COAL AGE

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DEVOTED TO THE OPERATING, TECHNICAL, AND BUSINESS PROBLEMS OF THE COAL MINING INDUSTRY

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Spotlighting the Sherman Law

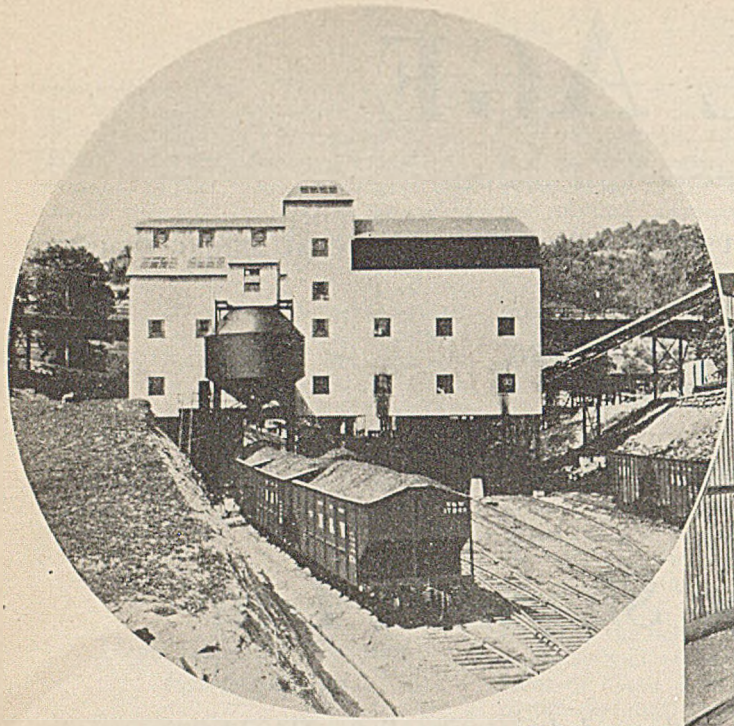
CONGRESSIONAL INQUIRY into the effect of the workings of anti-trust laws in the natural-resource industries is specifically recommended by President Hoover in his message to the national legislature on Dec. 2. As was the case in his Boston speech two months ago, the social consequences of destructive competition in bituminous coal furnish the text upon which the conclusion that a study to determine whether "these evils can be remedied without sacrifice of the fundamental purpose of these laws" is based.

BITUMINOUS COAL ought to welcome such an inquiry. For many years leaders in the industry have insisted that the rigid restrictions of the Sherman law are a stumbling block to any real approach to stabilization. For the most part, however, they have failed to press that complaint before the one body in a position to grant relief: the Congress of the United States.

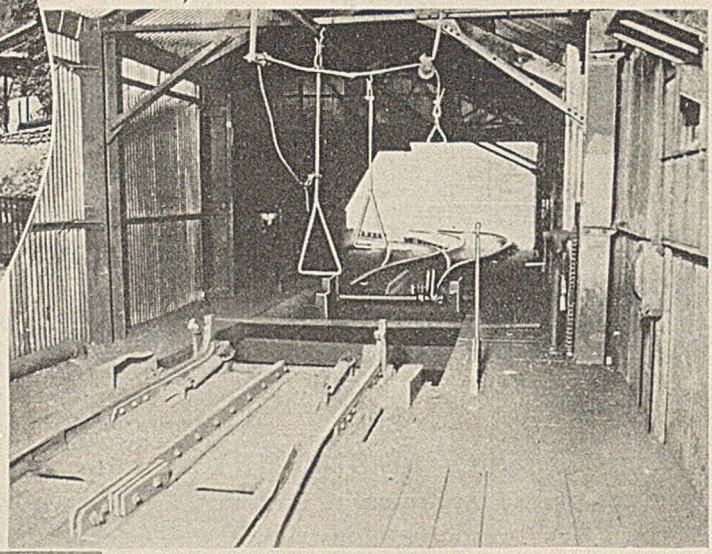
SUCH AN INQUIRY might reasonably be expected to develop definitely three facts of great moment to the coal trade: (1) The extent to which present statutes actually do prevent constructive co-operation within the industry; (2) what modifications are necessary to afford relief; and (3) the price demanded for such relief. Would Congress be willing to relax the restrictive provisions of the Sherman law without making that relaxation contingent upon the acceptance of some degree and some form of government regulation or supervision?

THIS LAST CONSIDERATION is crucial. If relief proposed as the result of the suggested inquiry should contemplate a change from the judicial scrutiny invocable under the present law to continuing administrative supervision by some federal agency, the industry might well debate the wisdom both in principle and practice of relief on those terms. Exchange of one restriction for another is not freedom. Relief granted might be more oppressive than the oppression of existing laws.

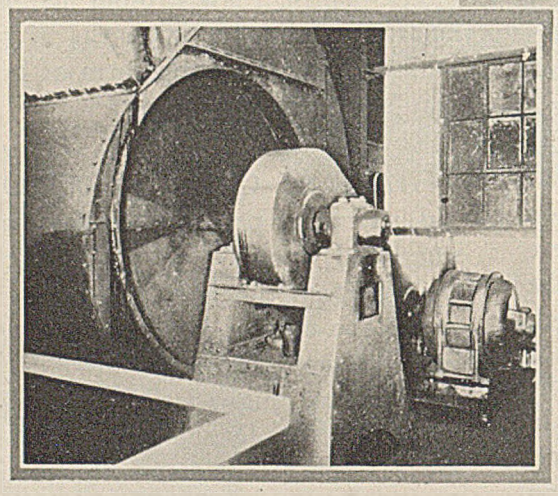
A CONGRESSIONAL INQUIRY would lift discussion of the problem out of the academic and should give an authoritative answer to these questions so vital to the future of the industry. With the legislative viewpoint clearly defined, industry would know whether it might safely look to Washington for relief or should direct its thinking into other channels.



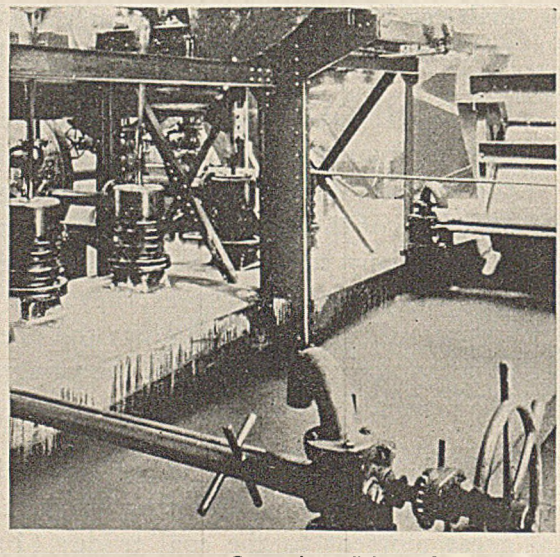
Air Cleaning Side of the Plant and Round Steel Pea-Coal Loading Bin



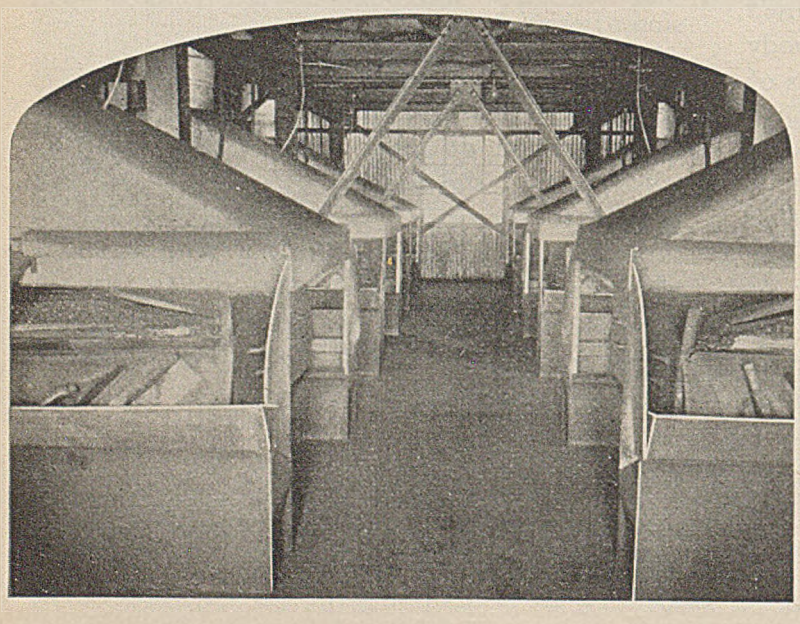
A Dump at Each End of the Hopper Solved the Problem of Two Track Gages



This Silent Chain Connection From Motor to Dust Exhaust Fan Is Typical of All Drives in the Plant



Operative's View of Wash Box in Action; Three of the Five Air Valves Show at Center Left



Six Pneumatic Tables, All Working on ½ In. to 0 Feed

COMBINATION PLANT

+ Concentrates Preparation

For Three Mines

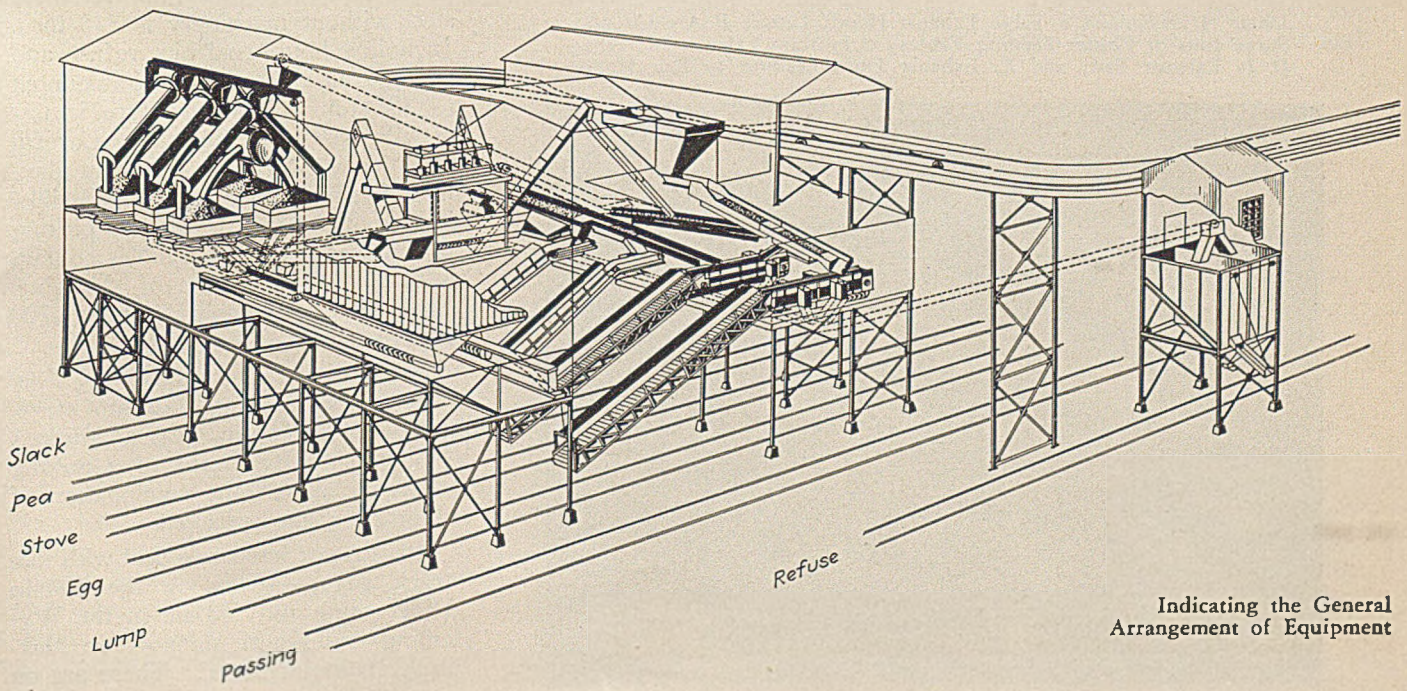
By H. C. FAUST

Vice-President and General Manager
United Pocahontas Coal Co.
Crumpler, W. Va.

BOTH wet and dry methods of coal cleaning were incorporated in the combination plant completed last summer by the United Pocahontas Coal Co. at Crumpler, McDowell County, West Virginia, to improve its "Indian Ridge Pocahontas Coal." This plant, including tipple and sizing equipment, concentrated the preparation and loading from three mines, rendering obsolete two plants, one of which was elaborate and modern in regard to sizing. Years of experience in shipping washed coal, as a sized product for domestic use and as washed mine-run, and close observation of pneumatic plants operating in the Pocahontas field furnished solid background for the selection of equipment to suit local conditions. Sizes above 4 in. are hand-picked, the 4 to ½-in. is cleaned in a Link-Belt Simon-Carves washer, and the ½ in. to 0 on American pneumatic tables. There is no presizing for either type of mechanical cleaning.

The three mines are in Pocahontas No. 3 seam areas that adjoin or are separated only by narrow valleys. Wyoming and Zenith mines were served by a tipple and jig washer located at Crumpler, and the Indian Ridge mine by a jig plant located on a different spur of the Norfolk & Western Ry. and only 2½ miles distant as measured on a beeline. In 1929 the three mines shipped 482,254 tons, this total made up of 237,755 tons from the Indian Ridge plant, at Worth, and 244,499 tons from the Zenith plant, at Crumpler. The latter included 92,470 tons from the Wyoming mine.

To bring out the underlying reasons for considering the construction of a new plant it is necessary to review briefly the mechanical cleaning and preparation experience of the company. In 1910 the Zenith plant, containing a jig washer and a picking table of sorts, was built. It was designed to load 4-in. lump coal over the picking table and the minus 4-in. coal was washed and after dewatering was screened to 2x4-in. egg, 1x2-in. nut, and minus 1-in. slack. These washed sizes were loaded into railroad cars from a large three-compartment concrete bin without any effort to remove the fines resulting from degradation through the bins. Naturally, this method of handling such



Indicating the General Arrangement of Equipment

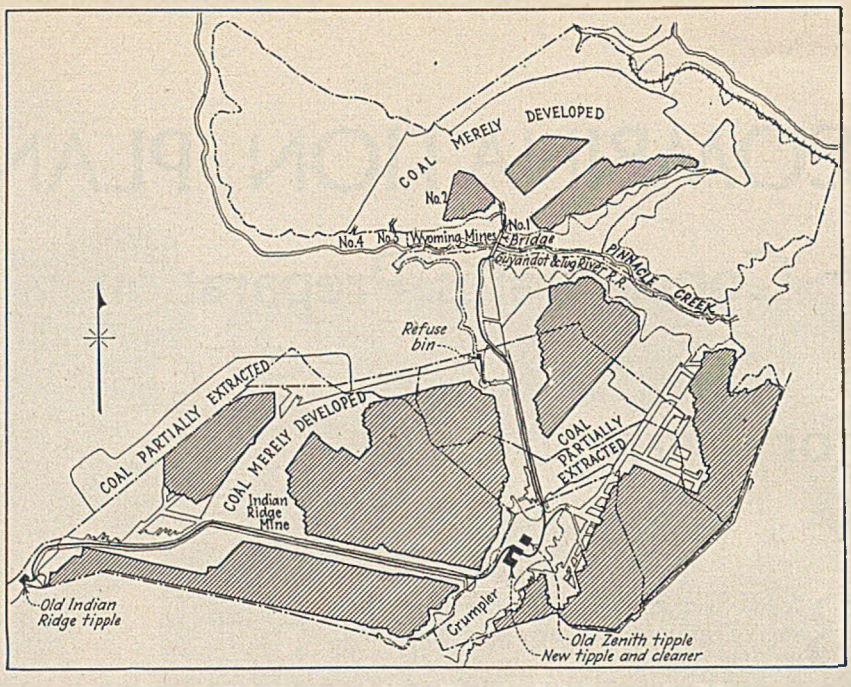
a soft coal resulted in considerable fines in the two domestic grades so loaded. Incidentally this plant was said to be the first washer in the smokeless fields of southern West Virginia.

