervision Close Enough to Provide for Standardization and Correlation of Activities

CLOSER study at coal mines to develop standard methods of performing operations and to eliminate lost motion and delays would increase output without changing equipment or adding materially to the personnel. Every operation should be given an intensive study both to develop the best method of performing the work involved and to fit its performance into the complete combination of effort by which coal is brought to the surface and dumped into railroad cars for shipment.

Production Losses at Tipple.—Fig. 1 shows the number of pit cars dumped by fifteen-minute periods for one day at one of the larger mines. It is presented as illustrating not so much the time losses at a single mine as the losses that are common in a large number of bituminous mines but which are not appreciated.

Production losses from four causes are shown. Approximately 6,000 tons of coal was hoisted and dumped at this tipple on the day observed, and although this was a relatively high day's production for that particular mine, and considered to be its maximum, it shows the tipple to have been operating at only 81 per cent of its capacity. The loss of 84 cars or 360 tons production due to major mechanical difficulties is a type of loss that cannot be entirely eliminated in any type of machinery subjected to the severe usage that tipple and hoisting equipment undergo, and a certain time loss, therefore, must be anticipated when designing the tipple arrangements.

The loss of 157 cars, or 670 tons of production, was, however, due to a type of mechanical difficulty which occurred over and over again, day after day, viz.: the incomplete discharge of the car at the first dumping. Yet no thought was being given to an improvement in

the mechanical process of dumping that would eliminate this large loss.

It is true that under almost any condition an occasional failure would be possible, but when these failures are identical in character and are sufficiently continuous to cause a loss in production of 670 tons, or over 10 per cent of the whole output, and are allowed to continue, it is evident that the elementary principles of management engineering that are coming to be employed so generally in other industries are not being applied in this instance.

TIPPLE STOPS EVERY TIME LOADER IS DOCKED

A loss of 37 cars, or 160 tons, was due to defective tipple design, it being necessary to stop hoisting whenever a car containing rock was dumped, in order to remove this rock and to dock the miner for loading it. Realizing that the losses from this cause were unnecessary the management were redesigning their tipple so that any such car of coal would be inspected and cleaned automatically on a separate table, leaving the regular tipple operations to be continued without interruption. Though this method was employed in some of the mines with the most advanced management and technical staff it was not found to be in general use.

A further loss of 48 cars, or 200 tons was due to defects in the underground-haulage methods. It represents the loss due to the absence of loaded cars at the shaft bottom at times when the hoist was ready to operate. This loss would have been much larger if the previously mentioned causes had not stopped hoisting and during that time permitted loaded cars to accumulate at the bottom.

Supervision Underground.—The relation of the number of assistant foremen or face bosses directly in charge of underground work to the number of men under their control is shown for several mines in Table I. The relation of tonnage, or piece-rate, workers to company men or day workers, differs materially, but

Sixth installment of report on "Underground Management in Bituminous Mines," made by Sanford E. Thompson and Associates to the U. S. Coal Commission. Previous installments may be found in Vol. 24, pp. 691, 733, 773, 811 and 845. Other sections of this interesting report will follow later. The introductory paragraph of this section is added to the original to serve as an introduction to what follows.

TABLE I—RELATIVE NUMBER OF WORKERS TO BOSSES

Designation of Mine	DS	RZ	TS	RM	TP	HI.
Total number of face bosses or section foremen	2	4	3	6	6	47
Total company men inside	83	190	52	94	205	553
Total tonnage workers (loaders and cutters)	268	450	122	194	153	889
Company men per boss	41	48	17	16	34	12
Miners per boss	134	112	41	32	25	19
Total men underground per boss	175	160	58	48	59	31

that is inevitable because of the difference in the physical condition of the different mines. But the ratio of underground workers to foremen and face bosses is not so readily explained when one stops to consider that in the case of mine DS, for example, the 175 men are scattered over a distance of more than a mile and a half underground, and the several workers separated from each other by distances of from 100 to 300 ft. When it is remembered that one man directly supervises their work it is easy to comprehend one of the reasons why the work is not standardized and correlated.

The standardization of a miner's work, as will be discussed later, involves two things: (1) The standardization of the method and time of the individual items of his work, and (2) the correlation of these items in such a way that the lost time both to himself and those other men whom his work affects will be reduced to a minimum.

The solution of the problem, as has been indicated already, is not necessarily more foremen of the present type, but more thorough training of these men such as is being given them in a few mines, and above all an organization based on modern industrial lines with functional supervision, not limiting the officials to the executive function but including as officials men trained to handle certain other principal elements such as haulage, planning the work of the men, and standards of production.

IN A MINE, WORK OF ONE SETS PACE FOR ALL

Correlation of Mining Operations.—The correlation of haulage with the work of the miner has been discussed in previous articles. Similar principles apply to other mining operations.

The work of all classes of men in a coal mine is interdependent. If a machine cutter fails to cut a loader's place the loader may be forced to stop work. If a tracklayer is behind in laying a switch it delays the opening of a room. If a timberman fails to set timbers quickly enough when needed at a certain place, and a fall occurs, it may disorganize the work of all the men in that section for several hours. The failure of a shotfirer to shoot a place at the proper time stops or delays the loaders and slows up the haulage.

When the loader in turn quits and goes home early without cleaning up his coal, it affects not only himself but the machine cutter, tracklayers and drivers, whose work is disorganized.

A loader's work covers in general other things besides the actual loading of coal. In some cases he lays his track (ties and rails), pushes his car to the face, sets timbers, loads or gobs slate, drills, snubs, loads and fires shots and loads his coal. In other cases he does almost nothing but load coal, everything else being done for him. The majority of cases lie somewhere between these two. No one has taken the trouble to ascertain the relative proportion of the miner's time necessary under normal conditions to perform the varied parts of this work.

All of these things and their variety show the need

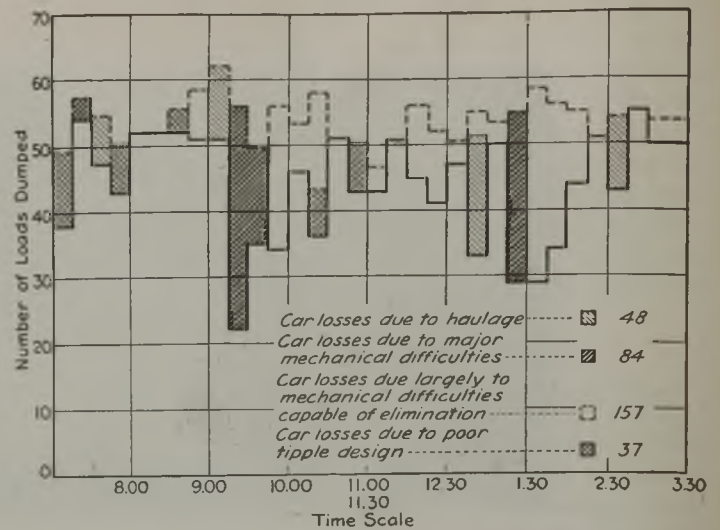


FIG. 1—NUMBER OF MINE CARS DUMPED AT TIPPLE BY 15-MINUTE PERIODS

Car losses have been figured by pro-rating the time lost on a basis of 54 cars per 15-minute period. The cars dumped in 15-minute periods were actually 1,402 cars. Averaging 4.28 tons capacity without delays 1,728 cars would have been dumped. The tippie was operating at only 81.2 per cent of the hoisting capacity.

for a modification of the scheme of management in line with that toward which some of the most up-to-date mines are already tending and which are exemplified still further in certain metal mines.

At present this definite control of the work of the loaders and company men is made impracticable by lack of knowledge of the time that it should take to do different classes of work. It is recognized that physical conditions present greater variety and affect operation much more definitely than in most manufacturing industries, the standards of production of which have been determined. As will be shown later, however, this division of the subject can be treated in detail, for it must be remembered that in metal mines, where operations are equally varied, they have been carefully standardized. This fact shows the possibilities of determining standards of production which will make possible a more scientific control of operations, thereby saving in operating costs and affording benefits to the workers.

In many of the mines visited, the foremen, superintendent and general manager were asked for estimates as to the time necessary to perform various types of work. Their replies varied from 10 to 45 minutes for the same operation. A member of the pit committee estimated that this same operation could be completed in two hours. They were all guessing and in the replies given favored their side of the matter. This was quite natural, but the point that should be emphasized is that the actual facts were unknown.

The same conditions exist with respect to the work of the company men, the tracklayers, timbermen, etc. Differences in estimates of the time required for any given piece of work generally varied more than 50 per cent.

FULL INFORMATION regarding the chemical composition of coal of the Twentymile Park district of Colorado and its heating value as determined by the U. S. Bureau of Mines is given in Bulletin 748 of the Geological Survey. This value is compared with the heating values of competing, or possibly competing, coals, so that the consumer, if he cares to do so, may balance one coal against another and thus be able to select that which will give the greatest return for his money.

Mine-Rescue Communication System of the Future

Results of Actual Mine Experiments—High- and Low-Frequency Penetration—Modified Wired Radio Seems to Hold Greatest Possibilities

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

FOR ordinary purposes, the present mine telephone, although somewhat costly in initial installation and maintenance, is giving satisfaction in most mines. In case of a disaster, such as an explosion, fire, fall of rock, flooding, etc., the telephone is one of the first instruments that usually is put out of commission, and at the time when it is most urgently needed. On this account the mining industry as a whole is interested in any system of communication—phone in preference to code—that can be relied upon in an emergency, and many requests have been received by the Bureau of Mines to devise such a system.

The solution of the mine-communication problem is dependent mainly upon the working out of a practical portable mine apparatus of sufficient sensitivity for receiving and transmitting at effective ranges. It is well known that signals can be transmitted considerable distances through the earth if sufficient power and a receiving set of sufficient sensitivity be used.

REQUIREMENTS FOR MINE-RESCUE RADIO

The ideal system for mine-rescue work and general underground communication would be one where voice transmission and reception is possible. This is the ultimate end as a solution; but if such a system is not immediately possible or conveniently portable, then a simpler system where a telegraphic code or prearranged signals may be employed is desired. The transmission of code cannot be considered as a general solution to the problem of underground communication. Code, however, has advantages as regards transmission of information, over the geophone.

A practical type of apparatus for underground communication will have to be simple in operation. If high frequencies are used, requiring tuning to produce resonance, some fixed wave-length should be used. Vacuum tubes are the only practical method for the successful modulation and transmission of voice signals. For the transmission of code signals many different instruments can be used.

The apparatus will have to be safe to use in an explosive gaseous atmosphere. During mine disasters, and especially when barricades are erected, there is great probability of danger from a gas explosion if unsafe electrical apparatus be used. All mine-signal apparatus should be of an approved and permissible type.

CONSTRUCTION AND DETAILS

For satisfactory and practical use in mining and rescue operations, an underground signal apparatus probably would have to be designed to incorporate the following points:

(1) The apparatus must be moisture- and water-proof—that is, it should be unaffected by dampness

and continuous standing in wet mines. In this connection it may be stated that practically none of the radio or high-frequency apparatus being sold today would be suitable for such work. The condensation of moisture on the surfaces of dielectric and non-water-proofed insulating materials, unprotected windings, condensers, etc., causes large current leakages. In one of our tests a radio receiving set which had been left underground for about six hours became very inefficient.

(2) The apparatus must be durable, rugged and fool-proof. The entire equipment should be enclosed in a strong case, and all delicate apparatus such as vacuum tubes, controller knobs, etc., should be protected.

(3) A practical mine apparatus should be easy to maintain in good working order. Depreciation of the apparatus itself is of importance, and also care must be given to any batteries which may be used. Batteries should be given regular inspection.

(4) The receiving apparatus will have to be simple to operate and probably will have to be very sensitive. In practically all types of underground communication, whether by direct ground, induction currents, radio, and to a much less extent wired wireless, there is high absorption of the transmitting current. The energy picked up by the receiving apparatus is only an infinitely small part of the energy transmitted, thus requiring a very sensitive receiving apparatus.

(5) The last and probably most important point to be considered is the weight and shape of the signal apparatus. The weight must be kept below about 40 lb. if the apparatus is to be sufficiently portable for underground use. It is possible that a satisfactory design will be worked out wherein the transmitting and receiving apparatus is contained in one cabinet, and the power supply, whether batteries or hand-cranked generator, contained in another cabinet. A suitable non-reversible plug, safe in explosive gaseous atmospheres, could be used for connecting the power supply to the apparatus when in use. The general shape of the enclosing case and carrying straps or handles must be such as to allow the apparatus to be readily moved should it be necessary to crawl or keep one hand free.

METHODS BEING INVESTIGATED

The present investigation being conducted by the Bureau of Mines includes studies of the following systems: (1) The T.P.S., or ground-conduction, method; (2) induction signaling, both high and low frequencies; (3) wired radio over underground mine power and telephone lines, trolley wires, rails, and through piping for water and compressed air; (4) radio; and (5) electrical geophone and auxiliary signal equipment. These investigations include studies of the effects of rock falls, mine flooding, and similar conditions encountered during disaster, as well as general underground conditions existing in the ordinary operations of metal and coal mines.

SUMMARY OF INVESTIGATIONS BY BUREAU OF MINES

Little difficulty was encountered in transmitting T.P.S. signals to distances of 1,200 ft. over compressed-air piping, car rails, or other conductors to any part of the Bureau's Experimental Mine. In these tests a short direct connection is made with the rails or pipes. There is a decrease in audibility with the distance between stations. In the transmission along mine tracks, mud and water over the tracks, switches and breaks in

the tracks, did not prevent exchange of signals. In two places, 8-in. wooden rails had been inserted as a protection against lightning, and the T.P.S. signals carried through the wooden rails, which were moist, without any great decrease in audibility.

In order to determine the effects of mine cars on the track, a mule was hitched to two pit cars and a truck. The transmitting set was placed at the rear of the mine, about 1,200 ft. from the entry where the receiving set was placed. Signals could be transmitted without difficulty, and it is interesting to note that the audibility of the received signals was low when the mine cars are near either the transmitting or receiving sets, but as the distance between these sets and the cars is increased, the audibility rises considerably. In vertical transmission tests the T.P.S. set was placed in the mine 600 ft. from the entry. Ground leads extending 100 ft. each way from the set were used, one lead going to ground 500 ft. from the entry and the other lead placed 700 ft. from the entry. Because of the narrowness of the entry, the ground plates, which were laid upon the mine floor, were placed within 3 ft. of the car rails.

UNDERGROUND TESTS CARRIED OUT SUCCESSFULLY

The Bureau's mine is a drift mine having about 160 ft. of overburden at the end of the drift, which is 1,300 ft. long. The receiving set was placed on the surface as near over the T.P.S. set as possible to estimate, the ground leads extending approximately parallel to the leads within the mine. Little difficulty was had in transmitting signals from within the mine to the surface, and signals could still be transmitted when the surface receiving set had been moved—still keeping ground leads parallel—to a point more than 800 ft. away from a point on the surface directly above the transmitting station.

Similar tests were carried out at the Pittsburgh Terminal Coal Co.'s Mine No. 3. This mine is a shaft mine about 250 ft. deep. Little difficulty was met in transmitting T.P.S. signals from the mine to the surface. A heavy rain fell during the first part of these tests and the receiving apparatus was not removed from the automobile. Two 100-ft. ground leads were run in opposite directions to the side of the road and code messages easily were received from the mine. The heavy rain and water covering the road did not prevent the T.P.S. set from working.

During the second day of the tests the ground was covered with about 3 in. of snow, and as before, code messages could be readily received. These tests were made with the surface ground terminals approximately parallel to those underground. Later tests, where the terminals were placed approximately at right angles, showed a marked decrease in signal strength, indicating, as had been found in the tests at our Experimental Mine, that the two ground terminals should be approximately parallel for maximum signal strength. In the track transmission tests, an abandoned section of track was used. The track was covered with roof falls practically its entire length and water varying in depth from a few inches to a foot covered many portions of the track. The dirt and water covering the rails did not appreciably affect the transmission of code, and results practically similar to those at our Experimental Mine were obtained.

The code T.P.S. set, while rugged in construction and extremely simple to operate, cannot be considered as a practical solution of the underground-communication

problem because of its being limited to the use of code alone. Present investigation being conducted by the Bureau of Mines is on a method of changing from the present T.P.S. code set to a similar type of apparatus capable of transmitting directly voice communication. These experiments are in progress at the present time.

Preliminary radio field work at the Bureau's Experimental Mine was done during the summer of 1922 by C. L. Colburn, C. M. Bouton and H. B. Freeman in conjunction with engineers from the Westinghouse Electric & Manufacturing Co. For this work a Westinghouse 20-watt transmitter and a single-circuit regenerative receiver was used.

WAVES PENETRATE HEAVY STRATA

Recent tests made at the Bureau's Experimental Mine may be of interest as they indicate the great attenuation of waves in penetrating the earth. In these tests a special 3-step radio frequency detector and 2-step audio-frequency set, with a 14-in. loop aerial was used. At the mine entry signals from KDKA and WCAN (about 10 miles away) could be heard over 100 ft. from the phones. The set was mounted on a mine car and audibility readings taken every 100 ft. as the car was pushed into the mine. The audibility dropped very rapidly the first 50 ft. and decreased more slowly thereafter until the signals faded out at a distance of 700 ft. from the entry. The directional property of the loop was maintained underground. The loop also has advantages in minimizing ground currents and induction effects.

While unsuccessful in indicating any practical method of using wireless for underground communication, these experiments, nevertheless, indicate clearly that electro-magnetic waves may be made to travel through solid strata. The absorption or loss of intensity with distance was very great for the high frequencies (short wave lengths) used in these experiments. It is known, however, that lower frequencies suffer less attenuation and absorption, and these may possibly be found effective under certain conditions.

SHORT WAVE LENGTHS SEEM BEST

The energy radiated from the antenna decreases, however, with the use of low frequencies. For general underground use, a large antenna is impracticable. The shorter the antenna, the higher must be the frequency in order to operate the antenna somewhere near its fundamental—at which point maximum radiation, for a given power input, is obtained. A compromise probably will have to be reached between wave length and the distance to be transmitted in order to obtain the maximum efficiency from the apparatus for mine communication service.