Jigs of a different type were installed in 1912, and until 1916 part of the shipments consisted of domestic sizes as given above. After 1916 no attempt was made to load sized coal, because of the inability to remove the undersize from the domestic grades. From that time until July, 1930, this plant shipped entirely washed mine-run, which coal, while on the Navy standard list, was difficult to sell in inland markets.

The Indian Ridge plant was built in 1915, and in 1925 the Indian Ridge tipple, which contained jigs of modern type, was rebuilt to ship properly sized and prepared domestic coals. Four years of comparison with shipments from the washed mine-run plant at Crumpler showed an attractively greater realization from Indian Ridge, indicating that the obsolete Zenith washer must be replaced by a plant equipped to size and load the product properly, since it was practically impossible to rebuild the existing plant to obtain the desired results.

Difficulty in finding a market for wet slack, especially during cold weather, was an important factor leading to a decision to install a dry-cleaning plant to clean the slack. The same reasoning dictated that a dry-cleaning plant for slack cleaning was as necessary for the Indian Ridge plant. Faced with the need for modern domestic preparation to replace the obsolete Zenith plant, plus the need for a dry preparation of the slack at both plants, the idea of a central plant began to take shape. Track grade in favor of coal movement to the Indian Ridge plant at first indicated this plant site as the proper location of a central plant. The difference in the track gage and the lack of capacity in the Indian Ridge tipple plus the lack of room for railroad tracks finally caused an abandonment of this plan, and the only other location available with railroad connections was at Crumpler.

The estimated cost of one centrally located plant was less than the cost of a complete plant for the Zenith operation plus the cost of a dry-cleaning addition to the Indian Ridge plant. Besides these factors, one central plant would include more modern and probably superior wet washing equipment for the ½- to 4-in. range of sizes, would simplify and centralize supervision of the equipment and operation, and reduce preparation labor cost per ton. Specifically, this cost has been reduced 20 per cent since the two old plants have been displaced by one.



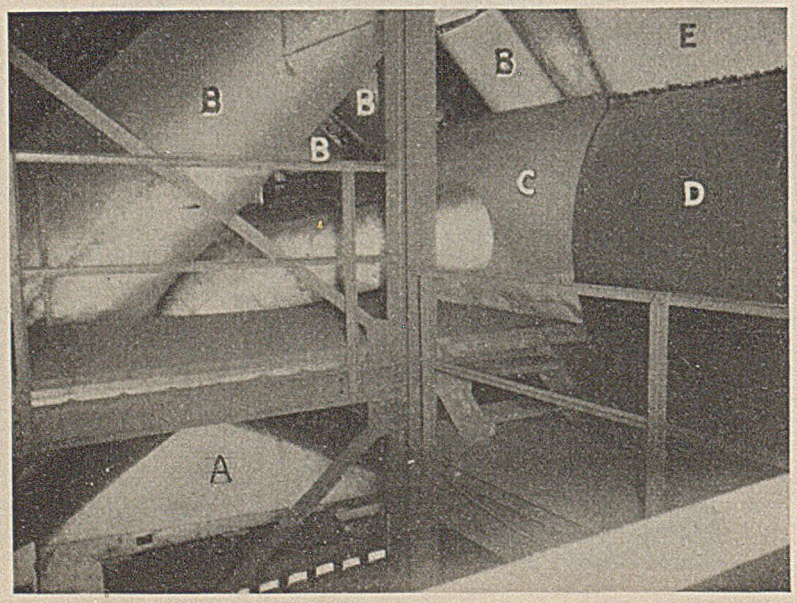
Location of Old Plants and New Plant in Relation to the Mines

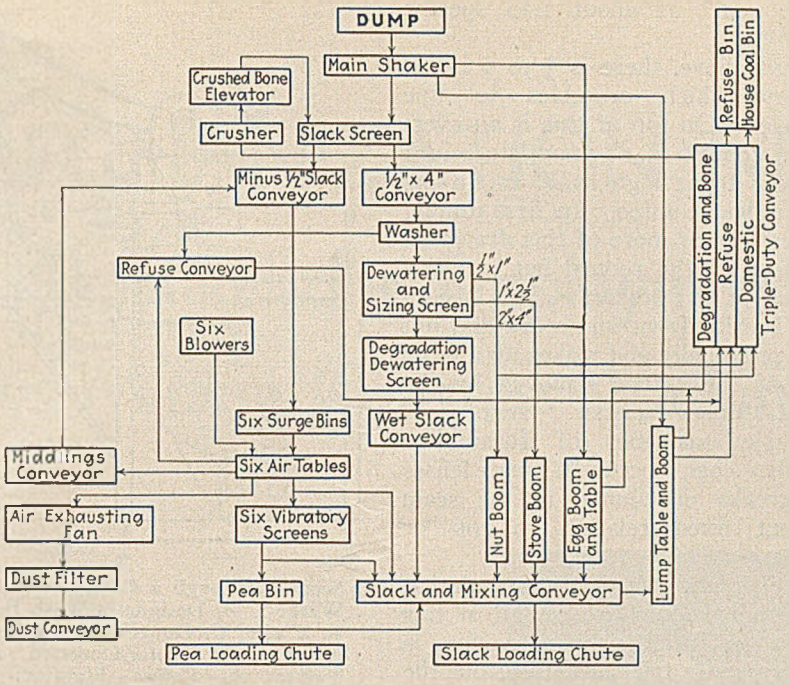
The new plant, which was designed and built by the Link-Belt Co. for a capacity of 300 tons per hour and serves five loading tracks, is a steel frame, wood-floored structure and is covered with Armco galvanized iron. In the structure proper, the weight of steel without machinery is 345 tons. Including house-coal bin, refuse and pea-coal bins, the total steel amounted to 381 tons. The structure is unusually free from vibration. Careful attention was given to obtaining daylight illumination so far as possible. The roofs above the dump, picking tables, washer, and air tables contain a total of 1,400 sq.ft. of skylights. Steel-sashed windows total 1,700 square feet.

Sizes loaded at the plant are 7-in. lump, 2½x7-in. egg, 1x2½-in. stove, ½x1-in. nut, ¼x½-in. pea, and minus ¼-in. slack. By means of a mixing conveyor almost any combination of these sizes can be loaded.

Because of having to deal with two track gages—48 in. in the Indian Ridge mine and 56½ in. in the Wyoming and Zenith mines—two kick-back dumps are used. These are on

Letter *A* Designates a Table Exhaust Hood; Letters *B* Are Circular Surge Bins or Chutes Feeding Tables; *C* Is Main Exhaust Air Pipe; *D* Is Exhaust Fan; and *E*, Exhaust Duct Leading to Bag House





Flow Sheet, United Pocahontas Preparation Plant

each side of a single bin. Chain feeders deliver the loads to the dumps from opposite directions and the empties run back by gravity to the empty tracks.

Egg and lump from the main shaker screen each pass directly onto an apron continuous type picking table and boom. The pans are fitted with Jones rescreen lips for returning degradation. Two belt booms load the washed stove and nut sizes. Lumps containing bone or rock and picked from the booms go to a double-roll crusher for breaking to about 1½ in. for mechanical cleaning with the under 4-in. from the main screen. Parrish type screens separate the 4 to 0 in. coal into 4x½ and ½x0. The larger size goes into the Simon-Carves washer without further sizing and the smaller size to the air tables, also without further sizing.

The Simon-Carves washer is a single unit of five-compartment design. Water pulsates up through the bed by reason of air at low pressure admitted to a chamber above the water in the other leg of a U of which one side is a receptive compartment of the washer box. The rated capacity is 85 tons per hour. The washed coal goes over dewatering and sizing screens of the Parrish type. That which goes through the ½-in. mesh with the water, next passes over wedge-wire dewatering shaker screens.

Water is circulated by means of a pump which elevates the water from a sump tank to a combination feed and settling tank built in the shape of an inverted cone and housed in the building with the washer. Because of the presence of considerable fireclay in the sludge, this product is wasted. It is drawn off at intervals by opening a valve at the bottom of the cone and holding this valve open until water appears instead of sludge. Because of an abundance of non-acidulous mine water, the tank is emptied at the end of the shift. During operation, clear make-up water enters the system by way of the sprays over the Parrish sizing screens.

Pneumatic cleaning equipment consists of six American type YA-54-120 tables operated at a 23-ton-per-hour rate. All treat the same size; that is, ½ in. to 0. The surge bins ahead of each table consist of a round pipe 5 ft. in diameter and 18 ft. long mounted on a 45-deg. slope. This round type of bin is believed to cause less concentration than one of square design. Another advantage of the round bin is the lesser obstruction to natural illumination from the skylights above.

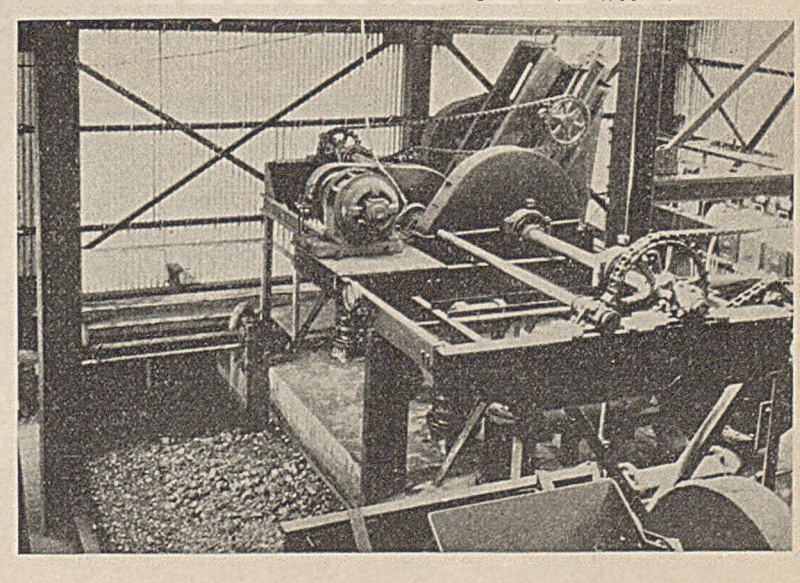
A Sturtevant planing-mill-type blower connected to a 20-hp. motor is mounted on the floor below each table. The intake feed to these blowers is controlled by a lever directly adjoining the table, so that the air pressure on the deck is easily controlled. A Sturtevant multivane exhaust fan operated by a 75-hp. motor exhausts from the six table hoods and into a tube-type dust collector consisting of 748 fabric tubes 7 in. in diameter and 19½ ft. long. This equipment efficiently eliminates dust from the table room and from the air exhausted to the outside. The latter is important because the plant is near the center of the town.

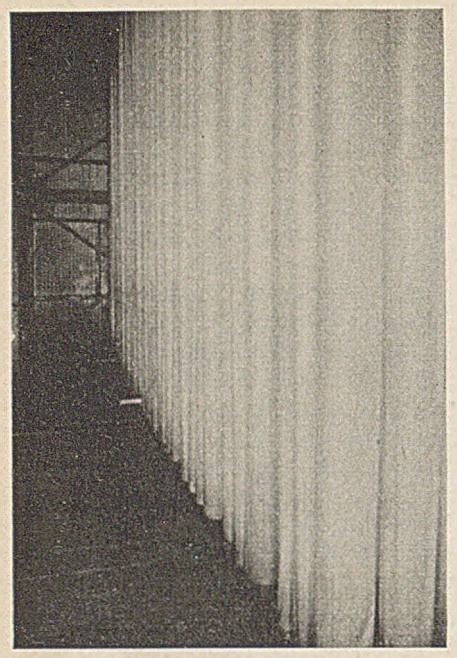
Installed directly under each table are mechanically vibrated screens for separating the cleaned coal into ¼x½-in. pea and ¼ in. to 0 slack.

Drives for the entire plant are General Electric type FTR 440-volt motors connected to the equipment with Link-Belt silent chains. Other equipment such as the crusher and vibratory screens are of Link-Belt manufacture.

Plant refuse and house coal are deposited in a divided bin, of round steel construction, by the bottom run of a two-compartment conveyor. The upper run of this same conveyor carries bone from the picking tables, also degradation from the lump and egg booms, to the crusher. Through

Simon-Carves Washer. View From a Position Above and to One Side. Water Has Been Cut Off to Show Coal in the Wash Box





Air Filters Out Through the Fabric Tubes and the Coal Dust Drops Down Into a Sealed Hopper to Which the Tubes Are Connected by Pipe Nipples at the Bottom

a chute at the bottom of the bin the refuse is loaded into mine cars and hauled about a mile through Zenith mine to an outcrop, where it is dumped into another bin, and loaded from this latter bin into a rotary or turntable dump-larry for final disposal.

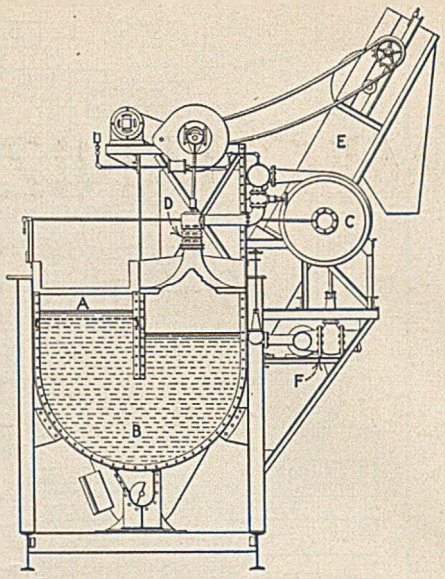
Before discussing results obtained with the new plant, the coal seam and mining conditions will be outlined. The bed averages 54 in. in thickness and pitches rather uniformly 2½ per cent north 75 deg. west. Near the center of the bed there is the characteristic bone averaging 2 in., but in the Wyoming mine this increases to 10 in. in places, and is practically a rock. Immediately above the coal and adhering tightly to it is ½ to 2 in. of "cube coal" of about 1.45 specific gravity.

Next above, there is ½ to 4 in. of fireclay which crumbles to fine particles. On top of this is an average of about 6 in. of drawslate, which thickens to as high as 16 in. in the Indian Ridge mine. In first mining 75 per cent or more of this drawslate stays up in the rooms, but in pillar mining it is broken. This drawslate breaks down into stove and nut sizes principally and makes up a large part of the refuse removed by the Simon-Carves washer. Also considerable quantities of fusain, or "mother coal," occur in small lenses or streaks distributed in the seam without fixed relation to top or bottom.

The practice has been to undercut with shortwall machines, but at this time a top-cutting slabbing machine is being given a trial in kerfing out the fireclay and cube coal. Getting rid of much of the fireclay would materially lighten the burden on the cleaning plant. All coal is hand-loaded directly into mine cars.

Of the total flow onto the lump picking table, about 25 per cent goes to the crusher. For the egg table the equivalent figure is 15 per cent. Of the total material picked from the lump table, it is estimated that 90 per cent goes to the crusher and 10 per cent directly to the refuse. On the egg table the proportions are close to 50-50. With the plant now operating at an average of 285 tons per hour and at peaks of 300 tons per hour, eight men pick on the lump table and five on the egg table. Total reject from the plant as measured by volume in mine cars for two months averaged 4.7 per cent.

No provision was made for crushing lump coal to provide for those



Section Through a Compartment of Washer. *A*, Designates Wash Box; *B*, Water; *C*, Centrifugal Air Compressor; *D*, Motor-Operated Air Valves; *E*, Refuse Elevator; *F*, Water Supply Pipe

times when egg and stove sizes are in greater demand. Crushing of the coal would produce such a quantity of slack as to balance the other advantage.

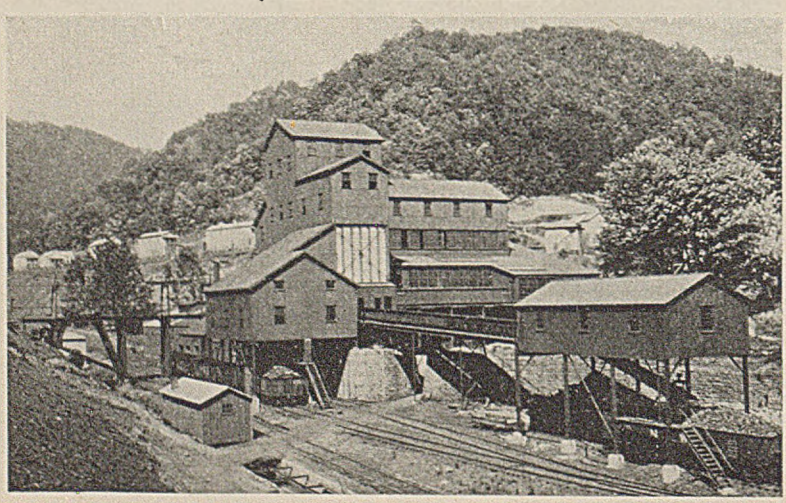
On the Simon-Carves washer, the guarantee was to clean 5 to ½-in. coal to a 7 per cent or less ash content with not more than 4 per cent floats in the refuse material above ½ in., as determined at 1.50 specific gravity.

The equipment is being used at an 85-ton-per-hour rate, and the feed, which is 4- to ½-in., averages 16 per cent ash. At the gravity of washing that is economic for the present market the total float in the refuse at 1.50 gravity equals 1.2 per cent. Eighty-nine per cent of the refuse is above ½ in. and this has but 0.25 per cent float at 1.50 gravity. The remaining 11 per cent shows 10 per cent float at the same specific gravity.

The dry-cleaning tables are making an average reduction of 3.25 in the percentage of ash in the ½-in. slack. Wet coal, the worst enemy of dry cleaning, seldom comes in sufficient quantities to cause difficulty. This happens only when a number of mine car loads are left standing for a long time in a heavy rain.

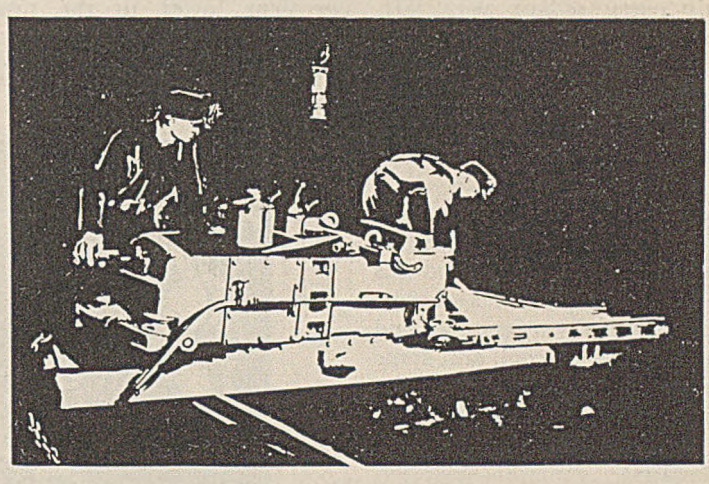
Experience to date with the plant indicates that the wet and dry combination was the proper selection. As usual, certain difficulties have been encountered, but on the whole the operation of the plant has been satisfactory and the results achieved have been in line with preliminary estimates.

Washing and Sizing Plant at Indian Ridge Mine; Rendered Obsolete by the New Crumpler Plant



MECHANIZATION NEEDED

+ For Stabilizing Employment, Says Mining Congress Washington Meeting



PROGRESS in mechanization is demanded of the coal industry, that it may thereby place itself in line with other industries, and that it may fit itself to meet the competition of other fuels. Only by aggressive modernization of its plants can the operator protect his markets and, therefore, his men from the incursions of rival fuels and water power, said Eugene McAuliffe, president, Union Pacific Coal Co., at the mechanization meeting of the American Mining Congress, Dec, 4, in Washington, D. C.

With L. E. Young, vice-president in charge of operations, Pittsburgh Coal Co., Pittsburgh, Pa., presiding, G. B. Southward, mechanization engineer, American Mining Congress, declared that in the bituminous mines of the United States as a whole the number of mines wholly or partly mechanized for loading, which was in 1929 about 230 mines, was now 310 mines. In the past year there were 367 units for mechanized loading and today 517 units. There were 1,953 pit-car loader units, whereas now there are 2,407. Of conveyors there were 253 units. Today the number is 395. In the number of scrapers and scows there had been no increase.

In the Central field, comprising Illinois, Indiana, and western Kentucky, the number of mines using mechanical means of loading had increased 20 per cent. The number of units in that area, which was 2,004, has increased to 2,300, an advance of 15 per cent. In the Northern Appalachian area, 22 mines were mechanized in 1929; now there are 35, an increase of 60 per cent, and the number of units for mechanized and partially mechanized loading has increased 100 per cent. In the Rocky Mountain region, 47 mines loading coal mechanically in 1929 have increased to 58, and 245 units have increased to 272, the latter being an advance of 25 per cent. Unfortunately, in the Southern field the increase was much less, though the report is still incomplete.

Asked by the presiding officer what had been the experience in revisiting mechanized mines, Mr. Southward answered that out of the 310 perhaps 4, or maybe 5, had discontinued the use of mechanical appliances for loading, but he wished to be understood that the mines thus reverting to hand-loading operations had never been extended users of mechanical equipment, but had merely experimented with that form of mechanization. All the figures presented were subject to revision.

Lee Long, vice-president in charge of operations, Clinchfield Coal Corporation, Dante, Va., wanted to know what would happen to the, say, 70 per cent of mines that were unsuited to mechanization. Would prices be stabilized so that these units could remain in business despite their handicaps, or would they be driven to the wall? Several spoke in reply, and the consensus was that they would be eliminated by competition, but that 70 per cent was altogether too large a figure, for mechanical loading had been successfully adopted in the thinnest of seams. Mr. McAuliffe said it was better to make the inevitable reductions in cost of production by mechanization rather than by reductions in wages.

R. L. Ireland, Jr., general manager, Wheeling & Lake Erie Coal Mining Co., Cleveland, Ohio, stated that mechanization had been fostered by his company because it met the problem of how to reduce cost without lowering the wage. It was mechanization, closing down, or wage reduction, and the first seemed least likely to work to the detriment of the miner. The experience of his company had been that mechanization had reduced cost and had enabled the mines to work steadily, with a steadily increasing payroll.

When he went with the Union

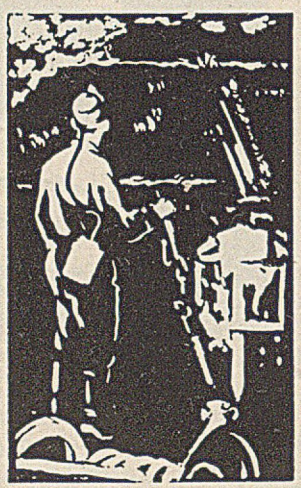
Pacific Coal Co., said Mr. McAuliffe, only 3.2 per cent of its coal was being loaded mechanically. There were 3,600 men employed. He did not want to lay off any men by extensive mechanization, because Wyoming could employ only a limited number of men, and that mostly at sheep and cattle herding. The labor turnover was, however, 144 per cent. It was easy to deplete the labor force without discharging a single man. By not hiring men the required depletion was attained, though in a period of big demand, when the British strike made the need for coal heavy, he had hired 225 men. Today the proportion of coal mechanically loaded is about 60 per cent. In some of the mines only entry pillars were left, and it seemed inadvisable to install in them mechanized loaders, but he had kept back mechanization temporarily, because he did not desire to disturb the labor balance.

LABOR would not be helped, however, by failing to be progressive. The competition of oil and gas must be met. The producer of coal may be as rightfully economic and efficient as the user of coal, and some of the railroads are resorting to the use of high-pressure steam to attain the economy they desired.

A. L. Hunt, general manager, Pennsylvania Coal & Coke Corporation, Cresson, Pa., declared that mechanization was solving the problem for the low-coal operator. His company had been operating 36-in. coal since 1924. It now has 28 units at work. Without those units the coal could not be profitably worked. It also introduces savings by reason of centralization and reduction of haulage costs. Moreover, it has increased safety.

George S. Rice, mining engineer, U. S. Bureau of Mines, remarked that if, as was suggested, Mr. Southward should seek statistical figures as to the safety, or lack of safety, in mechanization, it would be well to endeavor to obtain these figures on a basis of occupation. What was needed to know was what class of men suffered the accidents, what was the severity of accidents they suffered, and what proportion these accidents and severities bore to the men employed in these capacities. Mechanization, he said, had come to stay. What was wanted was to know just what dangers it involved, and then the operator could put the avoidance of these accidents up to his staff and to the manufacturer. Merely to know in broad general terms that there were so many accidents would work no remedy.

Dr. Young thought this an excellent idea, and said that some accidents that it was customary to ascribe to mechanical loading occurred behind the face and were not the result of mechanization of coal loading, yet they must be charged to the mechanized section of the mine. Mr. McAuliffe said he was dividing his men into four classes so as to ascertain relative hazards. In his mines there had been 75 accidents in the last two years in the mechanical sections, and 25 of these were not connected with mechanical loading. The accident rate per man-shift was 44 per cent lower in the mechanical sections, but the accident rate per ton produced was 80 per cent lower.



J. D. Zook, president, Illinois Coal Operators' Labor Association, declared that 49 per cent of the tonnage of the association was loaded by, or with, the aid of machines and 51 per cent by hand. There had been since Jan. 1 of this year 1,030 compensable accidents to hand loaders—that is, injuries causing more than 7 days of idleness—whereas there has been only 208 compensable accidents to the machine loaders. In counting the number of persons injured in the mechanical loading sections he had leaned backward in an effort to include as many accidents as possible. The insurance companies which had withdrawn from the state because of mechanization were beginning to be interested in its possibility of reducing risks and seemed to be meditating a return to a field they had so recently spurned.

Mr. Ireland urged that an advisory classification of accidents be prepared by Mr. Southward for the approval of the mechanization committee, but Mr. Zook said that figures, to be complete, must be collected by authority. He had figures collected by the state. His office merely received duplicates and tabulated them.

J. M. Hadley, secretary Standardization Division, suggested that the Mechanization Division request standards on sizes of (1) conveyor pans, (2) conveyor sprockets, (3) conveyor chains, (4) powder cartridges, and (5) drillholes. E. B. Gellatly, Gellatly & Co., Pittsburgh, Pa., said that two sizes of pan would be sufficient for all shaking conveyors and two pitches of chain would suffice.

Fred S. Pfahler, vice-president in charge of operations, Superior Coal Co., Gillespie, Ill., questioned the advantage of such standardization. He did not want to scrap his conveyor equipment. It was the manufacturer's business to introduce standards. J. H. Flory, Jeffrey Manufacturing Co., Columbus, Ohio, said that standards would apply only to new machinery or, possibly, replacements. However, the manufacturer could hardly stnadardize without cooperation with the mine owner and his engineers, for most of the variations arose not from a manufacturer's desire for variation but because the purchaser, to satisfy some real or imagined need, asked for something that varied from the usual design.

Mr. McAuliffe said there were four types of shaking chutes, all different, to be fitted with Duckbills. No one head would serve for all. The differences were due to the use, partly of the metric system in the case of foreign pans, and of the inch system in American and British pans. However explained, the differences were inexcusable. The conveyor standards were submitted to the Standardization Division, but the explosive standards were not so committed. Why, said Mr. Young, have standard sizes where the Bureau specified different sizes, where obviously different powder strengths demanded a variation in size for an equal result, and where resistance to the explosive by the coal varied greatly?

In the afternoon the discussion was renewed, inquiry being made into the intangible advantages of mechanization, such as concentration, reduced cost of ventilation and haulage, decreased cost of supervision, etc. To many this saving amounted to 3c. per ton, but Dr. Young placed it at about 8c.

SUBMERGED PUMPROOM + Solves Drainage Problem At William Penn Colliery

By IVAN A. GIVEN

Assistant Editor, Coal Age

AS ONE of the latest steps in its program of modernization of existing properties, the Susquehanna Collieries Co. has discarded the old water hoist which served the William Penn colliery, Shenandoah, Pa. for approximately 27 years, and has replaced it with a submerged pumping station. For economy and reliability of operation, the new installation has been equipped with an automatic control system which gives complete flexibility. In addition, the water storage has been planned to allow large fluctuations between maximum and minimum quantities, to obviate continuous operation of the equipment.

Two 8-in., eight-stage, 1,500-g.p.m., bronze turbine centrifugal pumps, each made up of two four-stage pumps in series, have been installed in an underground pumproom cut in solid rock in bringing dewatering methods at the William Penn colliery up to date. These pumps were built by the Scranton Pump Co. Each of the units, which consist of two pumps in series, is driven by a 500-hp. General Electric synchronous motor with direct-connected exciter. Both units are designed to work against a head of 975 ft., and are equipped with a 12-in. suction line and a 10-in. discharge line. The latter in turn is connected to a columnway made of 15-in., cast-iron, wood-lined pipe. Vertical lift from the pumps to the surface is 920 ft. Space has been provided in the pumproom for the installation of a third unit of the same capacity as the others, in case future drainage conditions necessitate it.

Originally, the drainage from the William Penn colliery, which now produces from 1,100 to 1,200 gross tons per day from eight seams of coal, was handled by steam pumps. Entrance to the mine was through a slope. In 1902, a shaft was sunk for hoisting coal. One compartment of the shaft was devoted to hoisting water from a sump just below the Fourth Level in the mine. Two tanks, each holding 1,500 gal., operated in the compartment, and were hoisted by a pair of 32x48-in. steam engines located on the surface. Dewatering with the tanks was a practically continuous operation, though at times the tanks were not filled to capacity.

Records of the quantity of water hoisted were made for a period of a year in preparation for the installation of pumps. From Oct. 1, 1927, to Sept. 30, 1928, inclusive, 489,000,000 gal. of water was hoisted, an average of 930 g.p.m. The minimum quantity raised in that period was 20,250,000 gal., in September, 1928, an average of 470 g.p.m. Maximum flow was 61,000,000 gal., in October, 1927, an average of 1,340 g.p.m. Minimum average flow per minute for the year was 250 gal., while the maximum average for the year was 2,900 g.p.m.