As a summary the present available data indicate that the most practical type of mine-communication apparatus will be a modification of wired radio utilizing compressed air or water piping, car rails, etc., as the conducting medium. Dirt and water over such conductors, and numerous breaks in the metallic circuit, do not appear to prevent the transmission of signals. In such a system, much simpler transmitting and receiving apparatus can be used. As to whether a voice-modulated high-voltage direct-current transmitting set or a high-frequency voice-modulated carrier wave set is to be used will depend upon future experiments.

Induction and Synchronous Features in New Motor

Design Embodying Best Characteristics of Both Types
Combines High Efficiency, High Torque, Constant Speed and High Power Factor

THE induction motor is one of the simplest types of electric motors, possessing characteristics that are highly desirable for many different types of drive. Its speed control, torque, size and ease of repair are important advantages in its favor, but it has the disadvantage of inherently operating at a poor power factor; in fact, on light loads the power factor often is as low as 20 per cent, and as most drives do not always operate at full load, the average power factor of many induction motors may often be as low as 50 or 60 per cent.

During and since the war changes in power schedules have revolved around the subject of power factor. Many power schedules have been put into effect penalizing the consumer for operating at low power factor. When we consider the large investment that the power company must make in generating and transmitting equipment to furnish loads with poor power factor, the justification of such penalties must be admitted. If the consumer is generating power for himself he is confronted with the same problems. Therefore it is important that the user of power operate at as high a power factor as possible.

One of the biggest problems of the manufacturers of electric motors has been to design a motor which would have the good characteristics of the induction motor and also the good characteristics of the synchronous motor. The squirrel-cage type induction motor develops a very high torque if the resistance of its rotor winding is high, but under these conditions the motor operates at low efficiency. It is possible to raise the efficiency of the motor by lowering the rotor resistance, but when this is done a low starting torque results. Synchronous motors have the advantage of operating at constant speed but usually have low starting torque and low pull-in torque.

To combine high efficiency, high torque characteristics, constant speed and high power factor, the Wagner Electric Corporation of St. Louis, Mo., has developed the Fynn-Weichsel motor. This motor is essentially a combination of the induction motor and synchronous motor. The usual rotor winding of an induction motor is placed on the frame and called the stator. The usual stator winding is placed on the revolving member, commonly known as the rotor. In addition, the revolving member has a winding which is essentially a synchronous-motor exciting field. These two windings

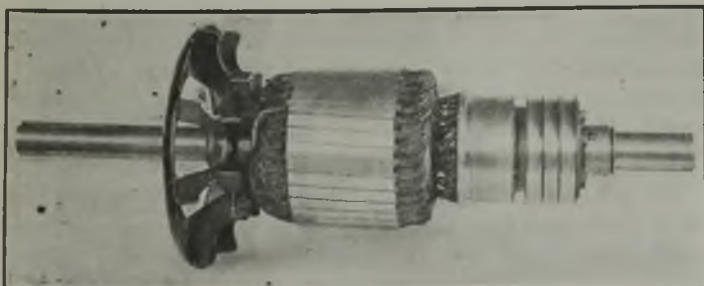


FIG. 1—ROTOR WITH STATOR AND EXCITING FIELD WINDING

The stator winding gives induction-motor characteristics and the exciting field winding gives synchronous-motor characteristics.

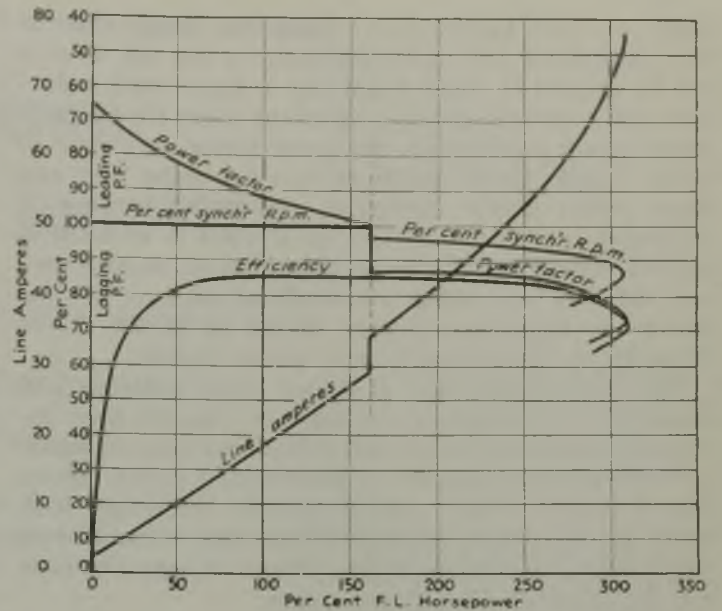


FIG. 2—CHARACTERISTIC CURVES OF NEW MOTOR

are respectively connected to slip rings and a commutator mounted on the rotor shaft. Power is applied to the slip rings of the revolving member, and resistance is placed in the stator winding to regulate the speed. This is quite similar to the wound-rotor type of induction motor, excepting that the power is supplied to the rotor and the control resistance is in the stator winding.

The operation of the motor is such that it starts out as an induction motor and, therefore, has induction motor characteristics, comes up to synchronous speed and operates as a synchronous motor, and under very heavy loads pulls out of synchronism and again automatically becomes an induction motor with high pull-out torque. During starting, when the motor operates as a regular slip-ring induction motor, it will develop 150 per cent full-load torque and still increase in speed up to synchronous speed and may be started in this manner under load, as the usual slip-ring induction motor, by cutting out resistance in the secondary circuit. The motor can speed up to synchronous speed with as much as 150 per cent of rated load. At synchronous speed it becomes a self-excited synchronous motor by the functioning of its exciting field winding mounted on the revolving member. If loaded beyond 160 per cent full load the motor is again pulled out of step and continues to operate as a slip-ring induction motor until the load exceeds 300 per cent full load rating, when the motor pulls out and stalls.

It will be noticed from the characteristic curve diagram that the power factor of this motor after being brought up to synchronous speed, is 65 per cent leading at no-load and continues to lead until the load has been increased to 160 per cent. Here it suddenly drops to a lagging power factor and is similar to the induction-motor power-factor curve from this point up to about 300 per cent full load. The speed is constant from no-load up to 160 per cent load and then drops off slightly until 300 per cent load is reached. The line current at 160 per cent load suddenly increases, as we would expect, because the power factor has suddenly changed from unity to lagging. An important point, however, is the fact that the efficiency curve is high over the whole range of load from 0 up to the point where the motor actually stalls; even at 25 per cent load the efficiency is about 72 per cent.

The application of this motor to correct lagging power

factor on lines having heavy induction motor loads is very important, but more important is the fact that it can be applied to loads requiring a motor with induction-motor characteristics and at the same time correct power factor or maintain the power factor very close to unity. Under these conditions it is far better than any other power factor corrective equipment because it maintains high power factors on all lines to which it is applied instead of letting the power factor become very bad and then correcting it somewhere back on the line where the advantage is only passed on to the power company or the local generator power station.

The installation costs of heavy lines, switches and transformer equipment, which are considerably increased in size in order to carry heavy wattless currents, can be materially reduced by maintaining power factors nearer unity. There also is another important item which is not always considered and that is the cost of circulating this high wattless current through the lines and its resulting high power losses.

Ohio Uses as Much Coal as It Mines

The most important coal bed in Ohio, according to Technical Paper 344, "Analyses of Ohio Coals," just issued by the Bureau of Mines, doubtless is the Middle Kittanning, which because of the quality of its coal has made the Hocking Valley famous throughout the country. The Pittsburgh coal bed probably is a close second and is mined extensively in Belmont and Jefferson counties. Other beds have attained prominence in local fields, but the two mentioned above must be regarded as furnishing the bulk of the coal produced in Ohio.

In a chapter on "Mining and Transportation of Ohio Coals," by J. W. Paul, chief coal-mining engineer of the Bureau of Mines, it is stated that the methods of mining the different beds of coal in Ohio are, in general, the same throughout the different coal-producing counties, consisting mainly of the room-and-pillar plan. In a few mines the rooms are driven in panels.

Because of the practice of not removing the room pillars the percentage of recovery of coal in Ohio has not been much over 50 to 60 per cent. The practice has been to leave the pillars as long wedges, widest near the mouths of the rooms and gradually narrowing toward their faces. In the Steubenville district the Freeport bed has been successfully mined by longwall.

The coal fields of Ohio are well served by a number of railroads. The Ohio River affords water transportation for some mines along its course, but the quantity thus shipped is only a small part of the output of the state. There are two principal fields in Ohio—the northern, which produces about 65 to 70 per cent, and the southern, producing 30 to 35 per cent of the state's total.

About 40 to 43 per cent of the total output of the mines is consumed within the state limits, 5 to 9 per cent is shipped to other states and 48 to 55 per cent embraces the tonnage delivered to railroads, exported by rail, or shipped to tidewater and to the Great Lakes for cargo.

Although the mines ship a large tonnage to other states, Ohio receives so much coal from beyond its borders that the consumption within the state, exclusive of railroad fuel, is equal to the annual production.

Technical paper 344 is the third of a series of papers issued by the Bureau of Mines, No. 269 referring to Iowa and No. 307 to the Kentucky coals.

The Miner's Torch

Is He the Absolute Boss?

YEARS ago, while I was a coal-mine superintendent, I was once a guest at a Chamber of Commerce dinner in a near-by city, and I was the only coal-mining man present. In introducing me the toastmaster remarked rather felicitously that I probably was the only "absolute boss" present. Of course, he had in mind company dwellings, commissaries, etc.

I first recalled that introduction in 1918. The government was moving heaven and earth in an endeavor to get the miners to speed up and dig more coal, because all of the essential industries were rapidly approaching a point where further increases in production were directly dependent on more coal. By way of doing "my bit" I attempted a series of articles appealing to the patriotism of the miners. As I was not in direct touch with miners or mines at that time I made several trips to mining camps in search of inspiration for the articles.

On one of these visits I met a superintendent who had a son in the trenches overseas, from whom he had had no word in over a month, and in consequence was on the verge of nervous collapse. "If only I could do something to help win the war I would not feel so bad," he said to me, "but in spite of all of my pleading with my men I cannot get them to work every day and on the days they do work they refuse to speed up. And most of these men know my son too."

And last week it came back to me again that remark about the "absolute boss." Once more I was at a mining camp and this time a superintendent was telling me of the Christmas plans of his men. "We have been working only two and three days a week lately and our miners are having about all they can do to keep the wolf from the door, but they can't think of disappointing the kids nevertheless," was the way he put it.

"Do you know, Thompson," he said to me, "I have only recently begun to realize how little authority a coal-mine superintendent really has. Every day the men report for work and one time they are met with the notice 'No work today' and again the notice says 'Work today.' Now how much do I have to do with the wording on that notice? Absolutely nothing. The city office checks up orders and gives us our instructions just as promptly as possible, and we in turn pass the information on down the line.

"With this desire to give the kids all they are looking for, it's pretty hard for the ones who have large families to make the best of present conditions and it's touching to see the disappointment registered on their faces when the notice points to an idle day. When I am around they come up to me and tell me all their troubles and it's plain to see that they think that I might change conditions if only I'd try hard enough.

"Of course, last year the shoe was pinching on the other foot and the city office was wondering why in thunder I couldn't get out more coal, considering all of the money I had spent for new equipment and that I didn't have a vacant house in my camp."

Yes, the coal-mine superintendent is an absolute boss.(?)

News Of the Industry

Renewal of Present Agreement Seen as Probable Program of Union

In Message to Indianapolis Convention Lewis Declares for Contract Running "a Term of Years"—"Reds" in Minority—Union in Sound Financial Condition

(Special Dispatch to Coal Age)

INDIANAPOLIS, Ind., Jan. 22.—A loud radical noise, but not much radical action, is expected out of the biennial convention of the United Mine Workers of America, now in session here. The session, which may run two weeks, gave evidence as it opened today, of framing a union program that will call for a continuance of the present scale and working conditions "for a term of years." It is entirely likely such demands as the five-day week and six-hour day will be put into convention resolutions, as usual, but that the scale committee, when it goes to Jacksonville, Fla., to meet the operators Feb. 11, will forget about them.

The advocates of nationalization and recognition of Soviet Russia were reasonably numerous in the convention as it assembled its 1,500 delegates in old Tomlinson Hall, but they appeared to be decidedly in the minority. Also Alex Howat, of Kansas, who is trying still to fight his way back into the organization after having been booted out for calling a long ago unauthorized strike in the Southwest, is here; but without the strong support of Frank Farrington's full Illinois strength, which backed Howat in vain at the last convention.

Farrington Heads Scale Committee

Frank Farrington was appointed chairman of the scale committee to meet the operators Feb. 11. The remainder of the committee will comprise district presidents and national officers, as usual.

The vast bulk of proposed convention resolutions sent in from district conventions called for a variety of things, but not many of them favored a demand for a marked increase in miners' wages, except one from Ohio, which asked 25 per cent increase. Most of them were said to be aimed to obtain better working time, instead of better pay; however, none of the districts proposed any cures for low market or any of the other factors contributing to short running time.

President John L. Lewis, in his mes-

sage, declared for a contract running "a term of years" in the following words:

"The industry needs breathing spell for purposes of readjustment to present day conditions. The laws of supply and demand have not operated within the industry for a period of six or seven years. A wage agreement for a term of years, effectuated without a strike or suspension of production would be of constructive help in restoring stability to the industry and would indeed be a boon to the coal-wearied public.

"Were such an arrangement possible, it would demonstrate to the coal-consuming public that the industry itself was making a sincere attempt to put its house in order. Such a policy, if carried out, would eliminate the necessity for coal legislation by the federal Congress or the various state legislatures. I am not one of those who believe that the enactment of arbitrary legislation will prove a panacea for every maladministration of the industry, or that economic laws can be set aside by the sweep of a legislative pen."

Mr. Lewis pointed out that during 1923 the country produced 545,000,000 tons of soft coal and worked but half time. This indicates the industry has development, investment, equipment, and man-power to produce a billion tons a year. "Such a situation," he said, "is unsound from every moral and economic standpoint, and constitutes a crying need for adjustment." He did not, however, propose any method of adjustment beyond implying that if the present scale is continued for "a term of years," the workings of economic law will remedy both overdevelopment and overmanning of mines. Mines which cannot stand the gaff will fall.

Mr. Lewis made much talk about the strength and unity of the organization, asserting that internal differences had been composed. Reviewing 1922-23 he said the record of victorious achievement of the union is "without parallel in the history of our organization."

Vice-president Philip Murray, in racy language, paid his respects to the Reds within the organization, but declared that "in this country there is too much soap, too many Gillettes and not enough whisksers to accept the bearded philosophy of Russianized revolution." He said the whole coal industry ought to be unionized because there would be very little friction in the industry were it not for them, for there could then be no exploitation of mine labor, no stealing of markets by low-cost coal, and many benefits to the public as well as the mine workers.

Union Finances Improve

Financially the union is in better shape than it was at the outset of the 1922 strike, it appears from the report of Secretary-Treasurer William Green. Whereas the union went into the 1922 strike with only about \$250,000 it now has on hand \$1,177,000. During the 1922 strike \$848,000 was borrowed, \$350,000 from the Indiana National Bank, of Indiana; \$150,000 from the Harriman National Bank, of New York; \$50,000 from the Bank of the United States, another \$50,000 from the Brotherhood of Locomotive Firemen and Enginemen and the rest from Districts 2, 6, 9, 11, 13 and 23 of the United Mine Workers. A total of \$116,000 was given the organization by friendly labor groups. During the two years and four months ending last November income from all sources was \$8,747,000. The heaviest expenditures for union work went out as follows: District 17, \$1,428,000; District 16, \$649,000; Coke Region, \$495,000; District 10, \$442,000.

Indicative of the amount which the union can raise from its own membership, Mr. Green reports that the special assessment of November and December, 1922, of \$2 per month per member brought in about \$1,760,000; the membership figures of the union for recent years show the following: 1920, 376,447; 1921, 442,000; 1922, 285,900; 1923, 445,734.

A REGRETTABLE ERROR was made in the table showing average spot prices of bituminous coal, f.o.b. mines, and the accompanying table showing relative prices of bituminous coal, on p. 110 of last week's issue of *Coal Age*. In the column showing prices for 1922 that for June was given as \$2.56 when it should have been \$3.31, and in the corresponding month and year in the table showing relative prices the figures for June should read 274 instead of 212.

Navy Opens Bids for Steaming Coal

The Bureau of Supplies and Accounts, Navy Department, received the following bids Jan. 20 for supplying 10,000 tons of steaming coal for delivery at New York between the date of contract and June 30 next:

For delivery f.o.b. vessels or barges under chutes at piers: W. H. Bradford & Co., Philadelphia, \$6.26 per ton; Coleman & Co., Philadelphia, \$6.25; Consolidation Coal Co., New York, \$6.57; Dexter-Carpenter Coal Co., New York, \$6.46; Morrisdale Coal Co., Philadelphia, \$5.59; Pattison & Bowns, Inc., New York, \$5.99; Titan Fuel Corporation, New York, \$6.39, and J. H. Weaver & Co., Philadelphia, \$6.06.

For delivery f.o.b. lighters or barges alongside vessels: W. H. Bradford & Co., \$6.49 per ton; Coleman & Co., \$6.45; Consolidation Coal Co., \$6.75; Dexter-Carpenter Coal Co., \$6.81; Morrisdale Coal Co., \$5.83; Titan Fuel Corporation, \$6.63; J. H. Weaver & Co., \$6.30.

For delivery in harbor, in lighters, coal to be unloaded, stowed and trimmed: Coleman & Co., \$7.15 per ton; Dexter-Carpenter Coal Co., \$7.99 and \$8.19; Morrisdale Coal Co., \$6.70; Titan Fuel Corporation, \$7.34; J. H. Weaver & Co., \$7.20.

An informal bid was received from Cosgrove & Co., Johnstown, Pa.