To install the pumps, a pumproom 95-ft. long, 15 ft. wide, and 12 ft. high was cut out of solid rock 65.5 ft. east of the shaft and 39.9 ft. below the Fourth Level, which is the bottom landing for the cages. Plan and profile views of the excavation are shown in Fig. 1. To reach the old

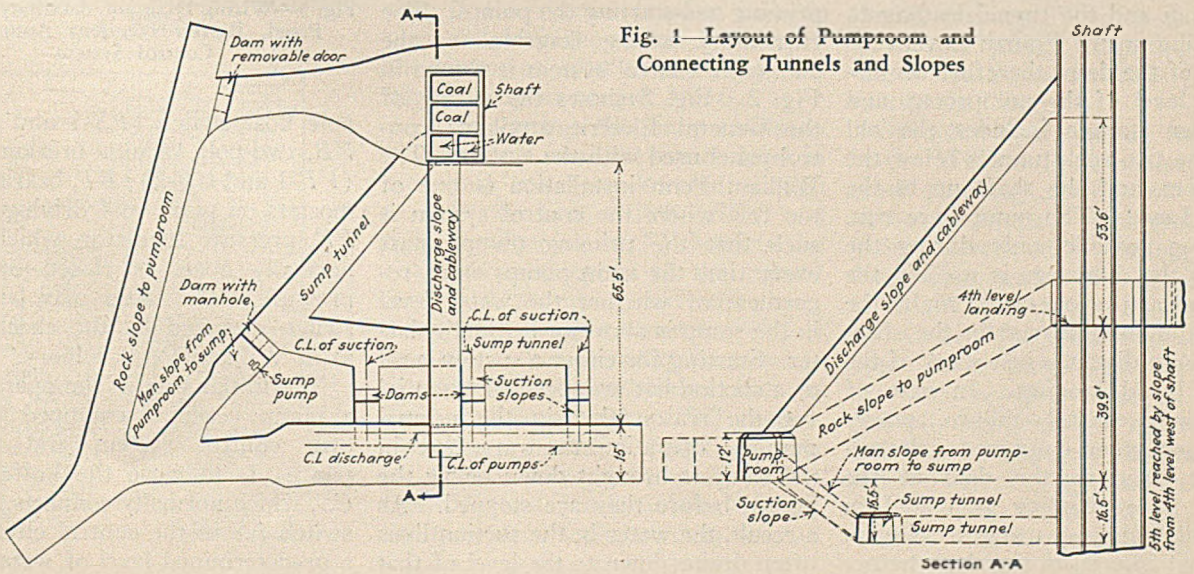


Fig. 1—Layout of Pumproom and Connecting Tunnels and Slopes

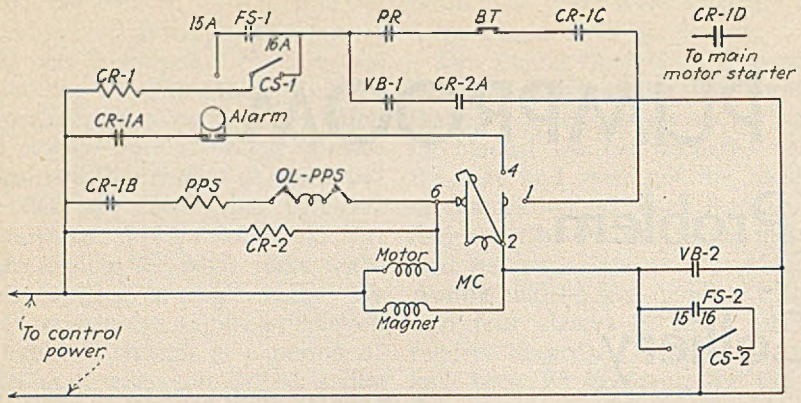


Fig. 2—Elementary Wiring Diagram, Barrett-Haentjens Automatic Control for Centrifugal Pumps

sump from which the water hoist operated, a rock tunnel was driven northwest from the south end of the pumproom to the shaft. This opening connects with another tunnel paralleling the pumproom. The latter is connected to the pumproom by three rock slopes in which the suction pipes are laid. Entrance to the sump is through the slope connecting the pumproom and the rock tunnel to the old sump.

The discharge column is placed in a rock slope entering the shaft at a point 53.6 ft. above the Fourth Level. Access to the pumproom is through a 26-deg. man slope which intersects a tunnel driven south from the Fourth Level. Suction lines from the pumps pass through dams in the rock slopes from the pumproom to the sump tunnel. Two other dams are employed in the construction of the pumproom and its connecting tunnels and slopes. One is placed at the foot of the man slope from the pumproom to the sump tunnel. This dam has a manhole to allow entrance to the sump when desired. A fifth dam, with a removable door, was built at the intersection of the slope leading down to the pumproom and the tunnel leading to the landing on the Fourth Level.

Four of the dams therefore are below the level of the pumproom, and the water storage includes the old sump, the two rock tunnels below the pumproom, and the shaft up to the Fourth Level. The pumps are run, as far as possible, only during the days, as the discharge is used in the William Penn breaker. At night, the water is allowed to rise in the shaft a maximum distance just short of the Fourth Level landing. In case of breakdown, control failure, power failure, or other emergency, the removable door in the dam at the Fourth Level landing is bolted in place, allowing the water to rise an additional 53.6 ft. in the shaft before the pumproom is flooded, giving a margin of safety for emergency repairs, restoration of current, or installation of emergency dewatering equipment.

Power cables, one for each of the two pumps, are brought in through the discharge slope. Individual cables are of the 400,000 circ.mil, three-conductor, 5,000-volt type. Each of the conductors which make up the cable is covered with 30 per cent Para rubber insulation. The three conductors are then combined to form the cable, and are wound with tape. The first tape winding is covered with a second of vulcanized tape. Jute is used for the outer covering. This type of construction, which results in a stiff cable impervious to blows and abrasion, is used in preference to lead- or steel-sheathed cables because of its comparative lightness. Both cables are fastened to the shaft timbers by wooden clamps.

Barrett-Haentjens & Co. 50-cu.ft. priming pumps driven by Westinghouse 5-hp. motors, together with the Barrett-Haentjens automatic control system and Electric Controller & Mfg. Co. automatic starters are used in priming and starting the pumps. The elementary wiring diagram for the automatic control system is shown in Fig. 2. Fig. 3 shows the wiring of the General Electric auxiliary control panel used with the system. The William Penn installation is one of the few where the control system is such that the priming pumps start every time the main pumps start, regardless of whether the water level in the sump is above or below the latter. Starting for either a suction head or a suction lift was deemed essential for the reason that in the normal pumping operation, the water level in the sump is brought down below the pumps before they are stopped. As a result, the water in the suction lines often drains down to the level of that in the sump, leaving air in the pump casing and part of the suction line. This air remains in the pump casing and suction line even after the water level in the sump again rises above the pumps. Consequently, it is imperative that the priming pumps start every time the main pumps start, though, through the automatic control, they shut down immediately if the casing is full of water.

Switches and other equipment employed in the control system (Figs. 2 and 3) are as follows: *MC*, definite time relay; *CR*-1, four-pole contactor, two poles (*CR*-1*A* and *CR*-1*B*) normally open and two poles (*CR*-1*C* and *CR*-1*D*) normally closed; (*CR*-2, single-pole, normally open contactor; *PPS*, priming pump starter magnet; *OL-PPS*, overload trip, priming pump starter; *CS*, two-pole, double-throw knife switch (*CS*-1 and *CS*-2) for transferring from float switch to hand control, or vice versa, *FS*, two-

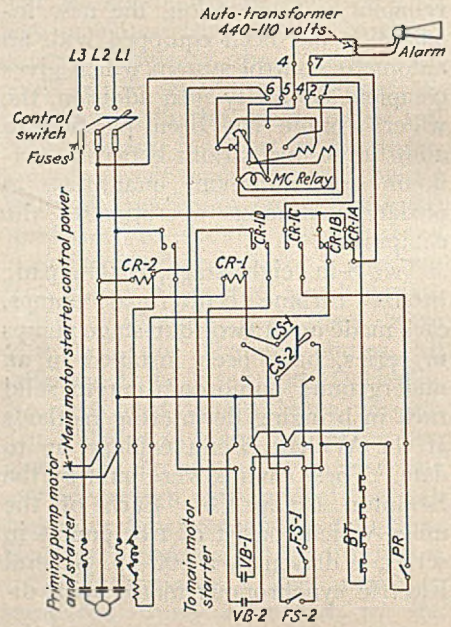


Fig. 3—Wiring Diagram, Auxiliary Control Panel, Barrett-Haentjens Automatic Control System

pole float switch (*FS*-1 and *FS*-2); *VB*, two-pole vacuum-breaker switch (*VB*-1 and *VB*-2); *BT*, bearing thermostats on pump and driving motor; *PR*, pressure regulator, which, while normally open, is closed by pump pressure. The latter may be a flow switch operated by the check valve, as at William Penn colliery.

The initial step in the operation of a pump (each is equipped with its own control system and priming pump) is to close the knife switch *CS*, which normally connects the float switch *FS* in the control circuit. At a predetermined level of water in the

sump, the float switch (*FS*-1 and *FS*-2) closes, energizing the relay *MC* and causing relay contact No. 2 to close. This contact is in series with *BT*, *CR*-1*C*, *PR*, *FS*-1, *CS*-1, and *CR*-1. Closing of *FS*-2 energizes the contactor *CR*-2, thus causing contact *CR*-2*A*, which is in series with *VB*-1, *FS*-1, *CS*-1, and *CR*-1, to close. The timing operation of the relay *MC* starts with the closing of *FS*-2. *MC* is set so that contact No. 4 will not close until after the pump has been primed and put in operation.

Closing of the float switch *FS*-2 starts the priming pump, as the contactor *CR*-1*B* is normally closed. The priming pump exhausts the air from the pump casing through the priming valve. When the air in the casing is sufficiently rarefied, water enters through the suction line, filling the casing and rising in the vacuum-breaker float chamber. The water in the float chamber raises a copper float, which closes the vacuum-breaker switch *VB*-1 and *VB*-2. As the float switch *FS*-1 and the contactor *CR*-2*A* are already closed, the closing of *VB*-1 energizes the four-pole contactor *CR*-1. Closing of *CR*-1 opens *CR*-1*A* in the "alarm" circuit, and also opens *CR*-1*B*, which stops the priming pump. The fourth contactor, *CR*-1*D*, closes and acts as a push button to start the pump motor. As the pump comes up to speed, the pressure builds up and closes the pressure regulator, *PR*. As *CR*-1*C* and *CR*-1*D* are closed together, the running circuit is established through knife switch *CS*-2, the float switch *FS*-2, bearing thermostats *BT*, *MC* relay contact No. 1, contactor *CR*-1*C*, pressure regulator (or flow switch) *PR*, float switch *FS*-1, knife switch *CS*-1, and contactor *CR*-1.

The pump has now been primed and put in normal operation, and the priming pump has been shut down by the opening of contactor *CR*-1*B* as a result of energizing the magnet *CR*-1. The "alarm" circuit is open, as the contactor *CR*-1*A* remains open after relay contact No. 4 closes, and the vacuum-breaker has drained and opened the switches *VB*-1 and *VB*-2. Opening of *VB*-1 removes the shunt circuit from around *PR*, bearing thermostat *BT*, and contactor *CR*-1*C*, so that the pump is protected from loss of pressure. During the entire time the pump is being primed and put in normal operation, the relay *MC* operates and, after a definite time limit, trips and closes contact No. 4. As contactor *CR*-1*A* is open, however, the "alarm" cannot sound. Tripping of the relay also opens contact No. 6, locking out the priming pump starter. The four-pole contactor *CR*-2 is used for making a series connection with the vacuum-breaker switch *VB*-1, so that if the vacuum-breaker fails to open and drain the contactor will open the circuit as soon as the relay *MC* trips and opens contact No. 6.

After starting, the pump continues in operation until the water level in the sump has been lowered enough to open the float switch (*FS*-1 and *FS*-2). Opening of *FS*-2 resets the relay *MC* and opens all the control circuits, thus shutting down the pump. The vacuum-breaker switch *VB*-2 is used to prevent the relay from resetting if the vacuum-breaker fails to drain, even though *FS*-2 opens. Opening of *FS*-1 shuts down the pump. When the contactor *CR*-1 opens, *CR*-1*A* closes, and the "alarm" will not sound if the vacuum-breaker switch *VB*-2 sticks in a closed position. Overheated bearings cause the switch of the bearing thermostats *BT* to open the control circuit, shut down the pump, and lock out the equipment. As the bearing thermostats have to be reset by hand, the pump will not restart automatically until the installation is visited and the trouble located.

As outlined above, closing of the float switch *FS*-2 energizes the relay *MC* to start the priming pump. If the pump fails to prime within the time setting of the relay, the latter will trip, and, since *CR*-1*B* is closed, will close No. 4 contact, stopping the priming pump, locking out the equipment, and sounding the "alarm." If the power is interrupted while the pump is shut down through failure to prime, the relay *MC* will be reset. Upon return of the power, the priming cycle will be repeated. If the pump loses its water while in operation, due to a leak in the packing glands or suction line, or if the float switch fails to open at low water setting, the pump pressure will be reduced, causing *PR* to open and shut down the pump. Opening of *PR* closes the contactor *CR*-1*B*, which sounds the "alarm."

Sequence operation of the pumps in the William Penn colliery and in other pumping stations of the Susquehanna company is controlled by a system developed by the engineering department under the direction of E. B. Worthington, chief engineer, and C. H. Matthews, electrical engineer. As an integral part of the system, each pump is equipped with its own priming pump and control. Fig. 4 shows the sequence panel assembly and wiring of plugs and relays for the William Penn station. Float switches, one for each pump, are set

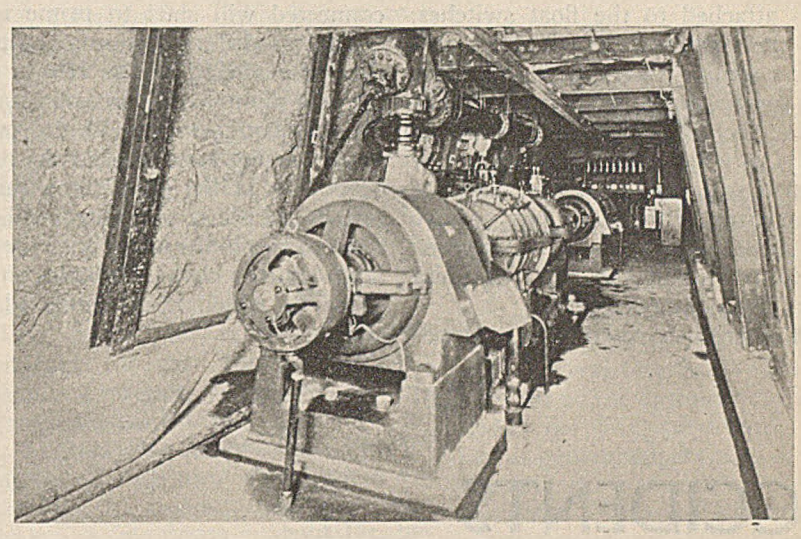
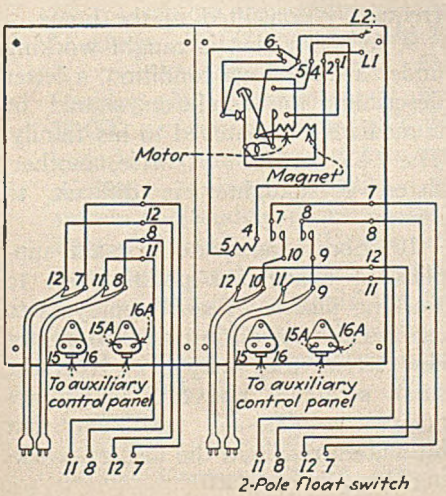


Fig. 5—William Penn Pumproom

Fig. 4—Wiring Diagram, Sequence Control, Centrifugal Pump Installations, Susquehanna Collieries Co. Pilot Pump Sequence Panel at Left; Sequence Panel at Right



for different levels of water in the sump. Thus, the operation of each pump is controlled by the setting of its float switch.