Rice to Tell A.I.M.E. of His Observations in Europe

George S. Rice, chief mining engineer, Bureau of Mines, will report the result of his discussions with foreign technical societies regarding the collection and interchange of data on ground movement and subsidence at the 129th meeting of the American Institute of Mining and Metallurgical Engineers, which begins Feb. 18 in New York City. Mr. Rice's report will be read at the afternoon session of the first day of the meeting.

Howard N. Eavenson, of Pittsburgh, Pa., will preside over the joint session on coal and coke, ground movement and subsidence, which begins in the morning of the first day, and will welcome to the meeting Dr. R. V. Wheeler, director, British Safety-in-Mines Station at Eskmeals, and Henry Walker, Deputy Chief Inspector of Mines. They will reply to Chairman Eavenson, and Dr. Rice, who was in Europe last summer, will give an illustrated talk on the mining methods he observed in Europe during his recent trip and on the methods used in restoring the coal mines in northern France.

At the session devoted to industrial relations on the same day sub-committees will report on safety, employment and industrial organization, education, and the physical and mental factors in industry.

The session devoted to coal will be held on the afternoon of Feb. 19 with Mr. Eavenson presiding. The speakers

Man the Pumps!

A new method of handling peat out of bogs has just been patented in the name of the late Captain Alexander McDougall, of Duluth, Minn. Rotary pumps mounted on scows in the bogs would be expected to pump the peat through flexible piping to a drying plant, the process of which is not described. The pumping process is intended to replace the draining of peat swamps and the cutting of the material by hand or machine.

will include Mr. Eavenson, Ray W. Arms, contracting engineer, Roberts & Schaefer Co., Chicago, and G. B. Southward, chief engineer, West Virginia Coal & Coke Co., Elkins, W. Va.

Charles H. MacDowell will preside at the meeting devoted to timber requirements and reforestation, and at the session on iron and steel and refractories, P. H. Royster, assistant metallurgist, Bureau of Mines, Minneapolis, and T. L. Joseph, assistant metallurgist will present a joint paper on the effect of coke combustibility on stock descent in the blast furnace.

Industrial relations will be discussed at two sessions to be held on Feb. 20, the last day of the meeting, one to be held in the morning under the direction of Arthur L. Notman and the other in the afternoon. Of the latter Sidney Rolle will be chairman.

The annual business session will take place on the morning of Feb. 19, when the election of officers will take place.

During the sessions several committees will hold dinners and the annual banquet will be held at the Waldorf-Astoria at 7:15 p.m., Feb. 20. The following day the members of the society will visit the Bethlehem Steel Works. A program of entertainment has been arranged for those women who accompany the members to the city during the meeting.

Trade Commission Accuses California Dealers

Suppression of competition is charged by the Federal Trade Commission in a complaint against coal dealers allied with the California Retail Dealers' Association, its eight local organizations and thirteen wholesale or producing corporations in the coal business in California and Utah. The complaint charges the companies and persons named with having fixed prices and attempting to shut off the supply of coal to co-operative purchasing enterprises or to non-member retail dealers in the trade.

The hearings scheduled before the Federal Trade Commission Jan. 17 in the matter of the complaint against the Northwestern Coal and Dock Operators' Association have been postponed until the latter part of the month, the commission announced.

Premium Anthracite Sales Continue to Decrease

Reports of wholesale dealers in anthracite for the two weeks ended Dec. 15, covering only premium coal of domestic and pea sizes, show a marked decrease in the proportion on which a gross profit of 50c. or more was obtained, according to the Federal Trade Commission. Continued use of coke, bituminous coal and other substitutes for anthracite, especially for stove and nut sizes, which appear to be in the greatest demand, the commission says, will hasten the elimination of premium anthracite from the market and establish the entire trade on a healthier basis.

Although gross profits ranging up to \$1.75 per ton are still being realized by some wholesalers on a small part of the tonnage handled, and the passing of anthracite through the hands of two or more wholesalers still tends to enhance the prices of a part of the anthracite handled by wholesalers, the main cause of high prices charged the consumer continues to be the premium exacted at the mine by producers of a comparatively small proportion of the total anthracite output.

The wide range in the gross profits reported by wholesalers is gradually disappearing, the report says. During the two weeks ended Dec. 15 gross profits were reported ranging from \$1.75 per ton on anthracite sold at \$12.50 to a loss of \$1.05 per ton on coal sold at \$8.95 per ton f.o.b. mine.

For the two week period ended Dec. 15, 77 per cent of all the reported tonnage of wholesalers of premium anthracite was purchased from the producers and sold to a retailer or consumer, thereby passing through the hands of but one wholesaler; 19 per cent passed through the hands of at least two wholesalers, and 3 per cent through the hands of at least three wholesalers. For domestic sizes sold at premium prices 74 per cent of the tonnage reported passed through the hands of but one wholesaler; 24 per cent through the hands of at least two wholesalers and 1 per cent through the hands of at least three wholesalers.

During the two weeks ending Dec. 15 80 per cent of the carloads of high-prices domestic sizes of anthracite reported as sold by wholesalers was purchased directly from the producer.

Morrow in Loader Business

J. D. A. Morrow, formerly executive vice-president of the National Coal Association and for the last year president of the Morrow Callahan Coal Co. and the John Morrow Coal Co., has just been elected vice-president and general manager of the Joy Machine Co. with headquarters in Pittsburgh. It is understood that the Joy company is about to bring out a new and larger model of its mechanical loader. Mr. Morrow will continue his connection with his coal companies.

Symposium by Scientists in Washington Reflects Growing Interest in Coal

Sovereignty of American People at Stake, Says G. O. Smith—Tryon Cites Illegality of Plans for Birth Control of Mines—Hood's Paper a Feature

An indication of the increased interest in coal was had last week when the Washington Academy of Sciences—a body which rarely considers economic questions—devoted a session to a discussion of that subject.

In opening the discussion, Dr. George Otis Smith, Director of the U. S. Geological Survey, declared that the real issue today "concerns the sovereignty of the American people in their relation to those who own coal mines and to those who work in coal mines." In leading up to that conclusion, Dr. Smith cited as the outstanding cause of the difficulties in the bituminous industry the uncertainty of its labor supply. "The present monopoly of mine labor," he said, "has followed in the trail of the union's necessary, beneficial work in behalf of the mine worker, but that labor monopoly is no less injurious to the general public, and its power needs to be curbed. Each and all of the reforms advocated by the Coal Commission will fail to stabilize the industry if periodic suspensions of mining are to continue. The open threat of tying up the commerce of the nation and shutting down its industries is the menace of economic chaos."

Charles P. Neill, a member of the Harding Coal Commission, called attention to the tendency of unionization to break down the spread between the fixed wages paid skilled and unskilled workers. He cited examples to show that skill adds very materially to earning power among piece workers. He made the statement that the public had no right to anthracite now at the prices paid prior to 1910. The price was not sufficient to allow the men adequate pay for the work they did and the risks they necessarily must run in winning the coal. To hear operators talk, said Mr. Neill, one would judge that all mine workers have an annual wage of \$5,000. When union leaders discuss it, the impression is that no mine worker gets more than \$500 a year. The inequality in wage payments in the coal industry, he declared, is between the man who works 300 days a year and the man who works only 70 days.

In the course of discussing the relation of the cost of production to prices of coal, David L. Wing made the point that relatively few persons realize the wide ranges of costs even in the same field. He explained how coal companies operating side by side and selling in the same market may have such varying costs that the relationship is three to one. If the mines are under separate managements, a wide range of efficiency might exist in the conduct of the property.

The thickness of the seam, its pitch,

the purity of the coal, presence of faults, the drainage and ventilation problems, the amount of timbering necessary, the age of the mine, character of the mining, he said, indicate physical conditions which might cause great differences in cost. One of the mines might lose time because of accidents, because of car shortage or because of labor trouble. Other factors which contribute to differences in costs are royalties, depletion, depreciation charges and officers' salaries.

H. Foster Bain, Director of the Bureau of Mines, discussed the cost in lives of mining coal. The whole trend now, he said, is toward greater mechanization, with its increased hazards, the greatest of which is the more general use of electricity in mines.

F. G. Tryon, coal statistician for the Geological Survey, reviewed the various proposals to check the birth rate among bituminous coal mines and pointed out that not one of these proposals was free from serious doubt as to legality or practicability.

George S. Rice, chief mining engineer of the Bureau of Mines, reviewed the British coal agreement of 1921, pointing out that the present demand for its suspension by labor did not mean repudiation of the principle of profit sharing but is simply a dispute as to the terms of division.

E. W. Parker, of the Anthracite Bureau of Information, admitted that the prices of the domestic sizes of anthracite are too high but he asserted that this is due to the fact that the price of the steam sizes is too low. He said all authorities agree that the small sizes constitute just as valuable a fuel. He believes the public will benefit materially by the educational campaign now being conducted by the anthracite operators in an effort to teach domestic consumers how small sizes may be burned as easily as the coal which they have been accustomed to buy.

A feature of the meeting was a paper on "Consumers' Economies," read by O. P. Hood, chief mechanical engineer of the Bureau of Mines.

"The domestic consumer handles about a sixth of our fuel," said Mr. Hood. "His influence on conserving the general supply cannot be so great as that of the other main users, but his attitude of mind toward coal problems is of great importance and out of proportion to his tonnage interest. He buys the highest priced coal, costing two or three times as much per ton as the industries pay, so that his financial interest is not represented by his tonnage interest. The art of burning coal he must pick up by himself. It is not

No Law Agin It

Two miners working in a mine of the Kaw Valley Mining Co., near LaCygne, Kan., stood on their constitutional rights to smoke in the mine the other day. Both were taken to a hospital. They were carrying a damaged keg of powder when they lighted up.

"You should have known better than to smoke while carrying powder," a deputy mine inspector reminded Clarity, a negro, one of the men.

"But, boss," Clarity replied, "they ain't no law agin smokin' in a mine."

taught with his arithmetic, nor does it go with his athletics. He sometimes makes a sorry mess of it, and at best it is a dirty, dusty and unwelcome job.

"Anthracite has been a nearly fool-proof coal. While it can be misused and give low efficiency, it is surprising how highly efficient it is with the most ordinary care and attention. It is a mistake to consider the average efficiency low. From 60 to 80 per cent of the heat probably gets into the house if one half tries. It is for this reason that it is so hard to displace with substitutes, for each substitute requires the application of a little more thinking and a little more labor, two items we are loath to give.

"In fact, this condition has produced an opposite effect to that of money economy. Instead of reducing the cost of this item of household economy, many are frankly facing an increased item in the budget for the winter's heat and using oil or gas, but requiring a superior type of service that no other fuel supplies. The cleanliness possible with oil or gas makes the basement a totally different place in the home, and allows its use for purposes not thought possible before.

"One of the most practical economies is to use the steam sizes of anthracite, which must sell in competition with bituminous coal. Equally good service can be had if means are provided to maintain a thin and uniform fire bed or to supply artificial draft. The economy adopted by most people will ultimately be the use of bituminous coal. In this district it will be the so-called smokeless coals which we must learn to use.

"They will require more care and attention in firing and a frequent cleaning of furnace heating surfaces. When we are willing to do this in moderate amount the smokeless coal will replace anthracite ton for ton. When we are ready to give really careful attention to the problem we can get along with less tons, for the potential heat is 10 to 15 per cent more per ton. If we are not willing to do more than we do with anthracite at present, we may make up our minds to thoroughly dislike the dirty stuff and let it go at that, which is, of course, quite unreasonable."

Nova Scotia Strike Affects 12,000 Coal Miners

The mines of the Dominion Coal Co., a subsidiary of the British Empire Steel Corporation, are idle once more. The company ordered a 20-per cent reduction in wages on Jan. 15, and the members of the United Mine Workers for the eastern Canada district refused to work under the reduction. While the reduction was to affect only the miners employed in the Cape Breton collieries, many of the miners employed in other sections have refused to work, as a sympathetic move, and it is declared they will not resume work until the trouble in the Cape Breton mines is amicably adjusted. About 12,000 men are affected.

Negotiations for a new wage agreement between the British Empire Steel Corporation and the officials of the district union had been in progress at Sydney, N. S., for several weeks. The miners asked for the rates of 1921, which was refused, the company proposing a 20 per cent reduction. The company on the same day posted notices of a 20-per cent cut in all the mines. Following a mass meeting of the miners a strike of miners at the Thorburn and Stellarton workings on the Nova Scotia mainland fields was ordered.

The company maintains the reduction is necessary and that a lockout was not intended. The provisional executive has ordered all the miners to remain away from the mines until further notice. In the meantime, President Wolvin, of the British Empire Steel Corporation, has sought an interview with President John L. Lewis. Thus far no disturbances have arisen in the strike zone, and no request has been made for troops or provincial police. Government authorities say the maintenance men must be kept in the mines during the strike.

Engineers' Report on Storage Ready About Feb. 1

Dean J. F. Walker of the University of Kansas, chairman of the American Engineering Council's committee on coal storage, announced at a recent meeting of the Executive Board of the council that the report of the committee is in preparation and will be made public about Feb. 1. Dean Walker said that considerable data bearing upon methods and cost of storage, practice in storing and handling of coal, production and transportation, and lost time and overdevelopment in the bituminous-coal producing industry had been collected.

In dealing with the data it has been decided to treat of the conditions in different sections of the country separately. Requirements and the conditions influencing distribution differ so radically in various sections, he said, that no single remedy for existing ills can be devised. Local needs must be fully understood before remedial action



W. P. Jennings

As general superintendent of the Pennsylvania Coal Co. Mr. Jennings is a firm advocate of modern colliery equipment. It was only after a thorough modernization of machinery and processes that the outputs mentioned elsewhere in this issue were made possible.

can be considered. The aim is to give reliable answers to certain questions which those concerned with coal supply will ask when confronted with the problem of adjusting coal demands to a more uniform rate of production.

"There is no specific remedy or cure-all for the coal industry's ills," declared Dean Walker in commenting upon the committee's work. "Anyone who is looking for some act, legislative or executive, which will revolutionize practices and create Utopian conditions, is doomed to disappointment. Certain trends in the economic world have brought about the present situation. Changes will come about gradually in response to adjustments which are in accord with sound business principles, not by creating an artificial superstructure."

VICTOR MURDOCK, chairman of the Federal Trade Commission, has resigned, effective Feb. 1, and will return to his newspaper business in Kansas. His term would not have expired until September, 1925. It is expected that George B. Christian, former secretary to President Harding, will be appointed on the commission.

Ships 21,431 Tons in a Day

The collieries of the Upper District of the Pennsylvania Coal Co., under the supervision of W. P. Jennings, general superintendent, made a wonderful record for a day's tonnage on Dec. 15, 1923, when the district shipped a total of 21,431 tons in one day. No. 1 Colliery shipped 7,557 tons in 170 railroad cars and Underwood Colliery shipped 5,658 tons in 129 railroad cars.

Mt. Jessup Mine Probers Urge Protective Legislation

A recommendation has been made by the anthracite mine inspectors of Lackawanna County that the Pennsylvania Legislature enact a law compelling every coal company or operator in the state to furnish mine inspectors with borehole records to each seam and maps showing the nature and irregularities of the stratum over ying every seam of coal about to be mined.

This recommendation, with others, was made as the result of an investigation into the cause of the accident at the Mount Jessup mine of the Mount Jessup Coal Co., near Jermyn, Pa., on Dec. 8, which resulted in the deaths of five men, including the mine foreman, Eben Jones.

The inspectors, Augustus McDade, L. M. Evans, D. T. Williams and S. J. Phillips, made their report public on Feb. 15 and say that the disaster, like many others, carries with it a lesson that all persons interested in the safe operation of coal mines should learn that too much emphasis cannot be placed on having a thorough knowledge of the strata over all seams of coal that are being mined. Borehole records to each seam and cross-sections of the stratum overlying the seams should show faults, dislocations or discontinuances in the strata, clearly defining and indicating the area of overburden affected and especially the area to be robbed, and no robbing should be permitted except by written permission of the mine inspector. The report says the quantity of coal mined from a central point where dislocations or discontinuances of stratum are shown should be determined in advance of final mining.

In asking that their recommendations be embodied in an act the inspectors say that if a law such as this had been on the statute books many sad tragedies might have been averted and many coal properties that have been practically ruined might be safe and profitable properties at present.

Illinois-Wisconsin Retailers Deny Boycott Charges

The Illinois & Wisconsin Retail Coal Dealers' Association denies charges made by the Federal Trade Commission that it used various methods to enforce an alleged co-operative scheme to boycott so-called "irregular" or "illegitimate" dealers and attempted to have certain producers and wholesalers of coal confine the distribution of fuel in respondents' so-called regular channels. The denial was contained in an answer filed Jan. 21 through Stanley B. Houck, of Minneapolis, attorney for the association.

The association asserts that its acts tend to provide "a higher quality of coal, a more dependable supply, freedom from misrepresentation and fraud in respect to coal, full weight, low prices and generally better coal and better service."

Lewis to Sponsor Coal-Mediation Plan?

Washington Report Is That He Has Scheme to Initiate Public Inquiry Into Labor Conditions in Non-Union Fields—Recalls Hoover Plan of 1919

BY PAUL WOOTON
Washington Correspondent of *Coal Age*

Washington is indulging in considerable speculation concerning a report that John L. Lewis is about to present for introduction the draft of a bill providing for some type of mediation in the coal industry. No definite information is available but if the report should be correct, it is assumed that Mr. Lewis has hit upon some plan for the creation of a tribunal to which non-union labor could appeal.

It is hardly to be supposed that Mr. Lewis will recommend a coal labor board, along the lines of the Railway Labor Board, in view of the opposition to that body which has been voiced by the American Federation of Labor and from the fact that the Mine Workers have been accustomed to cite it as a horrible example of what may occur when wage regulation is attempted.

The unions have been so hostile to everything with a savor of wage regulation that it is difficult to believe that they will put forward any suggestion for the setting up of an agency which might be in a position to exercise such control. At the same time there is possibility, it is admitted, that the Mine Workers will be in such straits because of the low rate of employment among union workers as compared with non-union workers that they may be willing to take a surprising step.