The only interlocking between pumps in a station is that to permit change of sequence in operation, and to prevent all pumps from starting at once when power returns after an interruption and the water level has risen sufficiently to close all the float switches. Change of sequence of operation is accomplished by interchanging float switches from one pump to another. This is done through the use of two two-pole plugs attached to the float switches, with the plug sockets wired to each pump auxiliary control panel. One float switch, without timing relay, is set for the pilot control, so that the pump to which this float switch is attached will start first and continue to run after all the other pumps have shut down, and until it has lowered the water in the sump to the point where its float switch opens.

All other float switches are equipped with a timing relay with a two-pole contactor. Each of these float switches is set for a different level of water in the sump, and each of them closes at a different higher level than that closing the pilot pump float switch. The timing relays each have different time settings to delay starting each pump. When power is applied, the timing relays trip and close the two-pole contactors, remaining in this position until the power fails.

After the return of power, the pilot pump primes and starts, and if any other float switches are closed, the pump or pumps to which they are connected will start to prime in sequence at different times, depending upon the setting of the relays, after the pilot pump has primed and started. This system prevents all the pumps from starting at once after the return of power. If the pilot pump fails to prime and start, the water will continue to rise in the sump until the next float switch closes, whereupon the pump to which it is connected will start.

▼ ▼

ACCIDENTS

+ How to Reduce Them

By MELL E. TRAMMELL

Safety Inspector, Gulf States Steel Co., Altoona, Ala.

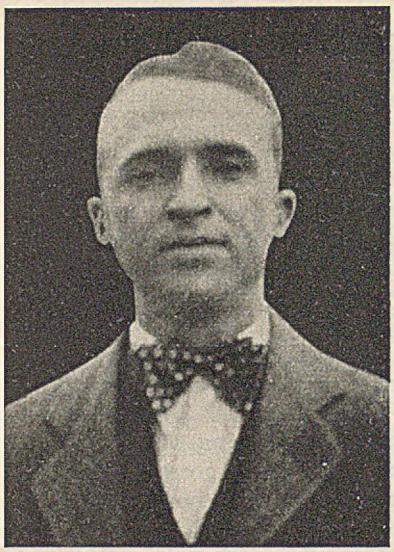
PROGRESS in mine safety cannot be definitely evaluated in terms of all the steps taken to procure it; but, nevertheless, there are clean-cut principles for the administration of safety which are known to accomplish desired results. A number of these principles are stated or implied in the remarks following:

1. Every operation, no matter how small or large, should have a local safety organization. Educate the miner by talks on general safety and specific working problems in safety at monthly meetings. These gatherings should be both entertaining and educational; they should be the occasion for the reading and discussion of the mine inspector's accident reports and for the consideration of other accidents.

2. Carry on a poster campaign. The posters should be displayed at conspicuous places around the mine plant and changed regularly.

3. Promote first-aid training to the end that 100 per cent of the employees at all plants are trained. The most important virtue of first-aid training, contrary to general opinion, is not that it equips men to care for the injured but that it makes those who receive the training more careful and less likely to get hurt. Statistics covering a coal company in our state on this score show that the man untrained in first-aid is eight times as likely to get hurt as the trained man. Statistics of the Standard Oil Co. and the American Agricultural Chemical Co. show much the same results. One hundred per cent first-aid training will materially reduce the number of accidents.

4. Require every foreman of every department to exercise strict supervision.



Mell E. Trammell

5. Require a safety inspector to visit all departments and sections of the mine and plant, look for dangerous conditions and have these removed. Really to find dangerous conditions, one must look for them, as they are not likely to be discovered accidentally.

6. Employ only conscientious foremen who are sold on the safety movement and believe that accidents can and must be reduced.

7. Establish stringent rules, especially for timbering, electricity, and haulage, and see that these are obeyed. Levy a fine for the first violation of a rule and discharge immediately for the second. For his own good, as well as for his employer's, discharge the habitually careless employee. If these facts regarding the punishment meted out are made known, the first and second offenses will seldom occur.

8. Provide every employee with a safety calendar. These can be furnished at a cost as low as that of ordinary calendars. No other article with the exception of the clock is so frequently consulted in the home.

9. When a man is caught working under a dangerous condition, a letter describing the condition should be immediately dispatched to his family. The "be careful" of wife, mother, sister, or daughter is difficult to ignore.

10. Locate adequate first-aid supplies at convenient points close to working places. Teach employees to use the kits for all injuries, no matter how trivial they may be. It is the small scratches and cuts which are not given first-aid treatment that ultimately result in the loss of working time, limb, or life.

CAPITAL AND OPERATING COSTS

+ Of Preparing Bituminous Coal

By J. R. CAMPBELL

Bituminous Representative
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THE question is frequently asked by the coal operator, "What is it going to cost to clean my coal?"—and very often he also asks, "What will be my sales realization?" Those two questions are difficult to answer by "grabbing figures out of the air." They require careful analysis of the problem at hand, and each answer is an individual one. There is no "rule of thumb" method of answering the questions nor is there a stock cost accounting system. The writer is often confronted with these questions and proposes to deal with the first one at this time in a basic manner.

The items in the cost set-up are generally as follows: (1) Capital cost or investment; (2) depreciation or depletion; (3) interest on money invested; (4) operating labor; (5) power; (6) maintenance of machinery; (7) maintenance of building or structure; (8) general overhead, taxes, insurance, etc.; (9) conversion cost or loss of input; (10) bank loss or loss of good coal. These items will be discussed in their order.

1. Capital Cost—This cost depends entirely upon the work to be done and whether or not the plant handles 600 tons per hour or 100 tons per hour. On a ton-per-hour basis, I have seen a price range of from $1,000 to $3,000 for capital cost. The average for a complete preparation plant may be around $2,000 per ton per hour. A complete modern and efficient washing plant alone may cost around $1,000 per ton per hour; this would include machinery and structure with adequate drying facilities, water system and sludge recovery—just the washery plant alone. Tipple, picking belts, extra large storage bins, loading booms, yards, etc., would not be included, as they form no part of the washery; but the washing plant is always its basis.

2. Depreciation—This item of cost depends upon the life of the coal property or the obsolescence of the equipment. Usually a 20-year period is taken for writing off the capital cost, which is equivalent to an annual charge of 5 per cent. Some big steel concerns prefer to write off the investment in ten or fifteen years.

3. Interest—Not all operators figure an interest charge. When it is done, 5 per cent is the usual rate charged off per annum. Interest seems a proper charge where borrowed capital is used.

4. Operating Labor—This item includes all operating men and is dependent, of course, upon the wage scale. A fair figure is about 1½c. per ton on the modern coal washery producing metallurgical coal. A complete preparation plant may run to 5 or 6c. per ton.

5. *Power*—This is an important item and should be well considered when installing a cleaning plant, especially where the cost of electric current is high. According to my observation, the cost of power should be about the same as the labor cost in a modern plant. Speaking specifically of the power consumption in the Pittsburgh district in going Rheolaveur plants, it is common knowledge that the power consumption is unusually low. One complete Rheolaveur preparation plant handling about 300,000 tons of coal per month has a power consumption of less than 1¼ kw.-hr. per ton; and another plant, producing metallurgical coal and handling about 700 tons per hour of feed coal, has about 995 hp. output, or about 1¼ hp. per ton.

6. Maintenance—Under this head will be considered the labor and material used in keeping the machinery in good operating condition and the building in good repair. The type of machinery and the type of structure, whether of wood or steel, will of course affect the upkeep. Maintenance of machinery should be figured on its cost and likewise building repairs. Whether the machinery is operated single or double shift affects its maintenance. On high type machinery, a 10 per cent annual charge usually will provide the necessary repair labor and material, and 2 per cent will repair and paint the building.

7. General Overhead—This item is best left to the customer to figure out under his own conditions. It embraces general supervision, taxes, royalty (if any), insurance, compensation, etc. Perhaps 2 per cent on the capital investment will take care of all ordinary general overhead expenses.

8. Conversion Cost—This item undoubtedly is the most important of any in the cost of washing, as I have pointed out in previous papers. The formula is:

$$\frac{\text{Cost of washed feed} \times 100}{100 \text{ per cent} - \text{per cent refuse}} = \text{Cost of washed coa}$$

Thus with 10 per cent refuse:

$$\frac{\$1.80 \times 100}{100 - 10} = \frac{\$1.80}{0.90} = \$2.00$$

therefore the conversion cost is $2.00 — $1.80 = $0.20 per ton. It is extremely unfortunate if the loss in the refuse has been increased needlessly by the presence in the refuse of 30 per cent of marketable coal at the washing gravity, for then the true conversion would have given 30 × 10 ÷ 100, or 3 per cent less refuse. This will give only 7 per cent of refuse instead of 10, and the true conversion cost will be obtained as follows:

$$\frac{\$1.80 \times 100}{100 - 7} = \frac{\$1.80}{0.93} = \$1.935$$

and $1.935 — $1.80 = $0.135 conversion cost.
The difference, $0.200 — $0.135 = $0.065 = bank loss.

This bank loss of 6½c. per ton on a 600-ton-per-hour plant may be calculated as follows:

An address delivered before the 23d annual meeting of the West Virginia Coal Mining Institute, Huntington, W. Va., Dec. 2, 1930.

600 × 0.06½ = $39 per hour
$39 × 8 hr. × 250 days = $78,000 annually

which is a return of 20 per cent annually on $390,000 capital investment. In other words, all other things being equal, the coal operator can afford to spend $390,000 additional money on a 600-ton-per-hour plant to recover the coal lost in the refuse.

Something will be said about bank loss later, but it will be pointed out here that in my judgment, more dollar and cent failures in the cleaning-plant game have been caused by this one item of cost than all the others combined.

It is now in order to set up a complete cost of cleaning coal, and the foregoing data will be used, except that 7 per cent refuse will be used, which it is believed, is a good average figure in the United States from modern and efficient cleaning plants. United States government reports for 1929 show that all the cleaning plants of the United States had a reject of 8½ per cent, both wet and dry methods.

Cost of Washing

1—*Capacity of plant*, 625 T. P. H. feed, 8-hour day, 250 days per year—tons		1,250,000
2—*Capital cost*		$750,000
3—*Fixed charges*		Per Ton
Depreciation (5%)	$37,500	$0.0300
Interest (5%)	37,500	0.0300
General overhead (2%)	15,000	0.0120
Total	$90,000	$0.0720
4—*Maintenance*		
Machinery—		
10% on $230,000	$23,000	$0.0184
Building—		
2% on $130,000	2,600	0.0021
Total	$25,600	$0.0205
5—*Operation*		
Power—750 kw. @ 1.2c.	$18,000	$0.0144
Labor—14 men @ $5.00	17,500	0.0140
Total	$35,500	$0.0284
6—*Conversion Cost*		
Refuse, 7% and coal $1.80	$157,500	$0.1260

Résumé No. 1

1—Fixed charges, per ton	7.20c.
2—Maintenance, per ton	2.05c.
3—Operation, per ton	2.84c.
4—Refuse, per ton	12.60c.
Total on feed basis	24.69c.
Total on shipped product (93% recovery)	26.50c.

In the above résumé it will be noted that actual operation and maintenance cost is less than 5c. per ton on a feed basis. The big items are fixed charges and loss of input (refuse). The former may be juggled about somewhat and the latter may be shoved off on the miner, but it is best to face the facts.

We sometimes ask ourselves, "Is it worth while to build a modern and efficient cleaning plant? Is it good business and economical?" Let us examine the data again. We will assume for the moment that it is possible to build a washery for two-thirds the amount given, or $500,000. Obviously, the fixed charges are cut one-third and become 4.8c. per ton. We may install the lowest type of washing machinery and the structure may be a cheap wood affair. The maintenance on cheap machinery will be more than doubled, as will building repairs. The machinery may then require 25 per cent annually and the building 5 per cent for upkeep. This charge will then look like this:

4—*Maintenance*		
Machinery		Per Ton
25% on $153,000	$38,250	$0.0306
Building		
5% on $87,000	4,350	0.0035
Total	$42,600	$0.0341

The power perhaps might not change much, unless the water system be curtailed and drying eliminated. The operating labor might be whittled to 1c. per ton by having one man do two men's jobs inefficiently. Let us say, power and labor is cut to 2c. per ton.

The conversion cost is what hurts most of all. Instead of a 7 per cent reject there is 10 per cent or more. The refuse loss has a value of $225,000, or 18c. per ton. The low-type washer set-up is as follows:

Résumé No. 2

1—Fixed charges, per ton	4.80c.
2—Maintenance, per ton	3.48c.
3—Operation, per ton	2.00c.
4—Refuse, per ton	18.00c.
Total on feed basis	28.28c.
Total on shipped product (90% recovery)	31.42c.

The total shipped product cost in the low-type plant, 31.42c. per ton, when compared with that of the high-type plant, 26.5c. shows 4.92c. per ton saving in favor of the modern and efficient plant, and 4.92c. per ton is $55,350 on 1,125,000 tons of shipped product, which represents 22.14 per cent return on additional investment.

Aside from this there is always the question of the quality of the market product. In the cost analysis given last, no account is taken of the problem on an equal ash basis. Ordinarily, the efficient washery will come within 0.3 or 0.4 per cent of the theoretical float ash at the washing gravity; the inefficient job will come within 1.25 per cent to 1.50 per cent of the theoretical. Thus, there easily may be 1 per cent difference in the ash content at the same washing gravity, and if put on an equal ash basis, the inefficient washer at a lower gravity will show a decreasing recovery with more good coal in the refuse. In the Pittsburgh district, on an efficient job, 1 per cent ash will equal about 2 per cent refuse.

Applying this line of reasoning to the specific case, the 90 per cent recovery becomes 88 per cent and the total cost of shipped product goes from 31.42c. per ton to 32.14c. per ton, an increase of 0.72c. per ton, and the 4.92c. becomes 5.64c. per ton, which would be saving per ton if the jobs were put on an equal ash basis, and which would be a true picture of the problem.

While on the subject of low-type coal washers, we will give a concrete example from a test made Oct. 24, 1930:

Float and Sink Data—Washing Gravity 1.60

Specific Gravity	Raw Coal—100 Per Cent		Washed Coal—85 Per Cent		Refuse—15 Per Cent	
	Per Cent by Weight	Per Cent Ash	Per Cent by Weight	Per Cent Ash	Per Cent by Weight	Per Cent Ash
Float 1.60	82.5	5.5	92.8	5.5	23.7	7.7
Float 1.60 / Sink 1.44	3.0	21.8	4.0	25.0	7.8	24.8
Sink 1.60	14.5	56.9	3.2	48.8	68.5	61.7
Total and average	100.0	13.44	100.0	7.66	100.0	46.0

Qualitative efficiency = $\frac{14.5-(3.2\times 0.85)}{14.5}$ = 81.05 per cent.