Mr. Lewis may have in mind some

such plan as was put forward by Secretary Hoover's industrial conference in 1919. That plan provided the machinery for voluntary arbitration for the country as a whole. There were to be regional boards of adjustment to which either or both parties to a dispute could carry their case. If mediation was sought by either party to the dispute, the regional board would investigate and make a report on the situation even if one party did not agree to the submission of the question to the board. If, under any conditions, the contending parties did not accept the findings of the regional board, it could be carried to a national board—a sort of Supreme Court of industry. There was no thought of compulsion other than that which could be exercised by bringing public opinion to bear.

Such a plan would result in a public inquiry into labor situations in non-union territory. Unquestionably the union would like very much to see it operative there, but if it were operative in the non-union fields it necessarily would have to be set up in the union fields, a thing which they would not like.

What seems more probable is that Mr. Lewis has some plan which will forward his scheme for establishing a minimum wage.

Mines Appropriations Pared From Estimates

The Interior Department appropriation bill for the fiscal year beginning July 1 next, as reported to the House, provides \$1,890,700 for the Bureau of Mines, an increase of \$121,000 over the allowance for the current year but a decrease of \$18,873 from the estimates. Detailed appropriations for next year are as follows:

Investigating mine accidents, \$350,000 (decrease, \$43,000); operating mine-rescue cars, \$262,300 (increase \$51,300); purchase of an additional mine-rescue car, \$40,000; testing fuel, \$138,280 (increase \$2,280); mineral-mining investigations including silver investigations, \$128,360 (increase \$3,360); petroleum and natural-gas investigations, \$500,000 (increase \$95,000); oil, oil shale and gas work, \$91,360 (increase \$11,360); maintenance of mining experiment stations, \$200,000 (increase \$25,000); care of buildings and grounds at Pittsburgh, \$57,400 (increase \$2,400); mining station and mine inspection in Alaska, \$35,000. Payments to the states next year under the leasing act are estimated at \$2,500,000. For the Geological Survey \$1,642,-

760 is provided, a decrease of \$27,430 from the current year and of \$162,512 from the estimates. The detailed appropriations are: Topographic surveys, \$500,000; geologic surveys, \$300,000; chemical and physical researches, \$40,000; report of mineral resources, \$125,000; investigation of mineral resources of Alaska, \$75,000; gaging streams, \$170,000; geologic maps, \$110,000, and classification of lands, \$250,000, the latter being \$30,000 less than the current year.

Urges Federal Mine Operation In "Emergency"

The President is authorized to declare a national emergency in case of cessation or threatened cessation of a steady supply of coal and to take over and operate the coal mines during such emergency by the provisions of a bill—H.R. 5263—introduced in the House by Representative Treadway, of Massachusetts. The measure authorizes payment to operators for the taking over of their property, and appeals from unsatisfactory payments would be made to the Court of Claims. The bill also authorizes the President to fix coal prices during such an emergency.

Oddie Defends Mines Bureau

A recommendation by the Institute for Government Research that the Bureau of Mines be abolished is sharply resented by Senator Oddie, chairman of the Committee on Mines and Mining, who characterizes it as a reflection on the mining industry. The institute's recommendation is made in a report by W. F. Willoughby on proposed reorganization of federal administrative departments. Herbert Hoover, Secretary of Commerce, and Chief Justice Taft are among the members of the institute. In recommending abolition of the Bureau of Mines the institute report says:

"Abolition of the Bureau of Mines is recommended since careful study of its activities shows that there is nothing done by it which cannot be done by other services and particularly by the Bureau of Standards and the Geological Survey. This being so, it is believed to be in the interest of economy and efficiency that it be discontinued and the duties taken over by the other services mentioned."

Notwithstanding this attack Senator Oddie announced that he would press his bill to create a Department of Mines. "Those advocating abolition of the Bureau of Mines do not know the mining industry," declared Senator Oddie. "The mining industry should be dignified by a department of its own." The Senator explained that it would be possible to reduce the number of mine strikes, if not eliminate them entirely, through the continuing activities of a Department of Mines.

Another Anthracite Exhibit In Washington

An exhibit designed to educate the consumers in the proper use of small sizes of anthracite, in order to relieve the demand for domestic sizes and thus tend to reduce prices, has been arranged by the General Policy Committee of the Anthracite Operators at 1328 F Street, N.W., Washington.

The exhibit, located in the heart of the retail business district, contains samples of the various sizes of coal, together with charts and descriptive matter on the walls. Moving pictures of mining operations and of proper methods of firing anthracite are displayed at frequent intervals. Literature on the subject is distributed to callers. The exhibit is similar to the one conducted in Philadelphia.

Borah to Present Pinchot Bill

Senator Pepper, of Pennsylvania, having declined to introduce Governor Pinchot's anthracite bill, the Governor has turned it over to Senator Borah, chairman of the Labor Committee, who will sponsor it in the Senate. Senator Pepper said he did not desire to introduce the measure, as he might not be able to give it his wholehearted support. Mr. Borah is expected to present the bill this week.



Practical Pointers For Electrical And Mechanical Men



Simple Attachment Insures Effective Method of Lubricating Trolley Wheel

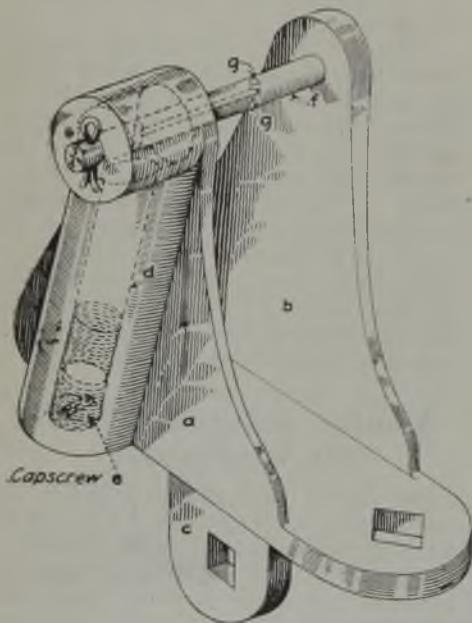
Men in charge of mines are always looking for, and eager to take advantage of, any improvement or new device that may be profitably applied to operating machines in and around their mines. Many machines in mining have reached such a point of perfection that continuous operation would obtain but for a defective accessory. The lubricat-

the result of applying lubrications for reducing solid friction to a minimum. Therefore the substitution is a cost reducer and can be made practically complete by efficient lubrication, thereby reducing frictional resistance to the lowest possible minimum on bearing surfaces. If lubrication is deficient either in quantity or quality solid friction becomes excessive and the bearings will be continually roughened by the sliding contact, which creates an ideal condition for increasing frictional losses and quick wearing out of parts. Such deficiencies are not so much the fault of the lubricant as the lack of proper application of the lubricant.

COST ITEM IMPORTANT

Even though a device or improvement may be small the item of cost is ever present in the mine operator's mind, and if comparative costs are in favor of the new device or improvement, he immediately tries and often adopts such an improvement. In the ordinary trolley-wheel frame it is customary to oil the trolley wheel by dashing black oil over the trolley harp, with the result that little of the oil reaches the parts to be lubricated. This is an accessory requiring considerable expense for upkeep, and in addition is at times a source of much trouble in causing delays, and this fact is particularly noticeable on long hauls.

A trolley-wheel frame has recently been evolved which provides for effective lubrication of the rubbing parts. This frame is designed for oiling the trolley wheel and axle with cup grease. The method of lubrication is best understood by referring to the accompanying sketch: The brackets (a) and (b) are the same as those used in the make-up of the ordinary trolley harp. The replaceable brass plate (c) is $\frac{1}{8}$ in. thick and pivoted to the base at the rear by a countersunk-head bolt. The shoulder (d) is hollowed and threaded on the inside full length and has an inside diameter of $\frac{1}{8}$ in. A cap-screw (e) of the same fit ($\frac{1}{8}$ in.) and $\frac{1}{2}$ in. long forces the grease up through a $\frac{1}{8}$ -in. opening into the hollow axle (f), thence through the ports (g) to the outer surface of the axle and inner surface of the hub of the trolley wheel. The axle is made of steel and fixed to avoid rotation by a slotted cotter key at each end, as shown in the sketch. It is esti-



LUBRICATING ATTACHMENT FOR TROLLEY WHEEL

By screwing up the cap screw into a chamber which is connected to the wheel spindle the trolley wheel is efficiently greased.

ing system of a trolley-wheel is defective and is a source of loss of time and expensive delays in haulage.

Comparative data from one mine that once used the system of dashing black oil on the trolley-wheel shows that twenty-five bronze graphite bushings were required to wear out one trolley-wheel at a cost of 22c. per bushing. The trolley harp with the grease oiling system was installed on each motor, with the favorable result that only one bushing was needed to wear out one trolley wheel. The trolley wheels were of the same diameter. Many other advantages no doubt have resulted from this installation. This is omitting the inestimable cost of delayed haulage.

In the operation of machinery two kinds of friction have to be overcome: Solid friction, which results from contact of rubbing parts, and fluid friction,

mated that two turns of the capscrew will force enough grease to supply ample lubrication throughout a shift of work.

HOMER COTÉ,
Pineville, Ky. Mining Engineer.

Danger Lurks in Using 2,200-Volt Transformers On 4,000-Volt Lines

No doubt many 4,000-volt lines around the collieries and mines of the country originally were 2,200-volt lines which have been raised to 4,000 volt in order to transmit larger amounts of power to certain districts. When this is done there is frequently a considerable amount of apparatus wound for 2,200 volts which must either be

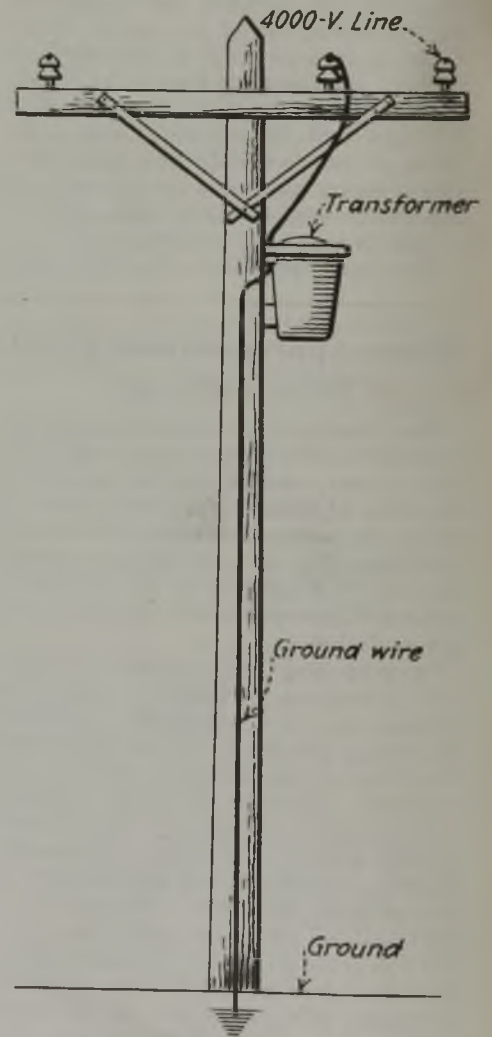


FIG. 1—USUAL CONNECTION FROM LINE TO GROUND

On a 4,000-volt grounded neutral system the voltage from a line wire to ground is about 2,300, so it is possible to use a 2,200-volt transformer in this way.



FIG. 2—HOW THE BLACKSMITH WAS SHOCKED

By placing his body in the circuit from the line wire to ground the man received a bad shock. The reason he was not killed was that his contact to ground was not perfect and he did not get the full force of the 2,200-volt pressure.

used on the new line operating at 4,000 volts or be transferred to some other location where it is again used on 2,200 volt-circuits.

Under these conditions lighting transformers built for 2,200-volt circuits may easily be used between one line wire and ground wherever the 4,000-volt line is operated with a grounded neutral.

This, however, introduces liabilities to accidents, one of which happened at a mine near our town. A lighting transformer was connected in the usual way, one side of the primary winding being connected to a line wire and the other side of the primary winding running down the side of the pole to a ground connection.

One day a wagon delivering supplies to the mine grazed the side of this pole, and the hub of the wagon wheel cut the ground wire. Immediately the lighting around the colliery went out, and a small forge fan motor working on the same circuit stopped. The blacksmith went out to see what the trouble was and knowing something about electricity immediately noticed that the ground wire from the transformer was broken off.

He had previously heard the electrician say that touching a ground wire would not harm anyone, and this was very often demonstrated to him, so he saw no reason why he could not make the repair to the ground connection of the transformer without any danger. He therefore touched the up-

per end of the ground wire and soon found himself curled up on the ground. This was quite a surprise to him and it was a fortunate thing that the ground on which he was standing and the shoes which he was wearing prevented him from receiving the full force of the voltage.

Many electricians have a false idea of ground wires and this is one instance where a ground wire was really dangerous, for in effect the blacksmith touched a line wire and got a bad shock because the circuit was complete from the line through the transformer primary to ground.

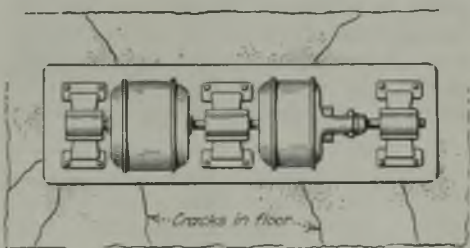
Another Motor Generator Set Without a Ground Wire

The stories which I have recently read in *Coal Age* referring to motor-generator sets which were not supplied with a ground wire until a serious accident almost occurred prompts me to tell you about an experience along the same lines which I once had.

The machine in question was set up as usual on a concrete floor and when a breakdown occurred in the motor winding the high a.-c. voltage sought various ways to reach ground. Cracks in the floor around the machine, although very small, had been filled up with coal dust from sweepings of the floor and a slight amount of moisture occasionally was noticeable along the cracks.

When this machine broke down the operator had the scare of his life. He closed the starting switch and saw streaks of fire along every crack leading from the motor-generator set, some of these streaks of fire running out from the sides of the machine along the cracks as much as 2 ft.

We took no more chances with there



FIRE CAME OUT OF THE CRACKS

The leakage from the machine was along the cracks, which became luminous when the power was applied to the machine.

not being a good ground on this machine by taking the insulation off the negative stud of the generator and connecting our negative lead to the track return from the mine and a nearby ground located in moist earth. This may be done with most machines and I offer it as a suggestion because ground wires ordinarily put on machines are of rather small diameter and may be burned off or broken and yet not be noticed. There is not much chance of a heavy return wire from the mine being broken and not noticed, because it probably is the only source through which the circuit from the mine is completed back to the negative side of the generator.

ELECTRICAL INSPECTOR.

Electrician Helps Himself By Helping Others

Unfortunately for mine locomotives as well as the power house there is entirely too much parallel operation of the locomotive motors. Strange as it may seem, some motormen go through years of actual operation without really knowing the locomotive with which they work.

The blame for this condition does not lie entirely with the motorman but rather with the electrician in charge, for it is the latter's failure to impart a small portion of the knowledge he possesses concerning certain things having to do with the operation of the locomotive that makes certain details of the equipment forever a mystery to some motormen. It is unfortunate that this condition should exist, but it will persist until electricians in general are more liberal with the knowledge they possess and pass it on to others less fortunate than they in being placed in positions of advantage.

One has only to look back at the time of one's own apprenticeship to appreciate the real force of this statement. Many sad chapters could be written of some motormen, eager for knowledge but afraid to ask for it because of the ridicule of some of their fellows, thus they remain motormen to the end of their days, and all because electricians in general remain blind to the harm they are doing themselves, their company and their fellow-worker in withholding information which would help make the work easier, safer and more efficient. The fact that there is always less trouble with a locomotive operated by a capable motorman is sufficient proof that it pays to have the electrician pass on his knowledge of the intricate parts of a locomotive to the man who runs it.

M. S. BEDDOW.

One heat-unit per square foot per minute equals:

- 0.1220 watt per square inch.
- 0.01757 kw. per square foot.
- 0.02356 hp. per square foot.

One heat-unit equals:

- 1,054.2 watt seconds.
- 777.54 ft. lb.
- 107.5 kilogram meters.
- 0.0002928 kw.-hr.
- 0.0003927 hp.-hr.
- 0.0000685 lb. carbon oxidized.
- 0.001030 lb. water evaporated from and at 212 deg. F.

One watt equals:

- 1 joule per second.
- 0.001341 hp.
- 3.415 heat units per hour.
- 0.73756 ft.-lb. per second.
- 0.0035 lb. water evaporated per hour.
- 44.254 ft.-lb. per minute.

One joule equals:

- 1 watt second.
- 0.000000278 kw.-hr.
- 0.102 kilogram meters.
- 0.0009486 heat unit.
- 0.73756 ft.-lb.



Problems In Underground Management



Siphon That Can Draw Air and Yet Work Continuously

Waterline from Surface Dam Feeds Down—Leg of Siphon Forming Continuous Vacuum Such That a Little Air If Admitted Is Promptly Discharged

BY ERNEST KRAUSE
Matyus-Krause Coal Co., Adah, Pa.

Because the siphon works well only so long as the sumps contain enough water to cover the intakes, and as the sumps usually are too small to keep the siphon running for any length of time, the following method of keeping a siphon running continually will prove helpful:

It requires a steady supply of water near the summit of the siphoning line. The water must be admitted below the summit on the down leg of the siphon, so that when it enters the siphon line it will all go down that leg and not into the "suction lines." With that exception, however, the point of entry should be as near the summit as possible.

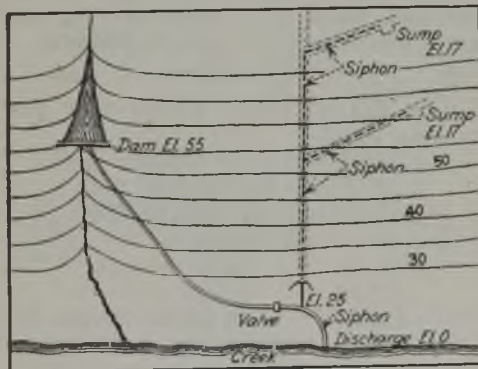
At the Crescent Mine sumps have been excavated in each of two right entries. These are connected by pipes

is admitted to the siphon line, the down pipe fills and the water runs out faster than the water from the dam comes in, and so a vacuum is created in the siphon. This vacuum is sufficient to lift water from the sumps in the mine, provided the intake end is covered with water. Consequently the sumps are emptied of water as fast as it rises to the desired level. The suction continues to exist so that as soon as the

water rises to the necessary height the flow of water in the pipe starts again. Drawing of air stops the siphon only temporarily.

Some such system could be used where large bodies of water to supply the down leg are found in high drowned areas in the mine. There also the water could be directed to a point near the top of the down leg and its escape through the line would maintain a perpetual suction and so keep the water in the sumps at a low level.

We find that the siphon will pull continuously even when it is taking air at one or both suction points. We had tried filling the line with a hand pump, but the sumps were so small that it was necessary to start up the siphon frequently. In consequence the pumping required much labor, all of which is avoided by the method indicated.



THIS SIPHON IS REALLY A PUMP

The weight of the water from the reservoir drives the air out of the down leg of the siphon without filling the line entirely with water. Something must take its place, and as a result air or water or both come in through the mine sump intakes.

with a pipe running along the main entry to the mouth of the mine and thence down a steep grade to the creek. Above the mine on the left is a stream across which a small dam was erected some 30 ft. above the summit of the siphon. A pipe connects this dam with the siphon a short distance below the summit of the down leg. The sumps in the mine are about 8 ft. below the summit.

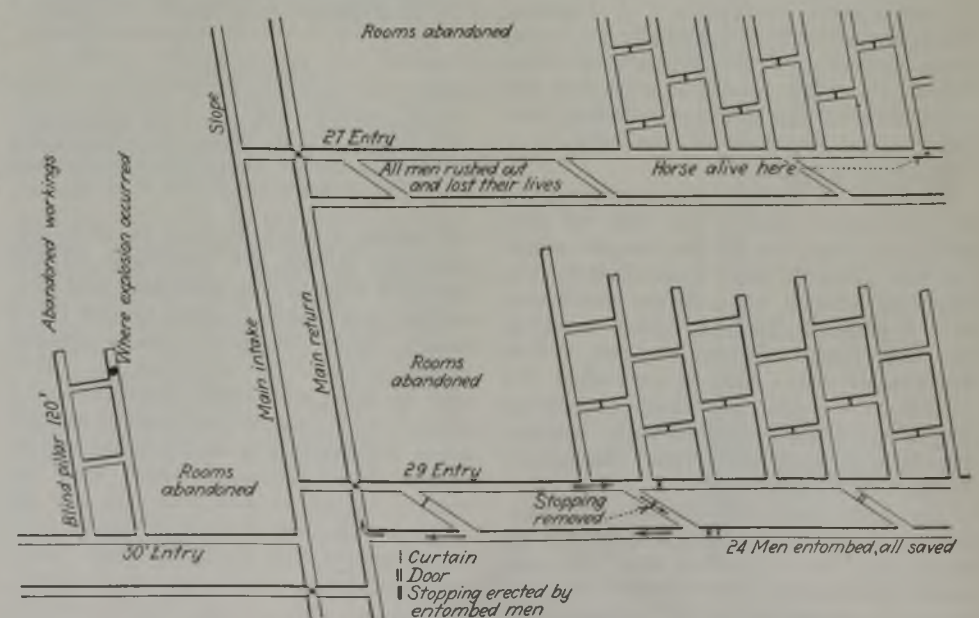
On this pipe is a regulating valve. When a little water in a steady stream

Where Barricade Saved Lives

BY JAMES ROBERTS
Frontier, Wyo.

Proof of the value of barricades in the saving of lives and of the importance of presence of mind after explosions is afforded by the Frontier disaster, in which my brother lost his life. In the 27th entry all the men, twenty-four in number, rushed out in their anxiety to escape. Only one is still living. The deadly afterdamp killed

all the twenty-three. If they had remained at their working places they might have been saved, for a horse which they left behind is still living. Better yet, they might have done as Cliff Phillips, a driver, did in No. 29 entry. He and twenty-three men built three stoppings and hung up a curtain. Every one of these men was saved as a result of this precaution and presence of mind. The drawing shows where the explosion started and where the barricade was erected.



SKETCH OF WORKINGS AT FRONTIER MINE, NEAR DIAMONDVILLE, WYO.

The men in Entry No. 27 tried to run through the area filled with afterdamp and were asphyxiated. Those in Entry No. 29 hung up a curtain, built three stoppings and remaining behind these barricades were saved.

Discussion

Wants Are Due to Erosion

By GEORGE A. SCHULTZ
Superintendent, Liberty Fuel Co.,
Latuda, Utah.

On p. 783 of the Nov. 22 issue of *Coal Age* Charles E. Lawall, of the University of West Virginia, has an article on what he terms "faults of erosion." The article deals with a subject of great importance to many of the mining companies in Utah and, I have no doubt, in other districts also.

In the Utah coal fields "faults of erosion," as Mr. Lawall terms them, are known as "wants," but I feel sure that neither term should be applied to many of these unusual occurrences. There is no question but that wherever these "wants" extend continuously for a number of miles their origin is easily explained. No doubt they are, as Mr. Lawall states, the result of coal being eroded by a stream, the stream bed in turn being filled with material which eventually forms rock.

I have mapped, however, a number of coalless areas after the coal had been extracted around them and have found that their lack of uniformity in outline always is striking. I have known them to vary in area from one-half acre to forty acres and in outline from the shape of a cigar to that of a side view of a duck. Some of them are separated from each other by 200 ft. of coal and others by about a mile.

Geologists have tried to explain these occurrences by saying that the larger ones are caused by stream erosion and the smaller ones by the eroding action of whirlpools in the stream, but their shapes are so irregular that these theories are unsatisfactory. My experience has been that the roof of the coal usually comes down over these wants, though with varying angles.

Sometimes the coal will gradually become thin from roof to floor, the change taking place in a distance of several hundred feet. On the other hand, in some instances the coal will become thin in a few feet, proving to me beyond a doubt that such wants are not due either to the erosion of the seam or to the formation of islands in the swamp or bog while the coal-forming material grew or was deposited.

One theory that has been advanced seems to me quite feasible. This is that the coal-forming material while still of a mudlike consistency was covered with sand or other material, the distribution of this overburden not being uniform. Wherever the greatest weight of material was deposited it settled, displacing the soft peat. The fact that the coal seam surrounding the "want" usually is thicker than the normal thickness of the seam seems to substantiate this theory. Many impos-

sible causes such as intrusions of volcanic origin have been advanced to explain the formation of these "wants," but I am disposed to believe that in most cases they are the result of an unequal deposition of material and of the extrusion of the almost liquid peat in response to unequal pressure.

United Mine Workers and Reds

For several months the publicity department of the United Mine Workers of America has been giving statements to the Associated Press affirming that they have discovered that all of the murders and disorders which have been charged against the miners' union since the war can be traced to the activities of "Reds," who are not in sympathy with the union and who are only using that organization for their own ends.

As bearing on the above statement I have taken a few facts from a brief of the Alabama Mining Institute submitted to the U. S. Coal Commission.

The United Mine Workers called a strike in Alabama in May, 1920, and in September, 1920, that organization sent Van A. Bittner from the International headquarters to take charge of the strike. He was sent as the direct representative of the national officers, and he is still being used on important assignments by the same organization.

The strike was called off in March, 1921, after both sides had submitted their case to Governor Kilby to arbitrate and he had ruled against the demands of the miners. The Governor handed down his decision March 19, 1921. On March 30, 1921, more than a week after the strike had been lost, Van Bittner made a speech at Blocton, Ala., to union men, most of whom had been refused re-employment. The speech was taken down in shorthand by a court reporter and the transcript from his notes sworn to.

Here are a few extracts:

"There has not been any strike yet. We are just going to start. We are going to hold this Governor and these coal operators responsible for that decision. They thought that because the decision was as rotten as it was, as ungodly as it was, the mine workers' union would say, 'Well, we are not going to comply with that decision.'

"It is going to make them fight. That is what it is going to do. If there are any scabs left here in Blocton in thirty days from now, you men ought to be chased out of the state. That is the thing for you to do."

"They may have a right to work, but by the eternal gods, they haven't any right to your jobs. It has been entirely too healthy for scabs around Blocton. That has been the trouble



Wide World Photos

Bathhouse at a Dutch Mine

The roof decorations are, of course, suspended clothes. Apparently four men are employed in keeping the floor clean. Seats are not provided as in American bathhouses. The clothes are suspended by chains and locked in place, each man carrying his own key.

with you. What would you do with a rattlesnake if one of them would start crawling into this meeting now?

A Voice: "Kill him."

Mr. Bittner: "A rattlesnake never did you half as much harm as a scab."

"If they had ever started to drive the organizers out of Alabama there are a lot of coal operators who would never have lived to read about it in the newspapers the next morning. We would have got a few of them in the fight. We are going to stay here just as long as you want us to stay. I think there are enough good, strong, union men to make the weak fellows fight whether they want to or not. I think we have reached that stage here in Blocton and everywhere else."

"We want you to make the mines 100 per cent union. We are going to give you until March 13, 1922, to do this. If you don't do it, we are going to build a fence around this infernal state and let you fellows down here scab and live in slavery all the rest of your days."

Were those remarks inflammatory? What is a "Red" anyway?

Birmingham, Ala. H. S. GEISMER.

Speaking of Queer Names

A small mine located at the junction of the Black and Little Warrior rivers, in the northwestern part of Jefferson County near the Walker County line in Alabama, is known as "Toadvine," which is the name of the small village that was there long before the mine was opened.

A mine known as "Who'd 'A' Thought It" is even more distinguished as a leader in the list of coal mines with queer names. This mine is northwest of Wylam, Ala., and located near Dolomite in Jefferson County. If any one can beat these two names, let him come forward.

P. W. GOOCH,
Superintendent, Coal River Collieries,
Prestonsburg, Ky.



Production And the Market



Strike Rumors and Drop in Temperature Cause Upward Swing in Soft-Coal Sales

Sales in the soft-coal industry, as in some other fields, are showing an upward tendency, possibly owing partly to the prospect of a suspension of work in April. Those having small stocks seem to be anxious. However, the weather in most sections of the country has not been without result. Consumers are showing more interest, inquiries have increased and the sales in January have exceeded those made in December. Some operators report sufficient business ahead to keep their mines going during the month and well into February. The possibility of a strike in England and the railroad dispute are matters much discussed, but so far they have had no general effect on the market. There has been more inquiry regarding contracts. The anthracite situation shows practically no change.

Though spot quotations for soft coal show slight changes in various districts the general result indicates comparatively little shifting from last week. *Coal Age* Index as of Jan. 21 registers the same as it did last week, 182, but the average price is \$2.25, an increase of 5c.

Markets Active in Middle West

The Midwest markets are reasonably active and dealers are kept busy. Moreover, the railroads have been slow to make deliveries, thus preventing an excess of coal from arriving. With the exception of smokeless coals, however, prices remain firm. Business at St. Louis is on the upgrade, the demand for bituminous coal and coke being fair, though slow for anthracite and smokeless coals. Western Kentucky prepared coals are moving better, including a fair tonnage to Chicago. Smokeless coals are not in good demand in the Northwest, but dealers at Milwaukee are having some good business because of the real winter temperatures.

A marked improvement for domestic coals is noted in the Ohio markets. Buying at Columbus is general

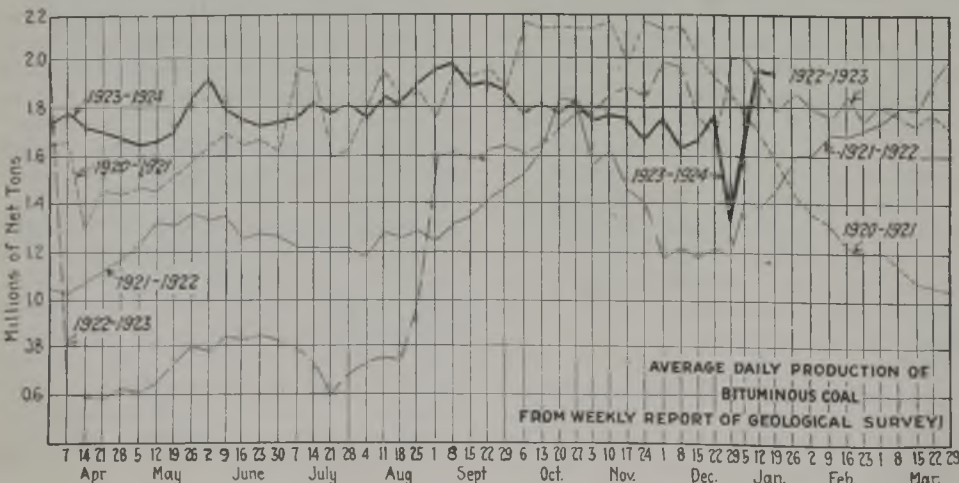
and dealers are placing more orders. Distress coal is practically cleaned up and a much better tone has developed. Steam coals are in much steadier demand and generally there is less shading of prices to force sales. At Cincinnati the demand for domestic coals is strong. Retail dealers whose stocks have been depleted are calling for prompt shipments. Retail demand at Cleveland is showing more activity, though operators and jobbers say that the demand from the steel mills is very quiet. Other industrial plants continue to buy for current needs. Steadiness is noted in the Pittsburgh market with a moderate demand for domestic coals. There is a feeling that there will be a suspension of mining on April 1. Demand for steam coal in New England is unchanged from last week; textiles are at low ebb. Trade along the Atlantic seaboard for domestic consumption is quiet, but there is a fair volume of spot coal moving, while at Baltimore interest centers in the export situation.

Soft-coal production during the second week of 1924 is estimated by the Geological Survey to have been 11,921,000 net tons, an increase of 2,853,000 tons when compared with the previous week. This also was the largest weekly output since December, 1920. Output of hard coal for the same week totalled 1,840,000 net tons, as compared with 1,436,000 tons the previous week.

Production of beehive coke during the week ended Jan. 12 was 248,000 net tons, as compared with 236,000 tons in the previous week and 323,000 tons in the corresponding week of last year.

Midwest Prices Firm

Continued cold has kept the Midwest markets reasonably active during the past week. There has been just enough slowness of railroad movement to check a too rapid flow of coal to market, with the result that prices all around have held firm. There have been few increases, however, except a slight upward tendency on the part of smokeless



Estimates of Production ¹		
(Net Tons)		
BITUMINOUS		
	1922-1923	1923-1924
Dec. 29	10,495,000	6,713,000
Jan. 5 (b)	10,529,000	9,068,000
Jan. 12 (a)	10,993,000	11,921,000
Daily average	2,074,000	1,987,000
Coal year	303,419,000	425,199,000
Daily average coal year	1,260,000	1,774,000
ANTHRACITE		
Dec. 29	1,560,000	1,236,000
Jan. 5 (b)	1,725,000	1,436,000
Jan. 12 (a)	2,113,000	1,840,000
Coal year	34,546,000	72,605,000
COKE		
Jan. 5 (b)	309,000	236,000
Jan. 12 (a)	323,000	248,000
Calendar year	581,000	445,000

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

coals from a field which is already partly shut down. Smokeless lump and egg pushed up to about \$3.50 and mine-run was strong at \$2.25, running up to \$2.50 in some cases. One or two instances of premiums were reported.

An effort on the part of western Kentucky to advance lump prices a little was not greeted with much encouragement. Quotations for delivery up to May 15 from that field at favorable prices indicate that the field does not hope for a sudden rise in the market even if there is a strike April 1, but what would happen after May 15 or thereabouts might be a different story.

Throughout the Illinois and Indiana fields domestic demand has been sufficient to reopen a number of mines that have not worked lately, and has generally improved conditions. Central Illinois, for instance, has been able to sell about all its domestic sizes at \$3@3.25 and screenings have not dragged heavily at \$1.50@1.60. Domestic production in southern Illinois and in the Standard district, however, has been heavy enough to slow down the steam sizes. The Standard field's production is great enough to cause a good deal of backing up of coal there. The Mt. Olive field as

well as the DuQuoin and Jackson Country regions have all been doing fairly good business.

St. Louis Trade on Upgrade

Cold weather has put the St. Louis coal business on the upgrade and the dealers report that demand is fairly good and all yards are active, principally with middle and cheaper grade coals. Coke has shown considerable improvement in the past week, while anthracite and smokeless lag. Franklin County is not selling as readily as the cheaper grades.

Wagonload steam is good, but carload steam is easing off on everything. Business conditions are not as good as they might be and there seems to be an overproduction that is forcing the market. Country steam is active in spots for nut sizes only, while country domestic continues good for the cheaper grades. There has been no change in local retail prices.

Operators in the western Kentucky field have found demand for prepared sizes somewhat better since cold weather created better movement to the Southern markets along

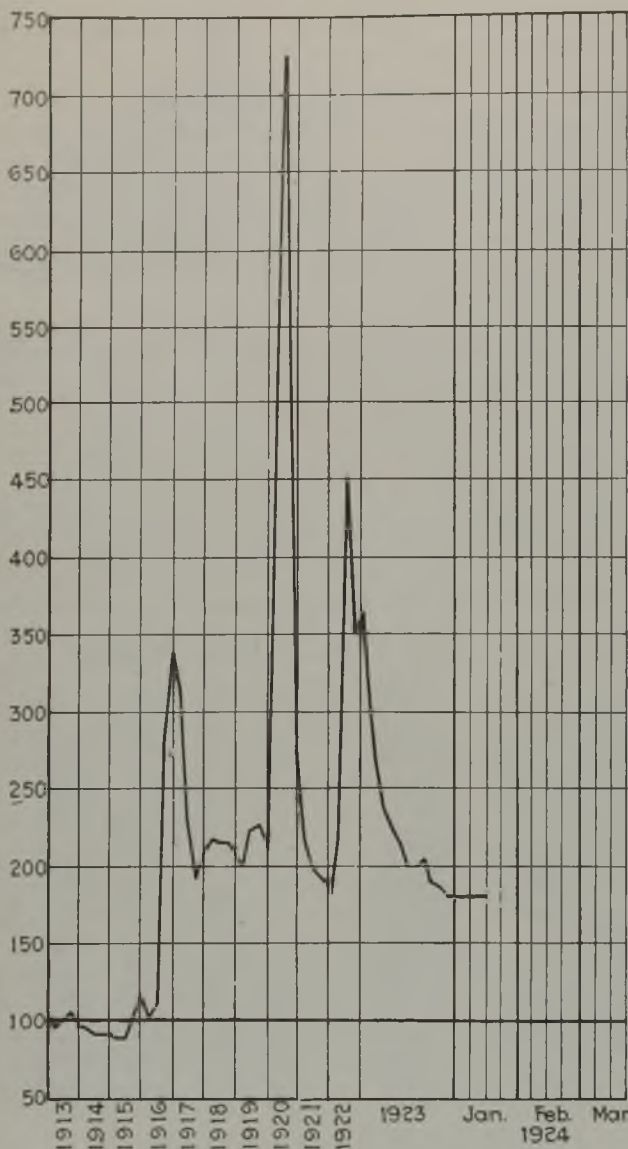
Current Quotations—Spot Prices, Bituminous Coal—Net Tons, F.O.B. Mines

Table with columns for Market Quoted, Jan. 22 1923, Jan. 7 1924, Jan. 14 1924, Jan. 21 1924, and Midwest, South and Southwest. Rows include various coal grades like Smokeless lump, Clearfield mine run, etc.