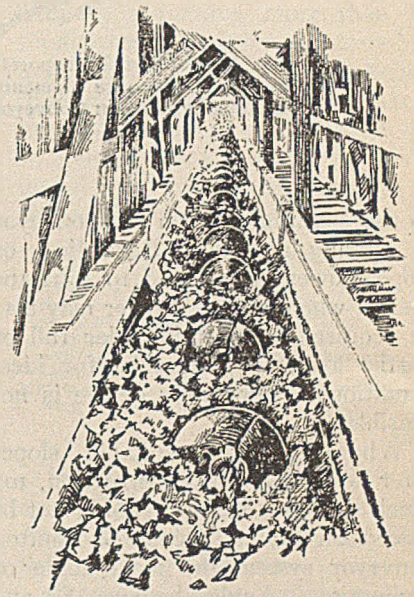
Quantitative efficiency = 100 − (15 × 0.315) = 95.27 per cent.
Bank loss = 4.73 per cent.

Value of bank loss at $3 Pocahontas coal, say prepared size (2½ x 1 in.), $3 × 4.73 ÷ 100 = 14.2c. per ton, and 14.2c. per ton on 100 tons per hour = $14.20 per hour, or $85.20 per day of 6 hours, or $17,040 on a 200-day year. This plant might be built for $75,000, whereas a more efficient plant would cost $125,000, a difference of $50,000 in capital cost, and $17,040 is a return of 34 per cent on the additional capital on loss alone. Is it worth while?

In conclusion, I leave the answer to this economic question in the hands of the operators—each to work out for himself. Nothing is said about quality of shipped product, which may have a bearing on the economics. In the set-up it will be noted that the washed coal still has 3.2 per cent of rock and heavy bone in it. The question is, How long will coal of this quality stay on a highly competitive market? The answer to this question also is submitted for careful thought and study.

WHEN, WHERE, AND HOW

+ To Use Button Conveyors



By HARRY F. GEIST

Webster Manufacturing Co.
Chicago

IN LOWERING run-of-mine coal down mountain sides, large capacity, continuous flow, minimum breakage, or degradation, and economy are demanded. Speed control is essential, and this consideration eliminates simple chutes in which the flow of coal cannot be regulated. The cable-and-button type conveyor, because of its strong, light, and flexible moving element, has proved its value for long courses on slopes too steep for belt conveyors. Wear and maintenance are low and control is largely an inherent characteristic. Belts, however, may be used in combination with cable-and-button conveyors, the latter being limited to the steeper hillside pitches and the belts to the more gradual foot slopes below.

A cable-and-button conveyor may be defined as a trough in which move disk-like flights, commonly called buttons, firmly clamped upon a single strand of steel cable. This cable is endless and passes over suitable terminal sheaves conveniently located at the trough ends, the return having its runway above the coal-carrying trough. If the trough is on an incline such that coal will flow by gravity, following the buttons and in some measure retarded by them, the conveyor is a retarder whether it generates power, consumes power, or is balanced for negligible power. Such a system is illustrated by Fig. 1.

The operating characteristics of a cable-and-button conveyor are dominated more by the slope than by any other condition, because slope determines largely the relation between gravity and friction. These components of force establish the maximum and minimum slopes within which a cable-and-button conveyor is good practice. This range, extending, as it does, between angles of 15 and 35 deg. to the horizontal, gives to this system a broad field of application and usefulness in mountain coal fields.

Coal enters the conveyor at the top with a certain potential mechanical energy due to gravity. In flowing downgrade its energy is partly consumed by friction. If free, the coal will accelerate until friction and the increase of momentum entirely absorb all the energy released. The cable-and-button system takes up the surplus energy chiefly by the additional friction it provides. It thus prevents acceleration and controls speed. The relation of the pressure of the coal on the buttons to the force required to circulate the system determines whether power will be generated, consumed, or negligible.

An inclination of 26½ deg. is the ideal condition, because it is the angle at which the moving coal is just able of itself to operate the cable and buttons. In practice, a perfect balance cannot exist, but the system will pulsate slowly under the influence of its driving control, with a low average power consumption.

For angles greater than the ideal 26½ deg. the system will usually generate power and will require a brake or governor device. Above 35 deg. the coal is in grave danger of avalanching. Even at 30 deg., swing-gate aprons usually are provided.

On less than the ideal slope, power is required to help keep the buttons moving, the quantity of which depends, of course, upon the quantity of coal being lowered, the weight of the cable and buttons, the angle of slope, and the friction. At about 15 to 18 deg. coal ceases to flow by itself. Below this critical angle, trouble is likely to arise, not the least of which is the tendency of the cable and buttons to pull out of the coal and ride over the top, causing congestion, spillage, and much breakage.

It is difficult, even with tests, to fix definitely the critical angle. Wetness, particularly in fine coal, percentage of lumps and fines, and vibration in the trough are factors. Large lumps will ride on top, free to follow the buttons, while the fines below may lag and may have to be pushed by the button above them. Experience has shown that 15 to 18 deg. is the lower limit of inclination even for short distances near the point of discharge.

The foregoing discussion of the effect of slope has reference solely

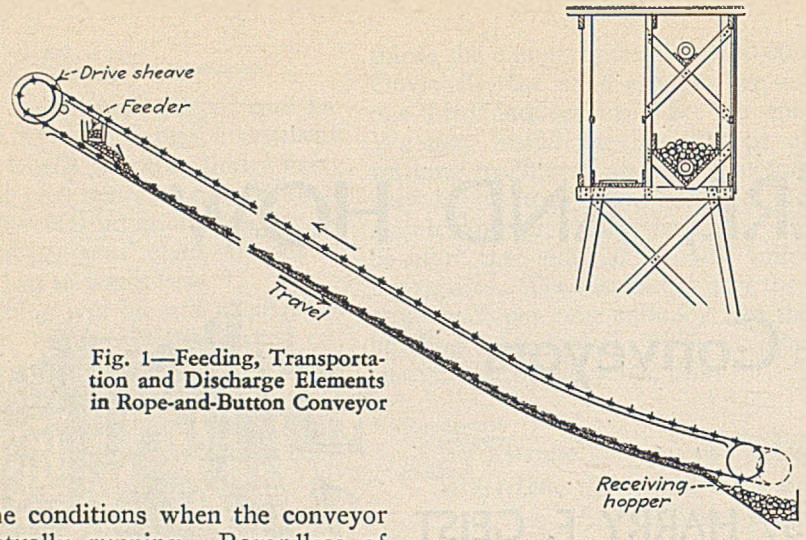


Fig. 1—Feeding, Transportation and Discharge Elements in Rope-and-Button Conveyor

to the conditions when the conveyor is actually running. Regardless of slope, power is required to start the system when empty. Power may also be required to start it under full or partial load, so that, even for ideal conditions, a motorless device is not feasible.

Wherever other suitable slopes offer advantages in construction, too much stress, therefore, should not be placed on giving a cable-and-button conveyor system the ideal angle of inclination. Angles between 20 and 30 deg. ought to be regarded as quite favorable.

Though cable-and-button conveyors are a development of long standing, limitations as to their length and capacity are not definitely established. Single units 1,500 to 1,600 ft. long have been in satisfactory operation on slopes of over 30 deg. for many years. For greater distances it is considered advisable to divide the course into two or three separate units in series, with suitable means for transferring coal from one to the other. This not only promotes safety but also permits more choice in selecting the most suitable path down the mountain side, particularly because the units need not be in line. At present no installation has been made having more than three units.

Cable-and-button conveyors may also have vertical curves for the closer fitting of mountain profiles. These may be convex or concave, but should be as sweeping as possible, preferably of 1,000 or more feet radius.

The carrying capacity of a cable-and-button conveyor probably is its most generous characteristic. This arises from the fact that between the critical and ideal angles the cable tension is largely that required to return the buttons uphill. Also because when such a conveyor is installed, the importance of continuous flow of coal requires that its design and construction shall be in generous proportions.

Existing cable-and-button conveyors handle from 150 to 450 tons per hour, but their physical proportions and costs per foot are determined more by length than by capacity. In large-capacity units the buttons are spaced at 48-in. centers, but in units of smaller capacity a 72-in. spacing is provided, which reduces the total button weight and yet provides a load on the individual button comparable to that with the 48-in. spacing.

A speed of 100 ft. per minute is regarded as suitable. Higher speeds tend to break the coal; it is better to obtain capacity by greater volume than by speed. With coal moving in volume the lumps ride on a bed of fines, which form a protective cushion. Therefore, for long conveyors of relatively low capacity a wide button spacing with low speed of travel is preferable.

The cable usually is of crucible-steel wires in non-spinning lay over a soft-iron center and of such size as computed stresses dictate, allowances being made to provide the buttons with liberal clamping area, to decrease the stretch of the rope in service, and to afford a factor of safety. The rope should be flexible so as to suit sheaves of 6½ to 8 ft. in pitch diameter. Cables in service range from about ¾ in. to 1½ or 1¾ in. diameter.

The buttons are of cast iron or semi-steel without machining and may weigh as much as 80 to 100 lb. each. To eliminate flange breakage and reduce weight, small sizes have been successfully made of malleable iron. It is not desirable always to reduce the button weight, because with heavier equipment the operation of the system is more stable.

The buttons comprise essentially a split hub cored to fit the cable accurately; they carry a centrally located flange, usually of 12 in. diameter. They are accurately spaced on 4- or 6-ft. pitch, pressed upon the cable without injury to the wires and secured by means of four or six heavy clamp bolts. Accurate spacing is necessary for smooth action at the sheave gaps, where each button in its turn may have to transmit the maximum cable stress.

Terminal gap sheaves for cable-and-button conveyors are a highly developed and perfected device. The four general types employed at present are: (1) the fixed-gap and fixed-pitch sheave; (2) the flexible-gap, adjustable-pitch sheave; (3) the roller-gap, flexible-rim, and adjustable-pitch sheave; and (4) the fixed-gap, adjustable-pitch sheave.

THE first is, as implied, just a gap sheave, usually reinforced, however, against wear at gap lips and in grooves. This type is used chiefly in Canada on conveyors for stacking pulpwood.

Sheave (2) has flexible members which provide the gap with resilient lips where the buttons enter or leave it. Springs provide the cushion effect. Rim members, which constitute most of the groove, are built of sections and arranged with bolts for adjusting the pitch diameter. Provision against flexing the cable at the button ends is made by having each groove section eccentric to the axis on which the sheave turns by an amount greater than one-half the button length.

Sheave (3) is illustrated by Fig. 2. It provides four rollers at each gap in pairs, spaced apart so that the cable may pass between them, allowing the rollers to engage the button ends in such a manner that they will be at right angles to the line of the cable. The rollers are individually mounted upon studs rigidly secured to the gear frame for transmitting the cable pull. Between the sets of rollers are arranged floating groove segments which determine the pitch diameter of the sheave. Each segment is adjustably pivoted to the gear frame at *P*, which as a center produces the hump-like groove which eliminates the flexing of the cable at the button ends. Sheave (3) also allows the groove segments to shift peripherally with the cable, reducing the friction between the rope and the sheave.

The gear-type body construction relieves the supporting shaft of all torsion.

Sheave (4) is usually employed as a tail-end terminal. It consists of a heavy cast-iron wheel on which cast-steel groove segments are adjustably spaced. The relative position of the groove segments to the wheel center determines the pitch diameter, which may be changed by adjusting a few bolts. This sheave with a suitable shaft-and-screw-type take-up bearings makes an inexpensive lower terminal.

THE drive and control may consist of a spur-gear train, or it may include a worm-gear reduction or transmission belt. The drive obviously is placed at the upper end. The purpose of the drive machinery is a slow and steady rotation of the head sheave under whatever fluctuations of cable pull the load may impose even under a reversal of cable tension. Normally an electric motor, of either alternating- or direct-current type, will automatically supply either the driving or braking power with moderate speed variation below or above its no-load rating. The larger the motor the less the variation.

Motor characteristics are not relied upon entirely in most cases, however, and mechanical brakes are also used which are made more or less automatic in action. Solenoid brakes, as a no-voltage protection, are also to be recommended. A single-thread worm-gear reducer offers possibilities as a hold-back device, although it is putting such a machine to service for which it is not normally designed. Spur-gear drives, or spur gears in combination with transmission belts, though less expensive, are quite efficient. Motors usually range from 15 to 75 hp., depending upon the installation.

In feeding coal to the conveyor from the dump hopper at the drift elevation, it is preferable and almost necessary to use a mechanical feeder so that it will be loaded uniformly and with as little breakage of coal as possible. A reciprocating plate feeder draws the coal more smoothly from the hopper, and can be arranged so that the coal will fall less at its discharge end, than with any other type of feed, but an apron-type unit makes an excellent inspection and preliminary picking table. Good practice requires a flow plate immediately in front of the feeder, to allow the coal to attain the direction of flow of the moving buttons before allowing it to come in contact with them. This precaution also decreases breakage.

Where two or more cable-and-button units are used in series it is desirable to use feeders or shaking chutes to transfer the coal uniformly. Plain chutes or chutes with swing gates are frequently used, but they generally break the coal unnecessarily.

Coal is discharged from a cable-and-button conveyor by having the trough slope away from the rope and expand into a hopper of suitable capacity. It may similarly load the coal directly onto shaker screens or grizzlies preparatory to its being loaded into railroad cars. Reservoir hoppers are particularly recommended, so that the conveyor may run continuously even when screens and loading devices are stopped for the changing of railroad cars or for other brief tipple manipulations.

Where a cable-and-button conveyor discharges onto a belt conveyor, a small reservoir hopper and a feeder should be used to load the belt. It is evident that when buttons are spaced 4 or 6 ft. apart they will not deliver the coal with sufficient uniformity for the direct loading of a belt.

Feeding, transfer, and discharge are incidental to the main subject and vary greatly with the peculiarities of each problem, but as coal preparation becomes more and more exacting and has an important bearing upon plant revenue, these features are being given more and more consideration.

Though cost estimates on installations of the foregoing type will vary somewhat for different contractors, somewhat for varying mountain-side conditions, and for other reasons, only tentative figures can be suggested. They will serve, however, as a reasonable guide for a preliminary survey or appraisal. It is necessary that these figures shall embrace something more than ideal conditions. The following costs based upon 1929 price levels are believed to be reasonably safe. They are for the installation of a conveyor 1,000 ft. long, erected in place, but do not include the cost of foundations and electrical wiring.

Terminal and drive machinery including motor	$5,500
Cable and buttons	4,700
Structural-steel gallery with wood walkway and steel-lined trough, corrugated roof and one side only, average supporting bents, but no terminal houses	21,000
Extra for all steel trough and walkway	4,800
	$36,000

If a feeder, a discharge hopper, or a transfer house and transfer equipment are added, $5,000 to $6,000 more may be required.

From the above estimates we see that a complete high-grade installation based upon 1,000-ft. length may be constructed at from $31 to $42 per foot.

For galleries constructed of timber, with steel-lined troughs and corrugated roofing and siding, one side only, a saving of $6.50 to $7.50 per foot is effected, but with increased fire hazard.

From these figures we may also arrive at an approximate cost of moving one ton of coal down a mountain side a distance of 1,000 ft. Based upon 1,000,000 tons moved per year, with allowance for interest on the investment, upkeep, attendance, power consumed, etc., this cost is about one cent per ton per 1,000 ft.