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

Table with columns for Market Quoted, Freight Rates, Jan. 22, 1923, Jan. 14, 1924, Jan. 21, 1924. Rows include Broken, Egg, Stove, Chestnut, Range, Pea, Buckwheat, Rice, Barley, Birdseye.

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



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

Index	1924		1923	
	Jan. 21	Jan. 14	Jan. 7	Jan. 22
Weighted average price	\$2.25	\$2.20	\$2.20	\$4.43

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.

with the Central and Western districts. A fair tonnage has been moving into the Chicago district and to Michigan. Screenings are in larger production, but are being moved fairly well and prices are holding. Prepared sizes are firmer, and not much price cutting is reported.

Car supply continues quite good in all fields of the state, but loadings are heavier and cars on long hauls are not making as good time as they were, but there is less coal standing unsold on cars than for some time past, which helps the situation a little.

Movement of prepared sizes from the mines from both ends of Kentucky is improving, and while screenings are in larger production, there are more consumers in the market, with the result that prices are holding firmly, in spite of some talk of \$1.10@1.15 offerings, made largely by brokers in an effort to break down the market. As a matter of fact it is impossible to trace any screenings moving at under \$1.25 to the consumer; good stock sells as high as \$1.60.

Northwest Trade Quiets Down

Smokeless coals dropped off during the past week, due to the anxiety of dock men to encourage householders to use them as substitutes for hard coal. Prices are as follows for those coals which have changed price: Kentucky

lump, \$7.25; run of pile, \$6.50; screenings, \$4.25; splint lump, \$6.75; run of pile, \$5.75; screenings, \$4; Pocahontas lump, \$9; run of pile, \$6.50; screenings, \$5.50. Screenings are strong all along the line. All other coals are firm.

The spurt in buying so evident the first part of the month was lost last week. Everyone is still buying from hand to mouth. Stocks of bituminous on docks are now estimated at 5,000,000 tons, and unless a strike occurs an oversupply on the opening of navigation is likely. It looks as if at least 3,000,000 tons will be on the docks at the opening of navigation. If there is no strike a reduction is certain.

The anthracite market is a puzzle. No accurate estimate of stocks is available, but it seems certain that not more than 150,000 tons can be on the Head-of-the-Lakes docks, and this mostly off sizes. A small amount of stove and nut remains in hiding, and the docks are delivering one ton of either stove or nut, but the buyer must also take an equal amount of egg or pea.

Real winter weather keeps the Milwaukee coal market lively, and everybody is busy. There is a good supply of everything in the way of coal, but jobbers report a tightening in the supply of Western screenings. Prices of coal and coke remain unchanged.

Western Markets Busy

There is considerable activity in coal trading throughout nearly every section in the West. In Utah some of the mines are working full six-day weeks for the first time in months though the average is still about 4½ days. Domestic call is steady and industrial demand is strong enough to firm up the price of slack a little. The quotations are \$1.25 for straight slack and \$1.75 for screened steam coal. In Colorado the market continues to rise slowly, so that there is only a little time lost nowadays because of "no market." Real winter weather spreads over the entire West.

With mines throughout the Southwestern district working full time as a result of continued cold weather and strong demand, the prices of Kansas nut and screenings were advanced 25c. Jan. 14.

Ohio Markets Show Improvement

With colder weather prevailing there has been a marked improvement in the demand for domestic coals in the Ohio markets. While buying is not as active at Columbus as in some former corresponding periods, orders from dealers are much better and distress coal has been cleaned up. The bulk of the demand is for the better grades of Kentucky and West Virginia coals although there is a good demand for Ohio mined coals. Retail quotations are stronger at some points and there is no inclination on the part of dealers to make concessions. There is more steadiness showing in demand for steam coals. While reserves are large there is a tendency to guard against a suspension and railroads are coming into the market for storage purposes. There is also good buying by the utilities, while iron and steel plants are buying a fair tonnage.

The Cincinnati market is feeling the effects of cold weather and there is a good demand for domestic coals. Quotations for these coals show an upward movement while the lower grades of slack and screenings have been softening. Reports at Cincinnati are that trouble is brewing in the New River district because of the attempt to cut wages. A cut in wages to the 1917 scale is reported from some parts of Kentucky. Dealers are calling for prompt shipments. The retail situation is slightly stronger. Advertised coals are quoted on a range of \$3 to \$4 for lump, \$2.50@3.25 for egg, and \$1.75@2.25 for mine-run.

The only noticeable change in the Cleveland market from last week is that prices on slack have eased off 5c. to 10c. per ton and demand from retail dealers is showing greater activity. Retail dealers have been busy since the first of the year and are replenishing their stocks. With transportation in good condition there is no anxiety among steam-coal users.

Weather conditions have so far failed to help the Pittsburgh market. There is a moderate demand for domestic coal from the mines, but nothing like the normal for the

first month of the year. Industrial operations have increased somewhat. In all business circles in Pittsburgh it is considered a foregone conclusion that there will be a suspension, the only question being its duration. Production in the Pittsburgh district has been running somewhat heavier since Jan. 1, but by no means more than enough to make up for the very light production during Christmas week. In the central Pennsylvania district car loadings amounted to 15,558 cars during the week ended Jan. 12, as compared with 12,878 cars in the previous week. During the same week there were 373 mines idle. The Buffalo trade is not hopeful.

New England Continues Dull

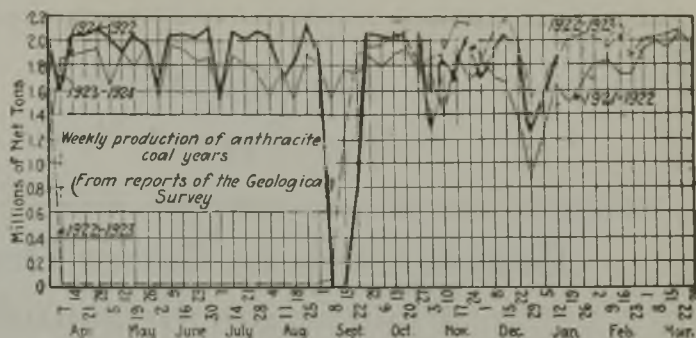
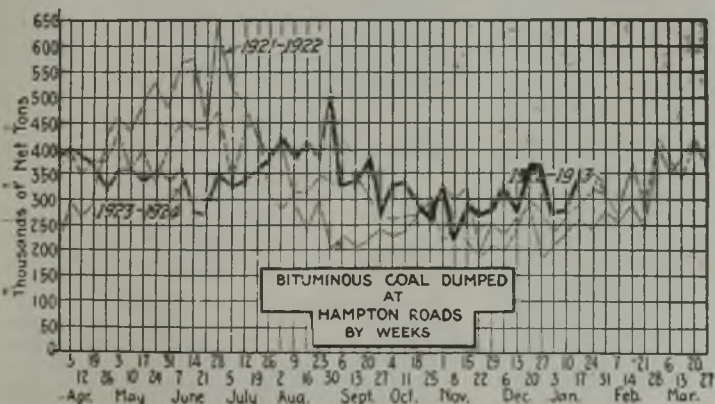
In New England the market for steam coals continues its December status. There is no appreciable change in prices, although tonnages available for shipment diminish steadily as mining is curtailed. The textile industry in general seems to be at low ebb, even though in certain special lines goods are being made in fair volume. Shoe manufacturers have much to contend with, the tire industry is dull, and in fact most industries in this territory have no prospect sufficiently good to warrant larger reserves of coal than are now carried. Among operators there is a feeling that the drastic restriction of output will gradually make itself felt, although the trade realizes it will take a reasonably long period under present conditions to make any substantial gain in prices.

At Hampton Roads there are several agencies with practically no coal at the piers, but even with minimum receipts at the piers there is no advance on No. 1 Navy standard coals as compared with a week ago. About the utmost figure that spot coal will command is \$4.75 per gross ton f.o.b. vessel, and at Boston for delivery inland there are no comprehensive sales at anything above \$6 on cars. The latter is an upset quotation and is realized only now and then as scattering inquiry develops.

For Pennsylvania coals buyers here are as scarce as hen's teeth. Selling agents are given no encouragement, and not even the lowest range of price is attractive. High volatiles of good repute have been offered at as low as \$1.50 per net ton at the mines, but transportation charges are all against them in this section. Steamers at low rates get practically all the cargoes that are dumped at any of the piers and while there is a surplus of this kind of tonnage it is unlikely that the fleets of barges owned by railroad companies will share the traffic to any considerable extent. A few seasonal arrangements doubtless are being renewed, as in the case of railroads, but probably only on a month-to-month basis, and a close canvass of the whole situation discloses no developments of any significance in the Northeastern section.

Increased Inquiries Along Seaboard

Some increase in inquiries was noted in the New York market and indications are brighter, but there has been practically no change in quotations. Buying is ordinary and there are no indications at either New York or Philadelphia that buyers are inclined to assume any different attitude. Consumers are not disposed to discuss any possible labor trouble. There is comparatively little contracting going on,



neither operators nor consumers showing any decided disposition to tie themselves up for any period. At Baltimore the trade's interest is principally centered in the export demand. January so far has been a disappointment to both shippers and producers. Demand has not increased and quotations continue at low figures.

Notices have been posted at some fifteen mines in the New River district in West Virginia that these mines will be shut down until such time as market conditions improve sufficiently to justify their reopening. Larger shipments have been made from the Pocahontas fields to the Western market because of the colder weather. There is a better demand for the prepared coals as well as mine-run. The market at Birmingham continues draggy and unsatisfactory. There is a slight demand for commercial coals in the spot trade, but the orders are small. The domestic situation looks somewhat better due to weather conditions, which have enabled retail dealers to reduce stocks materially.

Quiet Prevails in Anthracite Market

The anthracite trade remains quiet. Demand for egg and pea coals is not lively, while stove and chestnut are in good call in both New York and Philadelphia markets. Most retail dealers are fairly well stocked with all sizes and independent producers in some instances find it difficult to dispose of their coals at more than company prices. In some instances straight lots of stove and chestnut coals bring slight premiums over company price lists. Steam coals are in fair condition, with barley in best demand. Baltimore dealers are kept fairly busy but some dealers are advertising for business. Most dealers hesitate to put in too heavy supplies as they do not want to be caught with heavy stocks on hand should there be a reduction in mine prices this spring. Sufficient anthracite is being received by the Toronto trade to keep them busy.

Judge Says Kansas Mines Are Hard Put

Incidental to recent charges that retail coal prices in Kansas towns were too high, Judge John H. Crawford, of the Industrial Court, on Jan. 16 issued a statement of operating conditions in Kansas, based on a survey made in 1923 by the Industrial Court, a special representative of the Governor and an official of the U. S. Coal Commission, and on information which subsequently came to him. Southwestern operators say Judge Crawford's statement is a true picture of their predicament.

"Unless the cost of production can be lowered in Kansas, and a freight-rate adjustment be effected as favorable to Missouri River points as that granted Illinois, few Kansas and Oklahoma coal mines will be in operation in two years," he declared.

Lake head coal, seeking a market as winter closes its normal outlet, and that produced by non-union mines of southeastern Kentucky and West Virginia, force Illinois to seek a western market, Judge Crawford said. "With a preferential rate to Missouri River points, Franklin County (Ill.) lump coal is sold delivered in the two Kansas cities f.o.b. 50c. a ton less than Kansas coal. This condition has practically driven Kansas coal from Missouri River points.

"There was a time when the railroads took practically 80 per cent of the coal produced in the Pittsburg field. However, this is the day of fuel oil and electricity. The Santa Fe is using oil almost entirely."

Foreign Market And Export News

British Coals in Better Demand; Production Rebounds

Demand for British coals increased greatly during the last few days of the rail wage negotiations. Inquiries were more numerous both for domestic purposes and from the Continent. There has been considerable booking reported in anticipation of the miners' strike, as well as speeding up of deliveries previous to the railway men quitting their places on Jan. 19.

The South Wales markets show much improvement. Orders have increased, but prices show comparatively little change from the previous week. Demand for Newcastle coals is heavier.

The output of the British mines was 4,475,000 tons during the week ended Jan. 5 as compared with 3,383,000 tons the previous week and 5,886,000 tons during the week ended Dec. 22.

Tyne ports bunkering dues have been reduced to pre-war levels as of Jan. 1, making them the cheapest bunkering ports in Great Britain.

The Welsh coal market opened the new year slowly. Just before Christmas there was a rush of orders and the greater part of these have been filled. The output declined so that in many instances delivery was held over until it increased. It is expected that the miners' decision to end the wages agreement will embarrass the trade.

The German State Railways are negotiating for tonnages ranging to about 150,000 tons, contracts for 40,000 tons having been placed. The Norwegian State Railways are in the market for 40,000 tons of steam coal.

Demand at Hampton Roads Dull

Dullness again featured the market at Hampton Roads last week with lack of demand reported from all sides of the trade. The supply of coal on hand dwindled, but there was no scarcity because of the lack of orders.

Coastwise trade was slumping and bunkers held their own. Practically no new foreign business was being reported. Some coal moved overseas on

old contracts. Inquiries dropped off, and shippers continued to make little effort to get business at the present prices.

Conditions on the Virginian Ry. have about reached normal, though the supply of coal for movement to tidewater was reduced. The tone of the market was weak and the outlook not promising.

French Coal Production

Demand for the French industrial and domestic coals eased off early in the new year. The Nord and Pas-de-Calais collieries have increased their prices for the various grades of coal effective Jan. 1, according to the following schedule: Fat coals—raw smalls, 4 fr.; screened coals, 6 fr.; and 5 fr. on other screened coals. Dry coals—raw smalls, 7 fr.; washed peas, 8 fr.; other grades, 4 to 5 fr. Coke, metallurgical, 10 fr.; foundry, 5 fr.; and semi-bituminous and quarter-bituminous coals, 5 to 10 fr.

The high rates for British coals are preventing increased sales, but a decline is expected during January.

During November production of coal from French mines amounted to 3,432,000 tons as compared with 3,609,878 tons, while there were 182,974 tons of coke manufactured as against 190,223 tons in the previous month. Production in the Nord and Pas-de-Calais mines during November was 1,965,771 tons of coal and 129,222 tons of coke as compared with 2,024,097 tons of coal and 131,126 tons of coke in October.

Coal and Coke Exports From Baltimore

During 1923 1,459,482 tons of coal was dumped at Baltimore for shipment to foreign countries, as compared with 101,323 tons in the previous year and surpassing 1921 by 8,339 tons. Welsh coal to the amount of 14,620 tons was received at the port during the year while during the previous twelve months receipts were 113,184 tons. The export-

tation of coke from Baltimore during the year ended Dec. 31 amounted to 178,361 tons, while during the previous twelve months no coke was sent abroad. The four nations leading in the purchase of coke during the year were Belgium, France, Chile, and Germany, other shipments going to Cuba, Costa Rica, Italy, Porto Rico and Venezuela. Coal was sent to twenty-four countries, France leading with 463,584 tons of cargo coal, followed by Italy with 316,321 tons to her credit, and Germany third on the list, having received 196,358 tons. During the year twenty-one vessels left for Canada carrying 114,108 tons of coal.

Export Clearances, Week Ended Jan. 19, 1924

FROM HAMPTON ROADS

For Argentine:	'Tons
Ital. SS. Mincio, for Buenos Aires.....	5,871
For Algeria:	
Gk. SS. Andreas, for Algiers.....	7,950
For Brazil:	
Br. SS. W. I. Radcliffe, for Rio Janeiro.....	7,480
Pr. SS. Exmouth, for Rio Janeiro.....	5,305
For Cuba:	
Br. SS. Berwindmoor, for Havana.....	9,306
For Canada:	
Dan. SS. Bornholm, for Halifax.....	1,141
For Italy:	
Ital. SS. Hampton, for Porto Ferrajo.....	5,809
For West Indies:	
Nor. SS. Halse, for Curacao.....	3,138

FROM BALTIMORE

For Cuba:	
Br. SS. Berwindale.....	8,290

FROM PHILADELPHIA

For Cuba:	
Dan. SS. Stal, for Havana.....