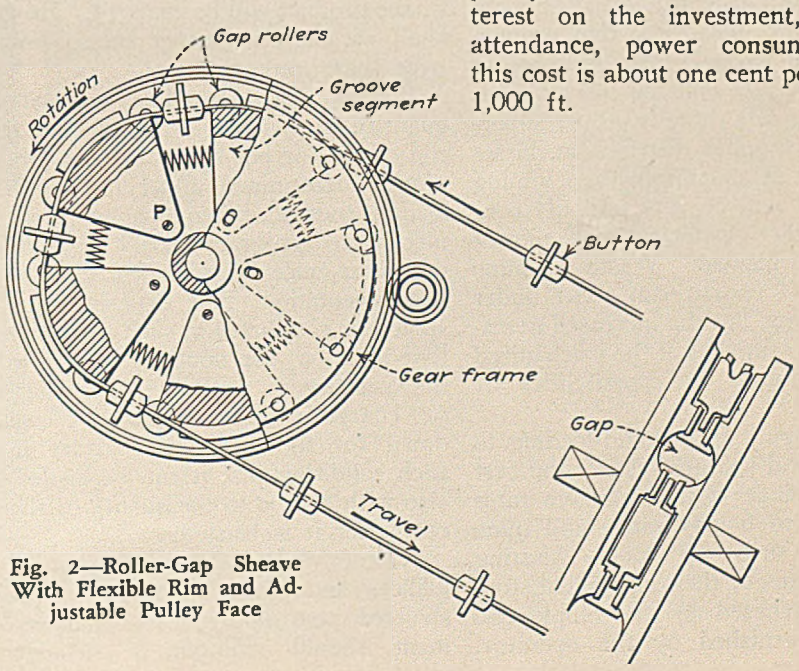
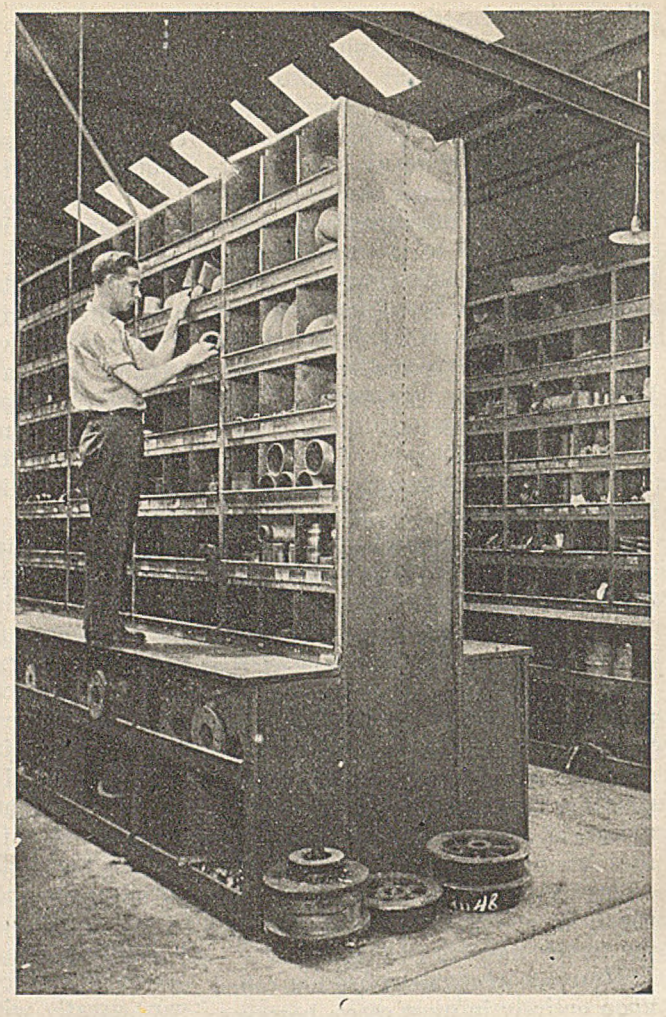


Fig. 2—Roller-Gap Sheave With Flexible Rim and Adjustable Pulley Face

PLUGGING THE LEAKS

+ In Supply Costs At Mechanized Mines



By VAN B. STITH

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MUCH has been written on reductions in labor costs at the mechanized mine, but very little said about supplies, although at times they represent as much as 30 per cent of the ultimate cost of production. In the operator's great desire to lower labor cost many of the other items entering into the cost of production frequently are lost sight of until it is discovered that production costs exceed sales realizations despite the fact that the cost of labor is low. Unless there is proper supervision of supplies distribution, losses will creep in and mechanized mining equipment will be very unjustly condemned where inefficient management should be blamed. Waste of mine supplies, of course, can occur under hand loading, but the increased necessary use of supplies at the mechanized mine augments the possibilities of wastage.

In changing from hand-loading to a mechanical-loading system, the first radical change is that tonnage rates give way to hourly rates, and mine supplies, such as tools, blasting supplies, etc., or their equivalent, formerly purchased by the employees, will be furnished by the operator. Lubrication costs will increase because more machinery is used; maintenance and repair of equipment also will become a large item. The quantity of necessary supplies to be carried in stock will increase and the condition of the product will be changed. How shall we exercise proper supervision over these expenditures?

Blasting Supplies—The necessary quantity of explosives to produce a ton of coal or per charge, if not previously determined under the hand-loading method, when turning to the mechanized program should be determined at once by scientific detailed experimentation. This experimenting should be conducted in such a manner that no room for doubt is left as to the quantity of explosives necessary per charge in order to blast the coal down for the mechanical loader in such condition that it can be loaded, also with a view to the quality of the coal after it is blasted.

After this has been determined, drillers and blasters should be instructed accordingly. The management should maintain a detailed account of all explosives issued each individual drill unit during the month and have a recapitulation of this information made each month to see if the men are using the blasting supplies as instructed. This can be easily accomplished if a record is maintained of the coal produced for each individual drill unit.

Use of excessive quantities of explosives is not always due to an excessive charge per hole, but is often caused by misplaced shots, which make it necessary to drill a second hole and shoot a second charge of explosives. It is well to have the same employee who drills the hole also tamp and charge it, as the charge of explosives is directly dependent upon the placement of the hole and the placement of the hole likewise is dependent upon the quantity of explosives to be used.

The quantity of supplies other than explosives to be consumed by the drillers and shooters also should be recorded and recapitulated each month on the basis of tons produced. This record should be maintained for

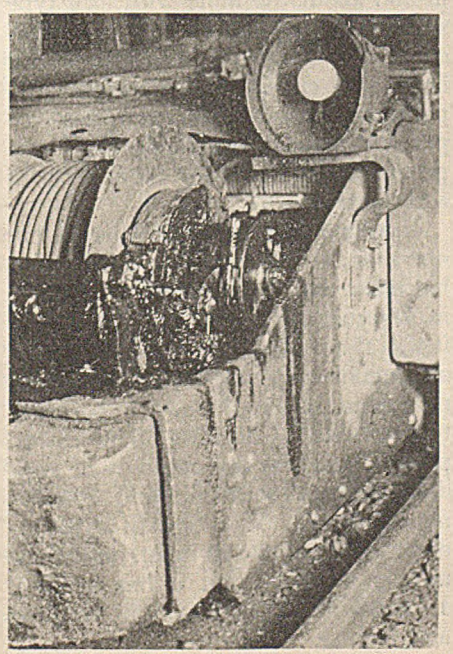
each individual unit. Such supplies will amount to quite a sum of money over a period of a year. They include friction tape for cable repairs, files for sharpening the drill augers or patent points for the augers, fuse links for the drills, blasting paper either in the roll or tamping bags, blasting fuse and caps, lubricant, supplies used for repair of drill and all tools used, such as drill augers, hand picks, etc.

Abuse and waste of friction tape can be decreased somewhat by requiring all employees using tape in the performance of their duties to turn back to the supply clerk the core from the used roll of tape before they receive a new roll. Fuse links for the drill are very easily broken when carried about in the pocket of the drill operator and, when such is the case, oftentimes when he sends his clothes to the laundry the fuse links go with them and are destroyed, so I suggest placing the links in a small box, together with files and other small items, under lock and key.

Abuse of the drill can be detected at once by maintaining a record of supplies used in the repair of the drill. The labor and parts for repairing disabled mining machinery does not amount to as much on the cost of production as the loss of time suffered by the non-productive period during the time the machine is being repaired; therefore it always pays big to prevent abuse.

Lubrication of Loading Machines—There exist a correct grade and quantity of lubricant for every purpose. But it is one feature to know the correct grade and quantity and another to get it used properly. This item, like the blasting supplies, should be recorded, the quantity and grade used on each individual machine based on tons produced. There is far too much lubricant being used in the mechanized mines with only a small quantity of it going into the bearing for which it was purchased. High-grade and costly oils are being used where cheaper oils would serve and cheaper oils are being used where the bearings should have the best lubricant available. The cost of this misuse is not wholly represented in the cost of the lubricant, but in worn-out bearings and disabled equipment.

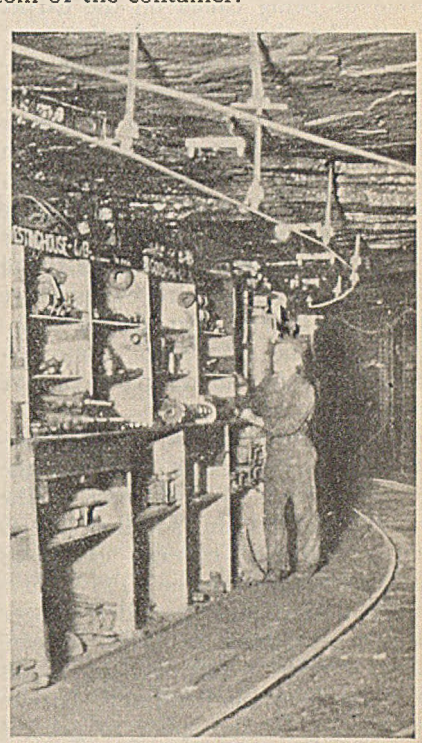
Solid Mounted Headlights Cause Broken Lamp Filaments; Note Also the Waste in Lubrication



I HAVE found that the machine operator is always ready to co-operate with the management in a proper lubrication program. Once he is convinced that he is being put on record he will be far more attentive in his oiling, as it is a human instinct in us all to want to excel in our job. True, I have met with some opposition in selling this idea to the underground foreman who believes that once he obtains a certificate of competency to serve as mine foreman and has so acted for a few years he needs no advice from the administration department as to his method of handling labor and mining machinery. This type of foreman, however, is in the minority and will soon be out of the picture.

Storage and distribution of lubricants at the mine are items that have been sadly neglected and have caused lubrication cost to go unnecessarily high. Few operators have proper storage houses for oils above ground, constructed for the prevention of fire and waste. Oil barrels are laid on their sides, sometimes on a rack, and a valve is screwed into them; in most cases the valve is of the slow-acting type. When a container is filled before this type of valve is closed, as usually is the case, much oil is spilled. The floor and surrounding ground will be found to be soaked with oil and when the empty barrels are returned to the oil company they contain a gallon or two of oil, facilities in the oil house not permitting complete emptying of the barrel.

The prevailing method of distributing oils in the mine from barrels on a truck, to visit the different oil stations and deposit a day's supply in an open-type container, generally an old carbide can or powder keg, which may and does at times get knocked over and the contents spilled, is the last word in extravagance. These open containers catch dust and dirt and later deposit it in a bearing. Examination will reveal as much as 2 or 3 in. of dirt and dust in the bottom of the container.



Experience Records Will Show Which Parts Should Be Stocked

I would suggest an oil house above ground of non-inflammable material with a cement floor. Tanks should be equipped with hose and pumps and so arranged that every last drop of oil can be emptied into them from the barrels. The truck that delivers the oil into the mine should be likewise equipped. In every case, faucets should be of the closed, quick-acting type. Individual oil cans for the operatives should be provided with a spout of suitable length, with a positive cutoff, so that the flow of the oil from the spout need not be started until the spout is injected into the oil box on the bearing.

Grease should be applied through modern pressure fittings. Labor will co-operate surprisingly well with a system of this kind, as no one delights in seeing waste.

Maintenance and Repair of Loading Machines—Cost of supplies for the maintenance of machinery is frequently lost sight of by the management in its desire to maintain output. Unless watched, the underground force will order some spare part for no other reason than fear that a ma-

chine will go down for want of this part. After the spare part arrives at the mine it may be carried in stock for an indefinite period, accumulating interest on its investment cost. Then when the part finally needs renewing, the machine will not be stopped until completely down because the force is afraid of being called on the carpet for not keeping up production.

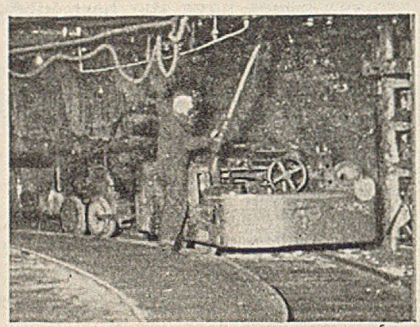
As a rule, too many parts are carried in stock and seldom is the right part available when needed. I realize this is a difficult problem, but it can be satisfactorily solved by maintaining a detailed record of all faulty equipment together with the supplies needed for repairs. It will be found that some parts need renewing more often than others. An adequate supply should be stocked or some improvement made in the parts to give them longer life.

Often a new electric cable is purchased for a machine when all the old cable needs is reworking of the old splices and an addition to its length. Rubber-covered cables as manufactured today should give service for an indefinite period if proper care is exercised in their upkeep. When a cable is run over or "blows up," the foreman invariably hurries the making of the splice to get the machine going again, when he should be seeing that a practical and lasting splice is made.

To correct this fault I would require the operative of the equipment to fill out a simplified report of all delays and their causes, including splices made. When a new cable goes into the mine, demand that the old cable be delivered to the surface for a thorough inspection. Determine if a new cable was really necessary and if the splices in it have been made in a workmanlike manner.

Power—Power cost has been allowed to run riot at the mechanized mine particularly because there more power is consumed in driving electrical machinery. Disabled armatures are by far the chief contributors to the trouble which is reflected in supplies and repairs.

The average machine in the mine is not equipped with a fuse or circuit breaker either on account of a desire



Repairs Should Be Made Immediately When Needed

to overload the machine or because the voltage is so low that the amperage rises abnormally under load. I have had a coal mine electrician tell me, when I asked him why he did not use the fuse, that he could not keep it from blowing. His excuses were an open confession that he had fallen down on the maintenance of his transmission lines and the distribution of power.