Hampton Roads Pier Situation

N. & W. piers, Lamberts Pt.:	Jan. 10	Jan. 17
Cars on hand.....	1,274	1,038
Tons on hand.....	69,222	69,403
Tons dumped for week.....	124,464	171,740
Tonnage waiting.....	25,000	12,000
Virginian Ry. piers, Sewalls Pt.:		
Cars on hand.....	774	651
Tons on hand.....	52,300	42,050
Tons dumped for week.....	50,275	77,359
Tonnage waiting.....	6,472	3,018
C. & O. piers, Newport News:		
Cars on hand.....	1,000	1,031
Tons on hand.....	51,805	52,710
Tons dumped for week.....	73,933	76,100
Tonnage waiting.....	1,855	2,290

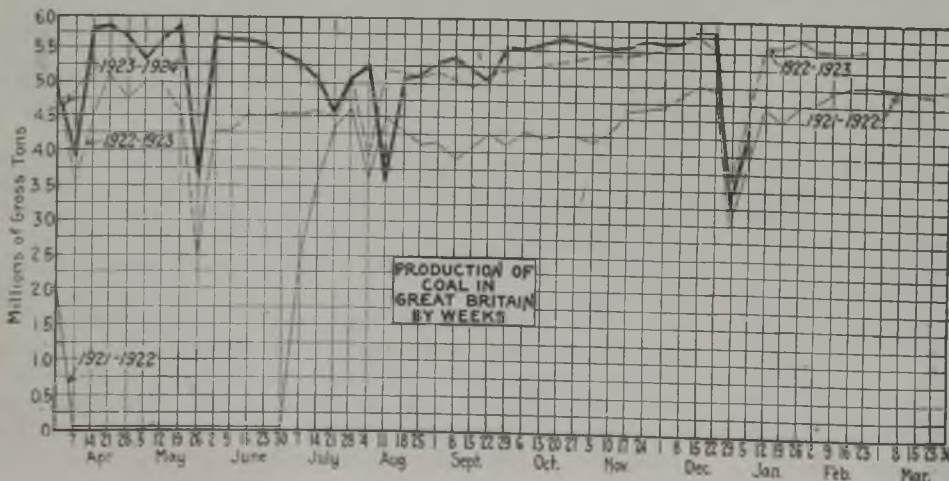
Pier and Bunker Prices, Gross Tons

	PIERS	
	Jan. 12	Jan. 19†
Pool 9, New York.....	\$5.00@5.25	\$5.00@5.25
Pool 10, New York.....	4.70@4.90	4.60@5.00
Pool 11, New York.....	4.60@4.70	4.50@4.70
Pool 9, Philadelphia.....	4.90@5.20	4.90@5.20
Pool 10, Philadelphia.....	4.50@4.90	4.50@4.90
Pool 11, Philadelphia.....	4.25@4.60	4.25@4.60
Pool 1, Hamp. Roads.....	4.90@5.00	4.75
Pools 5-6-7 Hamp. Rds.....	4.25@4.35	4.25@4.35
Pool 2, Hamp. Roads.....	4.75	4.50@4.65
	BUNKERS	
Pool 9, New York.....	5.30@5.55	5.30@5.55
Pool 10, New York.....	5.00@5.20	4.90@5.30
Pool 11, New York.....	4.90@5.00	4.80@5.00
Pool 9, Philadelphia.....	5.15@5.55	5.15@5.55
Pool 10, Philadelphia.....	4.90@5.20	4.90@5.20
Pool 11, Philadelphia.....	4.65@4.90	4.65@4.90
Pool 1, Hamp. Roads.....	4.90@5.00	4.75
Pool 2, Hamp. Roads.....	4.75	4.50@4.65

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

	Quotations, by Cable to Coal Age	
	Jan. 12	Jan. 19†
Admiralty, large.....	28s.@29s.	28s.@29s.
Steam smalls.....	20s.@21s.	22s.
Newcastle:		
Best steams.....	24s.@25s.	24s.6d.@25s.
Best gas.....	25s.	24s.6d.@25s.
Best bunkers.....	24s.6d.@25s.	25s.

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



Traffic News

Aver New England Rates Hamper West Virginia Fields

In connection with the hearings before the Interstate Commerce Commission on the petition to lower freight rates on bituminous coal to New England, the point was stressed by attorneys representing the West Virginia operators that if the Winding Gulf and New River fields were to get a rate on a basis similar to that for anthracite, coal production in those fields would be increased 15 to 20 per cent. It is asserted by representatives of the southern West Virginia operators that the rates to New England are unfair and prohibit competition with anthracite on an equal basis. It is pointed out by the southern West Virginia operators that the rates to Chicago or an equal distance west from West Virginia are in some instances one dollar per ton less than the rate for an equal distance to the East.

Joint Hard-Coal Rate Hearing On in Minneapolis

The first hearing in the opposition to withdrawing the joint rate on hard coal from Buffalo to the Twin Cities opened Jan. 17 in Minneapolis. The opposition is headed by the Twin City Coal Exchange, composed of independent dealers, who see in the move a step toward forcing them to buy from the docks and probably to pay more money for dock coal. County Attorney Olson, of Minneapolis, also is participating in the hearing. He has recently conducted an investigation of the coal situation which involved some phases of the dock trade and the independents. He threatens to institute prosecutions if there appears to be any ground for such action, and he has hinted that he believes there is ample ground.

New England Asks Lower Rates

Speakers representing New England urged the Interstate Commerce Commission on Jan. 14 to require railroads to make lower joint rates on coal from West Virginia to New England cities in order to give New England consumers a substitute for anthracite. Edward A. Goss, appearing for Governor Templeton of Connecticut, said the West Virginia coals of the low-volatile type were adequate substitutes for anthracite and with a reasonable rail rate would be taken in quantities throughout New England.

At Odds on Differential

Utah and Wyoming operators were in conflict before Examiner M. A. Paterson of the Interstate Commerce Com-

mission at Salt Lake City last week over the differential of 50c. allowed the Wyoming operators some time ago over their Utah competitors. The Utah companies declared the differential of 50c. was unjustified, and asked that it be reduced to 25c. Wyoming asks 90c. Attorneys for the Utah operators said fundamental conditions will always close Eastern markets to Utah coal but that the Wyoming fields are adjacent to the large Middle West market and can profit by it. It was contended that the 50c. differential favors Wyoming in competing for the Pacific Northwest market, a market naturally belonging to Utah. Briefs must be filed by Feb. 29.

12 Per Cent Gain on L. & N.

J. J. Elder, assistant to Wible L. Mapother, president of the Louisville & Nashville R.R., in a recent statement said that the road in 1923 carried 12 per cent more tonnage than in the preceding year.

Industrial Notes

Orders received by the General Electric Co., for the year ending Dec. 31, 1923, amounted to \$304,199,746, compared to a total of \$242,739,527 for the year 1922, or a gain of 25 per cent, according to a recent announcement by Gerard Swope, president of the company. For the fourth quarter of 1923 orders totalled \$74,452,442, as compared with a total of \$66,568,333 for the corresponding quarter in the year 1922, or a gain of 12 per cent. *Coal Age* estimates that during 1923 the coal industry expended \$74,610,000 for electrical machinery, equipment and supplies.

An important precedent in the granting of patents was established in the District of Columbia Court of Appeals recently when the Court ruled that inventions that have been developed to practical, workable condition should be given preference in the Patent Office over devices involving similar ideas but that have not been so perfected as to be ready for use. Joseph F. Joy, of the Joy Machine Co., Pittsburgh, obtained a patent on his loading machine in 1916, but E. C. Morgan alleged interference, and the Commissioner of Patents held that he was entitled to the patent on a prior claim, as he had applied for a patent on a similar machine in 1910. Witnesses testified, however, that the Joy machine is in practical use by a number of coal companies, whereas Mr. Morgan filed papers on the idea before it had been fully developed. In rendering a decision in favor of Mr. Joy the court said: "This court has commended the course of those who refuse to rush to the Patent Office before the merits of their inventions have been tested. Morgan filed as soon as he conceived the invention, while Joy waited until he was certain that he had a device that would satisfy the demands of the coal mining industry and advance the public interest. We think his course should be approved, and feel constrained to reverse the Commissioner of Patents."

The Automatic Mine Door Co. of Beckley, W. Va., has been organized with a capital of \$200,000, and the following officers have been elected: Dr. W. W. Hume, president; W. T. Ferguson, vice president; W. C. Canterbury, president; S. C. Ballengee, treasurer and manager. This company will manufacture and sell automatic mine doors and is erecting a factory building of frame and sheet iron at Beckley Junction. The new door was patented by W.

W. Ferguson and has been given a number of trials at the Amigo mine, in the Winding Gulf region. All machinery and door castings necessary to begin construction work have been ordered and will be ready for delivery as soon as the building is ready for occupancy.

Association Activities

The Monongahela Coal Association, composed of operators having mines along the Monongahela Ry. between Pittsburgh and Fairmont, held its annual meeting at Pittsburgh, Jan. 17, discussing members' problems confronting the industry in general and particularly those on the Monongahela River and transacted routine business. Officers were elected as follows: Samuel Purselglove, of Cleveland, president; R. M. Davis, vice-president, and J. B. Hanford, treasurer. On the board of directors elected in addition to the above officers are: E. F. Miller, George S. Connell, W. R. Mither, B. M. Chaplin, W. E. Watson, Samuel D. Brady, James H. McGrew, E. H. Gilbert, Whitney Warren, W. H. Soper and Stephen Arkwright. The directors at a meeting to be held later will select a secretary.

At the regular meeting of the Columbus Coal Exchange held Jan. 9 it was voted to change the weekly meetings from Wednesdays to Mondays in order to accommodate a larger proportion of the membership.

The Michigan-Ohio-Indiana Coal Association, of which B. F. Nigh is secretary and H. A. Bauknecht, of Muskegon, Mich., is president, has abandoned its usual mid-winter directors' meetings and there are no immediate meetings planned, according to the secretary. The time and place for the annual convention will be taken up by correspondence shortly after the winter season is over. According to Mr. Nigh the collection bureau has been unusually busy during the winter months and many thousands of dollars in claims against railroads have been collected for its members.

Obituary

David Hammond Parker, superintendent of the Clarkson Coal Co., died of heart failure at his home in Wheeling, W. Va., Jan. 16. He was 44 years old. A native of Carlisle, Pa., Mr. Clarkson began his mining experience as a civil engineer. He was for a time connected with the Pittsburgh-Buffalo Coal Co. and also with the Hilton Coal & Coke Co. His wife and two children survive him.

W. W. Harmon, aged 62, a widely known coal man of southern West Virginia and southwest Virginia, died at Tazewell, Va., Jan. 15, after an illness lasting only a few hours. In addition to being extensively interested in coal lands and in active mining properties in southwest Virginia and in southern West Virginia he also was a director of the Bank of Clinch Valley and of the Bluefield National Bank and was extensively interested in stock raising. His wife and two sons, C. Henry Harmon and Sayers Harmon, survive.

William M. Brinker, of Wilkinsburg, Pa., formerly a well-known coal operator, died in St. Petersburg, Fla., Jan. 15, at the age of 80 years.

William T. Grier, former New Jersey State Fuel Administrator and one-time freight traffic manager for the Lehigh Valley Railroad Co., died Jan. 16. He lived at Plainfield, N. J.

Coming Meetings

Rocky Mountain Coal Mining Institute, Winter meeting, Feb. 13-15, Albany Hotel, Denver, Colo. Secretary, Benedict Shubart, 521 Boston Bldg., Denver, Colo.

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

American Institute of Mining and Metallurgical Engineers. Annual meeting Feb. 18-21, 29 West 39th Street, New York City. Secretary, F. F. Sharpless, 29 West 39th St., New York City.

Northern West Virginia Coal Operators Association. Annual meeting Feb. 12, Fairmont, W. Va. Secretary, J. O. Caldwell, Fairmont, W. Va.

News Items From Field and Trade

ALABAMA

Negotiations are said to be under way for the consolidation of the Alabama Company and the properties of the Bush interests, large producers of commercial coal and coke. The Alabama Company has extensive ore and coal properties, operating coal mines at Mary Lee, Jefferson County, and at Searles and Brookwood, Tuscaloosa County, with large batteries of coke ovens at the latter two points, and also operates several furnaces in the Gadsden district. The Bush and Hammond interests are owners of the Alabama By-Product Corporation, large producers of coke and by-products and have several active coal mines in Jefferson County, besides being pipe manufacturers. The Hammond-Byrd Iron Co. conducts a large sales agency in Birmingham for the distribution of pipe, coal, coke, iron and coke byproducts. The amalgamation, if it is brought about, probably will involve a capitalization of \$12,000,000 to \$15,000,000.

Warren, Knight & Davis, architects, have been designated to prepare plans and specifications for the Erskine Ramsay Engineering Hall, to be erected on the campus of the Alabama Polytechnic Institute, at Auburn. Mr. Ramsay, widely known mining engineer, coal operator and capitalist, contributed \$100,000 in initiating the movement to erect the hall, which is to cost about \$250,000 and is expected to be ready for occupancy for the fall term of 1924.

The Manchester Coal Co., of Manchester, Walker County, will construct about twenty new houses for its employees and also add a new steam shovel to its stripping equipment at an early date. The Jefferson seam of coal is being mined by the stripping process, two shovels now being in use, John M. Kilgore, of Jasper, and associates are developing the property.

CALIFORNIA

A group of Oakland men have opened a mine in the Mendocino field with the expectation of successfully selling domestic sizes in competition with every other coal that reaches the San Francisco district because their product will enjoy a \$4 advantage over the nearest other coal, and they expect it to produce coke for the southern California steel industry. A mine has been opened in Mendocino County on the new extension of the Northwestern Pacific R.R., which runs from San Francisco to Eureka.

ILLINOIS

The Kolb Coal Co. receivership has been lifted. On Jan. 12 the U. S. Circuit Court of Appeals at Chicago issued an order ousting Edwin J. Schubkegel, the receiver appointed nearly two months ago upon the petition of P. H. Sauter, of St. Louis, Mo., who alleged that as a stockholder he had not received his share of the company's earnings. The Kolb Coal Co. operates mines in St. Clair County.

Figures compiled by Scotts Coal Bureau will show that 50 per cent of the coal mined in Illinois in 1923 was mined at a loss, on account of the high overhead and wage scales and poor market conditions.

Joseph Hartley, of Du Quoin has been elected to fill the vacancy of William Hutton as member of the executive board of the United Mine Workers. Hutton is now acting as commissioner for the Illinois Coal Operators' Association.

Robert M. Medill, former director of the state Department of Mines and Minerals of Illinois, has been appointed as receiver for the Dodds Coal Co., at Carriers Mills. The company recently failed to pay its employees the regular semi-monthly payroll. The company is incorporated at \$90,000 and is said to owe \$50,000 in debts.

The Mitchell & Dillon Coal Co. of Chicago is celebrating its golden anniversary this year. In 1874 the concern was organized by Abe Mitchell at Burlington, Iowa. Shortly afterward the company moved to Chicago.

The mine at Braidwood has been idle for some time on account of being flooded, supposedly from seepage from a nearby stream where the workings are 65 ft. below the surface. The water came in during the night and drowned the mules. It is an old mine and pretty well worked out.

The Bartels Coal Co. of Carlinville, will be reopened. The mine is now being cleaned and rehabilitated, preparatory to hoisting coal. The mine is conducted on the co-operative plan and consumption is largely local.

A suit to foreclose a mortgage on the West Bethalto Coal Co.'s mine has been filed in the Circuit Court at Alton, because, it is alleged, of failure to pay interest on the mortgage. The mine is working steadily.

Work has been resumed at the St. Clair Coal Co. mine near Belleville, after a shut down which started Nov. 1 last. The "Radium" mine, also located near Belleville, which was flooded Dec. 6 when a hole was cut through into the workings of an abandoned mine nearby and in which several employees lost their lives, also has been reopened. Only a portion of the mine is being worked until the water can be pumped from all the working places.

Approximately half a million tons of coal will be stored in the next two months by the Missouri Pacific R.R. near Gorham, in Jackson County, on 100 acres of land leased for the purpose. This is being done in anticipation of a miners' strike in the spring. The coal probably will be shipped from mines on the company's line in Jackson or Williamson county.

Water has flooded the mine of the Lebanon Coal Co. at Lebanon. It is thought to have seeped in through quicksand. The mine was re-opened only a few weeks ago after being shut down for some time. It was taken over by a number of the miners employed and was operated as a co-operative company.

Two important mines reopened this month are No. 8 of the O'Gara Coal Co. at Eldorado, and No. 2 of the Wasson Coal Co. at Carrier Mills.

The Taylor Springs mine of the Indiana and Illinois Coal Corporation, which has been idle two months, has recently been inspected by Hillsboro and outside capital with a view of buying it.

KENTUCKY

James D. Rash, of the St. Bernard Mining Co. interests, Madisonville, Ky., as State Senator from that district, has been appointed on the Senate Rules Committee.

W. F. Bradshaw, coal operator of Paducah, interested in mines in western Kentucky, as well as being a banker, insurance agent and capitalist, has just been elected president of the First National Bank of that city.

The Kentucky Legislature has spent ten days in argument relative to committees, etc., and in getting ready for its session, but so far hasn't passed any bills, or really gotten down to business. This further indicates that a legislative meeting every four years, instead of every two years, as is demanded by some interests, would be an improvement over the present two-year plan. A good many bills opposing the coal industry are to be introduced, chief of which will be the coal-tonnage tax bill.

Heavy rains, followed by a mud slide caused a heavy slide of rock on the Stony Fork branch of the Louisville & Nashville R.R., near Middlesboro, on Jan. 15, one rock being reported so large that dynamite had to be used in breaking it up. The slide blocked the line and put the Crystal and lower Hignite mines out of commission temporarily.

Dan D. Walker, Jeffersonville, has been appointed manager of the St. Bernard Mining Co. for Louisville, New Albany and Jeffersonville. He succeeds William B. Gathright, who has retired after eighteen years with the company.

The Anchor Dean Coal Co., of Barbourville, capital \$10,000, has been chartered

by W. R. Lay, P. W. Golden and A. M. Decker, as an operating company.

With the December tonnage estimated production of coal in the Big Sandy field of Kentucky amounted to 7,125,490 tons in 1923, according to the Northeast Coal Association. In 1922 it was 6,133,077 tons.

George Marting, of the Logan Pocahontas Coal Co.; J. T. Bradley, of Jewett, Bigelow & Brooks, and R. R. Atkins, of the Liberty Coal & Coke Co., of Hazard, met with John P. White, former president of the United Mine Workers, and two others at the Hotel Gibson, Cincinnati, on Jan. 12-14 in the hope of finding a solution to a wage agreement that will have to be fixed for the men working in the territory of the Kentucky-Tennessee Coal Operators' Association. This association was formed following or during the strike of 1922 and the agreement expired. Those above were appointed arbitrators and their sessions were kept secret. It appears, however, that no point of contact was reached and it was decided to adjourn to meet on Feb. 4 at the same place in the hope that progress at the annual meeting of the Mine Workers at Indianapolis would open the way to a solution.

R. H. Davis, treasurer of the United Collieries Co., of Ashland, has announced the purchase of Barney Nos. 1 and 2 mines on Beaver Creek, in eastern Kentucky.

NEW YORK

Rights to subscribe to the stock of the Lehigh Valley Coal Co. are expected to be listed on the New York Curb Market soon according to a statement made Jan. 17. The stockholders of the railroad company were offered rights to subscribe to the coal company stock on the basis of share for share of railroad stock held by them, plus a charge of \$1 for each share of coal company stock.

J. G. Allsach, Jr., recently was appointed sales manager in New York and New England for Camp, Osgood, Sleppey, Inc., of Scranton, Pa.

NEW MEXICO

The Phelps Dodge Corp. has embarked upon a thorough campaign of safety and first-aid training at its Stag Canon branch in Dawson. A class for miners is now organized which is expected to grow to a membership of 1,000. Also about 250 women in the coal communities and nearly 100 children are to have first-aid training.

OHIO

That Governor Donahey's appeal to the people of Ohio to burn Ohio-mined coal is bearing fruit is shown by conditions in the Hocking coal fields the past two weeks. In the Corning-Athens field, comprising about 50 mines, the output for the week ending Jan. 12 was 352,188 tons, as compared with 58,226 tons for the same period in December. There are about 1,200 fewer idle miners in this field than on Dec. 1. Storing of coal by railroads and factories in anticipation of a strike in April is said to be helping the situation.

The Blanchard-Zanesville Mining Co., a Pittsburgh concern, has made application to the United States Government for permission to construct a coal tippie, ice breakers, pile clusters and dredges in the Muskingum River at Ellis, 10 miles north of Zanesville, for the purpose of mining coal on a large scale for the Ohio Power Co.'s \$15,000,000 plant at Philo. The coal will be transported in a fleet of barges if permission is granted to the company.

Applications for permission to increase their capital stock have been filed with the Secretary of State by the Oakley Coal & Supply Co., of Oakley, from \$100,000 to \$145,000; the Ohio Coal & Supply Co., of Cleveland, from \$10,000 to \$200,000; and the Hocking Valley Coal & Oil Co. of Bellefontaine from 20 to 2,000 shares of stock, no par value designated.

The office of the Puritan-Tuttle Coal Co. has been succeeded by the Tuttle Coal Corporation in the Dixie Terminal Building, Cincinnati, a divorcee of the Tuttle from the Puritan interests having taken place. The Pocahontas-Kanawha Coal Co.'s office in the Dixie Terminal has been closed, the company's business being done through its Dayton office. The Kentucky & Virginia Coal Co. has opened for business in the First National Bank Building. The Fayette Smokeless Coal Co. of Mt. Hope, W. Va., has opened a selling office under the direction of Mr. Kirley in the Dixie Terminal Building.

PENNSYLVANIA

Charles D. Wells, of Scranton, has been appointed receiver for the Buck Ridge Coal Co., operating an independent mine at Shamokin, which suspended Dec. 30 after failing to pay employees wages due them for the first two weeks of December. It is reported that \$70,000 in wages remain unpaid. The company is composed of New York men.

Suit for \$300,000 has been filed in Common Pleas Court by the Pittsburgh & West Virginia Ry., against John A. Bell, banker and coal-land owner, in connection with the building of a branch line from the main track of the plaintiff company to property, owned by the defendant in the Cross Creek district, Brooke County, West Virginia, and Jefferson township, Washington County, Pennsylvania. The railroad alleges that after it had built a spur track at the request of Bell the defendant failed to open mines as he agreed to do, thereby occasioning a loss in the amount sued for.

John Markle was re-elected president and A. B. Jessup was named vice-president at the annual meeting of the Jeddo-Highland Coal Co., held at Jeddo. There were no changes in the personnel of the board of directors. The company in 1923 produced more than 1,000,000 tons of coal. This is about the average and the corporation stands at the head of the independent operators in production. Gradual extension of the policy of electrification of the Jeddo-Highland Coal Co. mines is to be pushed until the whole chain of mines is eventually electrified.

George F. Osler has resigned his position as general superintendent of the Carnegie Coal Co., of Pittsburgh, and accepted the position of vice-president, in charge of operations, with the Pittsburgh Terminal Coal Co., with headquarters in the Wabash Building, Pittsburgh, to succeed M. D. Kirk, transferred.

Employees of Lehigh Coal & Navigation Co. and subsidiary companies have an opportunity to purchase stock of this concern. They can subscribe for stock at the rate of \$65 a share and the maximum number purchased is to be determined by the salary received by the individual. Subscriptions end Feb. 1, when allotments will be made.

Edward V. D'Inwilliers, geologist and mining engineer, formerly located at 518 Walnut Street, Philadelphia, has formed a partnership with Walter Gilman and J. B. Dilworth under the name of Edward V. D'Inwilliers Engineering Co., with offices at 121 North Broad Street.

The Hillman Coal & Coke Co. of Pittsburgh, has begun cleaning up the Orient mine recently purchased at sheriff's sale, and is preparing it for operating. This company on Jan. 1, closed down its Patterson mine, near Elizabeth, for an indefinite period due to the dull condition of the coal market.

Arthur N. Young, of South Brownsville, inspector for the Hillman Coal & Coke Co., was on Jan. 1 appointed superintendent of that company's recently acquired Orient plant, with headquarters at Orient, Fayette County.

John Lepitsky was recently fined \$10 and costs for taking matches and cigarettes into the Francis mine of the Ford Collieries Co., Curtsville. This is the first prosecution brought in this locality in many years under the Mine Protective Act of 1911, which makes such an offense a misdemeanor.

William C. Hood, of Uniontown, assistant general superintendent of the H. C. Frick Coke Co., has been elected to the board of directors of the Merchants and Miners Bank of Uniontown.

An indication that business is picking up in the Connellsville coke region is seen in the firing of 600 additional beehive coke ovens by the H. C. Frick Coke Co. last week. The Oliver & Snyder Steel Co., which had been operating only about 40 per cent of its ovens, is now operating all of them. The Hillman Coal & Coke Co. has resumed operations at the Warwick mine, on the Monongahela River near Masontown, and is cleaning up the Orient mine, recently acquired at Sheriff's sale preparatory to operating it. The Pittsburgh & Erie Coal Co.'s Braznell mine, which has been operating only two days a week for some time, resumed full operation last week. The Poland Coal Co. also recently resumed operations.

A State charter has been issued to the Sullivan Flynn Coal Mining Co., of Wilkes-Barre. The company has a capital stock of \$200,000 and Eugene Sullivan, 1016 Plane Street, Avoca, is treasurer. The incorporators are Eugene Sullivan, Edward M. Flynn, Avoca, and Margaret Flynn, Avoca.

Other companies incorporated were the Campbell Coal Co., Ellwood, \$25,000; Oscar J. Zimmerman, Coraopolis, treasurer, who with Lester A. Campbell, Ellwood City, and Lola M. Zimmerman, Coraopolis, incorporated the company; Clyde E. Speer Coal Co., Inc., Pittsburgh, \$25,000; incorporators, Clyde E. Speer, 706 Hastings Street, Pittsburgh, treasurer; Lee H. Funckem, Pittsburgh, and Joseph A. Richardson, Pittsburgh.

Ten steel smokestacks 90 ft. high, over the steam-generating plant of the Prospect colliery, of the Lehigh Valley Coal Co. near Wilkes-Barre, were blown down by heavy winds on Jan. 16. Two men were injured. When the stacks fell the main steam lines supplying pump stations, fans and engine house with power snapped off. Steam locomotives used about the yards of the colliery were placed in position and furnished sufficient steam to start the fans after several hours' delay. With the fans shut down all men in the mines were notified to come to the surface. Colliery officials balanced the powerless cages with a coal car and scrap, raising one loaded with men and lowering the other loaded with ballast. This operation was repeated, the men at the bottom unloading the ballast from the down cage and getting on it themselves while those at the surface loaded the other cage with ballast of sufficient weight to lift the down cage. Men in the workings were hoisted to the surface in this manner.

A letter sent out by A. T. Dice, president of the Reading Company, and W. J. Richards, president of the Philadelphia & Reading Coal & Iron Co., notifies holders of the general mortgage 4 per cent gold bonds issued under the general mortgage of Jan. 5, 1897, that they have the right to surrender their bonds and receive in exchange \$666.66½ principal amount of general and refunding mortgage 4½ per cent gold bonds, series A (or scrip certificates, as hereinafter provided), of the Reading Company issued under the mortgage and deed of trust dated Jan. 2, 1924, made by the Reading Co. to the Central Union Trust Co. of New York, trustee, and \$333.33½ principal amount of refunding mortgage 5 per cent sinking fund gold bonds (or scrip certificates, as hereinafter provided) of the Philadelphia & Reading Coal & Iron Co. issued under the mortgage and deed of trust dated Jan. 2, 1924, made by the Philadelphia & Reading Coal & Iron Co. to the Central Union Trust Co. of New York, trustee, for each \$1,000 principal amount of general mortgage bonds so surrendered.

VIRGINIA

The New England Fuel & Transportation Co. has taken over the nine steamers formerly operated by Crowell & Thurlow, and will put them exclusively in the Hampton Roads-New England coal trade for the New England Coal & Coke Co. It is one of the largest single fleets of ships now in the coastwise trade.

WASHINGTON

The Roslyn mining field went through the year 1923 without a fatal accident, John E. Morgan, an operator, recently reported.

"Snowbirds" in the Seattle region are offering more serious competition than ever before. No less than twenty-eight in Seattle alone have formed an association and claim to be buying Utah and British Columbia coal in steady volume. They have undercut the market about \$1.50. F. H. Benton, of the Consumers Fuel Co., is one of the organizers of the group.

WEST VIRGINIA

It has been announced by C. F. Keeney, president of District 17, United Mine Workers, that R. M. Williams, of Morgantown, an insurgent leader in the United Mine Workers, was elected vice-president of the district over William Petry, the present incumbent, and Nick Aeillo, in the special election held in December. Petry was elected vice-president at the regular election held in December, 1922, but soon after Williams made the claim that he had been debarred as a candidate when his name was removed from the ballot by the district board. He started a movement for a special election.

The Wyatt Coal Co. recently won a suit in the U. S. District Court for the Southern District of West Virginia, in which it was a defendant. The suit was brought by the Detroit Edison Co., which asked damages

for alleged non-delivery of coal on contracts for 1916 and 1917. The verdict in the case was returned at the instance of the court.

Preparations are well under way for the opening of a new mine at Chapmansville by the Dwyer Coal Co. The company has obtained a lease on 500 acres of coal land in Logan County. Two openings have been driven and in driving a third opening the company will operate in the Alma seam, having a vein 5 ft. thick. Work has progressed to a point where it has been possible to lay the tracks 300 ft. within the mine as well as to the base of the hill where the tippie is to be located. That structure will be equipped with shaker screens and other equipment for the preparation of coal. It will be necessary to lay only about 100 ft. of rails to reach the mine from the Chesapeake & Ohio and it is proposed to put in a two-end siding with three tracks. In addition to a club house and other plant structures, the company is preparing to build a number of five-room houses for miners, with hot and cold water and provided with other conveniences. The company has made provision for an adequate water supply by building a concrete reservoir on the side of the hill and also has installed a sewage system. This corporation is capitalized at \$100,000. The president of the company is John G. Dwyer and J. W. Dwyer is secretary and treasurer. The Dwyer brothers were among the early operators in the Greenbrier field and have also operated mines in the Kanawha and New River fields.

Ejection of nineteen miners occupying dwellings belonging to the Francois Coal Co. in the Harrison County field is sought, the company desiring to gain possession of its houses in order that miners who will work in an open shop or non-union mine may be employed. Change in the labor status of the mine, it is indicated in the proceedings, follows the leasing of the company's mine at Norwood, to the Turkey Run Coal Co. After hearing the testimony, Magistrate Kidd took the case under advisement and will announce his decision later.

The Bonafide Coal Co. will operate in the vicinity of Tunnelton, in the Preston County field, having just been organized with a capital stock of \$125,000. Among those interested in the new concern are Guy M. and Alberlee C. Bonafide, John F. and Lola F. McKone and C. M. Eliason.

CANADA

The Vancouver City (B. C.) Harbor Commissioners have announced that coal bunkers are to be constructed at the Port of Vancouver at a cost of about \$500,000. They are designed to handle shipments from the interior of the province as well as from the Province of Alberta and the Vancouver Island field. It is recognized that to be a great grain export center and shipping port Vancouver must have fueling accommodations for ships making long voyages. It also is thought that United States Pacific ports will be in the market for higher grade steam coals.

Coal operators of British Columbia are meeting with competition in the domestic market from the products of the coal fields adjacent to the City of Bellingham, Wash. This has been classified as lignite, or lignite dust, by the customs officials and so is being admitted to Canada free of duty.

It would appear as if the problem on carbonizing Saskatchewan lignite is being solved. The new Hood-Odell oven erected at the lignite utilization plant at Bienfait, Sask., is turning out char in large quantities and complete success has been attained in briquetting it at the briquetting plant at Hebron, North Dakota, where two carloads of briquets have been manufactured. One carload was distributed to householders in Regina. Exhaustive tests will be carried out at Ottawa under government auspices.

The Dominion Coal Co., Ltd. has declared a dividend at the rate of 1½ per cent upon the preferred stock of the company, payable Feb. 1, to shareholders of record on Jan. 12.

J. E. McLurg, has been appointed vice president of the British Empire Steel Corporation, and will reside in Sydney. Mr. McLurg, who has been general manager of the Halifax Shipyards Co., a subsidiary of the British Empire Steel Corporation, succeeds D. H. McDougall. Since the retirement of Mr. McDougall, H. J. McCann, former assistant general manager of the company, has been in charge of coal-mining operations. Mr. McCann has been in ill health for some years.

New Equipment

Bulldog Trolley Clamp

The outstanding feature of the Ohio Brass Co. new bulldog trolley clamp is the automatic operation of the jaws in opening when the nut is turned to the left. Ordinarily one thinks of clamping the jaws to the wire only with the nut, leaving the problem of preparing the jaws for taking the wire to the man who makes the installation. Anyone who has tried the combination of lifting the trolley wire into place, manipulating the wrench and at the same time trying to hold the clamp jaw apart will readily see the importance of this new feature. The nut can be set to open and hold the jaws ready for receiving the particular size wire to be used.

The design is simple, consisting of only five parts, nut, stud, two jaws and a high-strength steel hinge pin. The assembly provides for great holding power, and offers a pleasing appearance. One size of the clamp will take care of all the usual figure 8 and



TROLLEY CLAMP EASY TO INSTALL.

The nut on the top holds the jaws open, thus enabling the workman to place the wire in the clamp with ease.

grooved wire sizes without changing the jaws. Another size with different shaped jaws takes all ordinary sizes of round wire.

Waugh Comparascope

The Waugh Comparascope, manufactured by the Denver Rock Drill Manufacturing Co., of Denver, Colo., was designed to simplify the process of forging and heat-treating drill steel so as to obtain the highest efficiency in drilling and to insure durability of the drill steel. By the use of this instrument it is possible for the blacksmith to heat-treat his drill steel easily with speed and precision.

Steels when heated to various temperatures have certain definite colors corresponding to the hardening temperatures. Therefore heat-treating is very much a matter of color comparison. The varying shades which the steel

takes when heated are almost imperceptible, so the comparascope has been developed to enable the blacksmith to match the color shown by the comparascope with the color of the steel that he is heating.

The Comparascope is connected to an



INSTRUMENT FOR ASSISTING THE WORK OF TEMPERING STEEL

By comparing the color of the heated steel with the color indicated by this device—for that particular grade of steel—it is possible to heat-treat the material to the desired degree of hardness.

electric-light cord and the current heats a small coil of high-resistance wire, visible through a lens in the center of the apparatus, to any desired temperature color, the blacksmith comparing his steel when heated. The coil has a fixed resistance and is connected in series with a variable resistance, which in turn is connected with various plug connections on the front of the unit.

To further aid in the process of hardening steel, a high-grade permanent magnet is suspended at the center of the instrument immediately below the radiating coil. This magnetic indicator shows the magnetic condition of the steel, which is another indication of the hardness to which the steel will temper.

When the carbon content of drill steel is known, forging and hardening temperatures are quickly and easily determinable. By plugging into the socket having a carbon content corresponding to the material being worked, as indicated on the directions plate, the Comparascope shows the proper color to which the steel should be heated. The magnet is very useful when the carbon content of the steel is not known. If the magnet is attracted to the steel, the change point—that is, the hardening temperature—has not

been reached. By first heating the material to a low red heat and increasing its temperature and testing with a magnet, the temperature of the steel may be raised until the test shows no attraction of the magnet.

Light-Weight Electric Valve Grinder

The new No. 1 slow-speed Black & Decker electric valve grinder is similar in all respects to the valve grinder previously produced by this company except that it embodies many refinements. It weighs only 6 lb. and is arranged with a double gear reduction to give what has been ascertained by experiment to be the most efficient grinding speed.

It is equipped with the most improved designed pistol grip and trigger switch and particular attention has been given to the elimination of vibration, so that it can be used with the greatest of ease and comfort by the mechanic.

The manufacturers are now making tools for this machine, and will be able to make deliveries in large quantities within a very few weeks. The Black & Decker Manufacturing Co., of Towson Heights, Baltimore, Md., makers of the grinder, give the following example to show the value of this tool to the automotive maintenance man from a dollars and cents standpoint:

"If an eight-cylinder car requires one man's labor for five hours to perform the actual valve grinding operation and he charges his customer \$1.25 per hour he will have to charge \$6.25 for the grinding work. As the new valve grinder performs the work more than four times as fast as it can be done by hand, the same man can grind the valves on at least four eight-cylinder motors in the same length of time, five hours."



ELECTRIC VALVE GRINDER

Increasing the work per man per day, resulting in more productive effort is real labor saving. This equipment sells its own value.