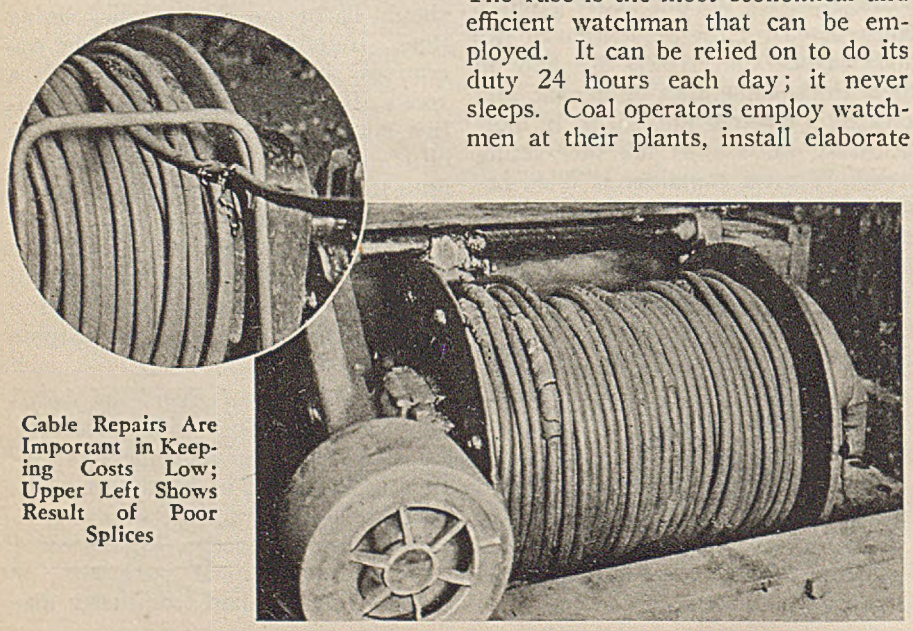
Once I had the voltage up to standard I would insist that each and every motor be protected by a fuse or circuit breaker of suitable current carrying capacity for the rated horsepower. The fuse is the most economical and efficient watchman that can be employed. It can be relied on to do its duty 24 hours each day; it never sleeps. Coal operators employ watchmen at their plants, install elaborate punch clock systems to see that the watchmen do their watching, but they will neglect the installation of protective devices on mining machinery. I will wager that the same electrician or foreman who keeps no fuse on the mining machines intrusted to his care has one on his automobile.

Illumination Supplies — Electric light bulbs are a source of never ending waste at the average coal mine. What practice! Stringing them along the entries, screwed into weatherproof sockets unprotected from theft, or tied to two wires with no sockets at all. No thought is given to the existing voltage in the purchase of these bulbs, it being presumed that the power remains constantly at 250 volts. What happens at no load when the generator compounds underload until the voltage is 275 or 300? The bulbs cannot but have a short life under these conditions. When the motorman or machine runner needs a bulb, instead of applying for it at the supply house he takes down the first bulb he comes to and puts it on his machine. In getting the bulb he tears down wiring and all. As a result a stretch of entry is in darkness until another bulb is installed.

Headlights on most locomotives are of the old solid-bed type bolted direct to the frame. I have seen broken headlights replaced by a 4- or 6-in. piece of pipe. These makeshift lights transmit shock into the bulb and cause filaments to be broken. One bulb a day is a fair average for this type of headlight.

TO avert this, I would keep a record of all bulbs issued for locomotives and machines, equip all lights in and about the mine with lock type sockets that cannot be removed without a key, equip the locomotives with headlights cushioned on springs, and purchase all bulbs with a voltage 10 per cent higher than standard. These provisions will pay for themselves in a short time.

In conclusion I wish to state to the operator of mechanized mines that his labor may be the most vital item in his cost of production—no doubt it was the primary cause of his mechanizing his property—but labor is by no means the only item of importance to deal with. The item of mine supplies is vital also and can only be handled through scientific and detailed management. This type of management has been late in its arrival in the mining industry, but it has arrived. It looks as if its stay will be long and lasting.



Cable Repairs Are Important in Keeping Costs Low; Upper Left Shows Result of Poor Splices

DEPLETION

+ By New Income Percentages Should Reduce Taxation

By McKINLEY W. KRIEGH*

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EARLY in December the joint committee on internal revenue taxation at Washington will give a hearing to consider the preliminary report of the staff of that committee on the subject of mine depletion allowances, and to hear representatives of the mining industry in this connection. In this report, two new methods of determining mine depletion allowances are suggested.

Plan No. 1 resembles the Canadian method and is based upon 33⅓ per cent of the net income from the property. Plan No. 2 is based upon 40 per cent of the net income after a certain amount of such net income has been allocated to plant investment. A rate of 6 per cent is used in the hypothetical cases presented in the report to illustrate the application of Plan No. 2; that is, 6 per cent of plant investment is deducted in each case from the net income before depletion, to represent the amount of profit which should be allocated to such investment, and 40 per cent of the remainder is then taken as the depletion deduction. It is deemed unnecessary for purposes of this article to discuss Plan No. 2, for it embodies impracticable features which have been so thoroughly analyzed since the report was published that the staff of the committee will not be likely to offer this plan for consideration at the hearing.

The conclusions on the bituminous coal industry reached in the report are interesting and enlightening. To quote: "For the total period of ten years, beginning with 1916 and extending through the year 1926 (omitting 1917, figures for which are not available), coal companies paid 39 per cent of the total tax for the entire mining industry, although it received only 30 per cent of the net income" (p. 11, Preliminary Report on Depletion). "The coal industry receives inadequate allowances" (p. 21). "Bituminous coal mine operators have not received the relief given other mine operators. The coal industry has been profitable only in a few years and is now in a condition as depressed as agriculture. The present system results in taking away from the bituminous coal industry a large proportion of its profits in taxes in the infrequent year of prosperity. It appears, therefore, that a substitute method is desirable" (p. 22).

Of coal companies reporting net income the following illustration is given (p. 30) to show how percentage Plan No. 1 would increase depletion allowances:

Depletion allowances	1924	1925	1926
By present method	$11,489,275	$7,619,860	$17,304,112
By plan No. 1	19,218,107	18,417,392	37,649,668
Tax			
By present method	$5,554,238	$5,587,086	$10,646,874
By plan No. 1	4,588,134	4,183,507	7,900,324

The above figures speak for themselves. The coal industry certainly would not refuse such a result thus offered. And the staff of the joint committee, after more than six years of intensive study and investigation, states that "It appears that the change is not too great to be acceptable," meaning, of course, such a change is necessary to correct the existing inequitable situation with respect to the coal industry.

Valuations of coal-mining properties for depletion purposes have been ridiculously low. The income tax law has provided, since 1918, for "a reasonable allowance for depletion . . . according to the peculiar conditions in each case." The question to be determined was, What is a reasonable allowance? It has been the policy of the Treasury Department to base such determination upon valuation of the coal-mining property as of March 1, 1913, or other basic date, dividing the valuation finally computed by the total estimated units contained in the property and valued to find the rate per unit, and then multiplying the units extracted in the year under consideration by the rate per unit so established.

The Treasury Department holds this practice constitutes "a reasonable allowance," on the theory that the peculiar conditions of each case are considered in making the valuation. It will be obvious to those who are familiar with the valuation methods applied by the department in the case of the coal industry, that this is debatable; just as it was obvious to the investigating staff of the joint committee.

In the first place, the department holds that coal exists in such enormous quantities and in so many localities that it could have little or no value. For example, a valuable operation in New Mexico, Wyoming, or Colorado, with an excellent market because of long-term contracts for output, was allowed little value because government coal lands in the vicinity, known to contain equivalent

*Formerly tax counsel, American Mining Congress.

grades and seams of coal that could be produced with equivalent mining costs, were available for purchase and operation, if desired by any purchaser or operator. Thus, it was held that the peculiar conditions of that case warranted a valuation as low as those of the government coal lands in the vicinity, although the property valued was a profitable operation owned by a going concern and adequately financed, with a certain market for its output, and proved conditions of mining that gave its coal a value far above comparable "for sale" values in undeveloped government coal lands adjacent.

Then, too, in a well-developed coal-mining field like West Virginia, which, for purposes of this article, would be typical of coal districts in Illinois, Indiana, Ohio, or Kentucky, valuations of mines owned by going concerns, adequately financed, were held down to the lowest possible level that could be justified by sales of undeveloped properties, uneconomically operated mines, forced sales, local assessed values, sales between close corporations or individuals having a community of interest somewhere, or minimum royalty contracts that in most cases had and have no definite relation to true value in the case of a fully developed, adequately financed, and efficiently managed operation.

The fact that percentage depletion has been referred to in the report as a "substitute method" has caused some operators to fear that its adoption would mean the elimination of March 1, 1913, value as a basis for depletion. As to this phase of the matter, it may be said that Congress did not eliminate March 1, 1913 value in adopting a percentage basis for the oil and gas industry. The concluding clause of the oil and gas provision, Section 114 (b) (3), Revenue Act of 1928, reads as follows: "except that in no case shall the depletion allowance be less than it would be if computed without reference to this paragraph"; meaning that in no case should the allowance based upon 27½ per cent of the gross income subject to the limitation of 50 per cent of the net income be less than it would be if computed on the basis of cost or March 1, 1913, value. There is no complaint against the oil and gas provision. There is no suggestion that Congress apply any different rule for mines in case the percentage method is adopted.

The joint committee staff's report quotes the following excerpt from a communication received from a domestic taxpayer who also is allowed percentage depletion under the Canadian laws:

"Such a method of ascertaining the annual depletion allowance has apparently been so simple, equitable, and satisfactory to both the tax authorities and the taxpayers, that it has not been necessary for the Canadian government to issue any general regulations or publish rulings in connection with its method of allowing depletion."

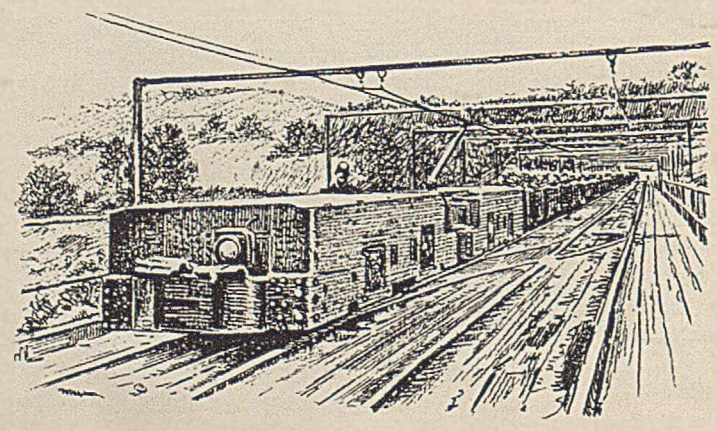
It has been long recognized that in the case of mines net profits or net operating income represents two distinct accounting elements—true profit and return of capital. That is, a mining operation converts capital held in the form of property into capital in the form of cash, and the profit is the cash or cash value received from the sale of the product in excess of the capital value thus converted, less operating expenses or items of expenditure that are properly chargeable against the price received for the product, and are therefore deductible in the determination of true profit.

A simple illustration of what is meant by capital value of a mining property, is this: A mine containing 1,000,000 tons of mineral of a certain value in place, is found after full development to contain 4,000,000 tons. The local tax assessor for general property tax purposes assesses the value of that 4,000,000 tons. Such property value is capital value. If, under the income tax law, any part of the value of that 4,000,000 tons is taxed as income, then one government is taxing the property as real property and the other government is taxing it as income when its value is converted into cash. The depletion principle reconciles the two systems of taxation, and harmonizes them.

The percentage method of determining depletion is in line with the principle, although it uses actual profits as the measure instead of estimated future profits which are the basis of all analytical appraisals of mines under the present methods. The depletion report states that: "In fact, it can be proven mathematically that depletion by a percentage of net income and depletion by the analytical appraisal method will be the same if the expected profit is correctly estimated in using the latter method. Illustrations are given in the report to show that the analytic appraisal method and the percentage-of-net-income method may be made to produce the same results."

The near-present hearing before the Congressional joint committee is not being held for the purpose of taking anything away from the mines that they are justly entitled to retain. On the contrary, its announced purpose is to ascertain whether percentage depletion will be a practicable solution to the present problems, inequities, and instances of discrimination that have grown up under the existing system.

I do not wish to attempt to impose my views upon those who are financially interested, and who would be the beneficiaries if the plan works out as indicated, or the chief sufferers, if it should be adopted in another form and worked out disadvantageously. What the coal industry should have is the facts. Its representatives should be adequately informed before they act.

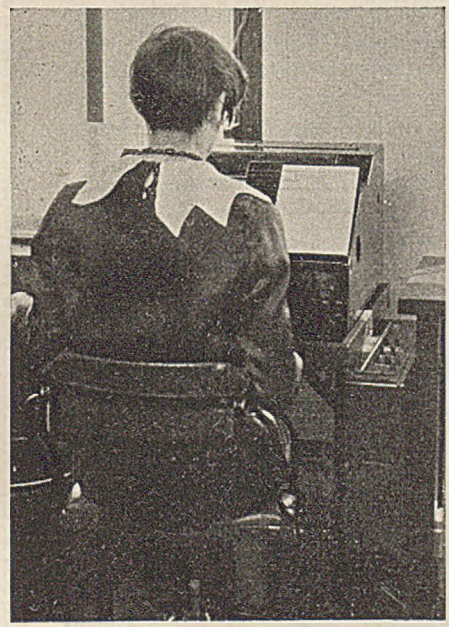


TELEPHONE TYPEWRITER

+ Centralizes Control of Mining Operations

TWO large midwest coal operators—Peabody Coal Co., and Bell & Zoller Coal & Mining Co.—are using telephone typewriter service, which affords them instantaneous and private written communication between their general offices, sales offices and mines. Telephone typewriter service, which consists of two or more electrical typewriters, is furnished by telephone companies and connected by telephone wires. Whatever is typed on one machine is automatically typed on one or more connected machines, whether they be separated by a few city blocks or by hundreds of miles.

As installed by these companies, each station, or machine, is equipped with a selector system which enables



The Written Word From Chicago to Zeigler, Ill., Via Wire

communication with other stations individually or collectively. Inquiries and replies may pass back and forth as in telephone conversations.

Peabody has 26 mines within 300 miles of Chicago. The executive offices, in Chicago, are linked with district offices of the downstate mines by telephone typewriters. Springfield, Harrisburg, West Frankfort and Taylorville, Illinois, are joined in this circuit. At Springfield a ten-line switchboard connects with all points in a system in which two machines may be in communication with different points at the same time. Chicago sends orders to the mines. Shipments, car numbers and billing information are returned. The cost of each day's mining activity is reported to furnish an up-to-date basis for price quoting. Problems which arise at the mines or at any of the offices may be taken up without delay.

The Bell & Zoller company employs this service for communicating between its general offices in Chicago and its mines and sales offices at Centralia, Zeigler and Peoria, Illinois. By this system the various departments in Chicago are enabled to maintain constant and confidential typewritten communication with all of the other points named. Orders typed from Chicago to the mines enable the company to speed up deliveries to its customers 24 to 48 hours. Operating instructions also are typed from the Chicago office. In return, the mines send back reports of shipments, car numbers and other billing information. Information on the amount and grade of coal produced each day and other highly desirable information is given to the sales department in Chicago at once in clear, legible copy which provides a permanent record at all points.

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LETTER

. . . to the Editor

It is to be hoped that the new session of Congress will reach a degree of sympathetic interest in the plight of the coal industry such as was evidenced by President Hoover in his speech before the convention of the American Federation of Labor. Many believe modification of the Sherman law offers the greatest promise of immediate relief. While this might be true with respect to certain local districts, considering the problem nationally I am not sufficiently optimistic to believe that the aims and purposes of the 6,000 operators comprising the industry could thus readily be welded into a harmonious whole.

Permit me to suggest a simpler but more potent remedy. Let our legislators enact a law in the interests of the conservation of our natural resources which will restrain the coal industry from its own folly—a law forbidding the sale of any part of the coal output at a price under the regular and normal cost of production.

Such a law would have ample justification. Without doubt, the practice of selling coal at a loss results in wasteful mining practices and the inevitable premature abandonment of many coal deposits rendered unfit for reopening. This results in great waste of a valuable resource belonging, first of all, to the public. Even more directly is the public affected, because, as a consumer of lump coal, it unfairly pays the losses occasioned by the dumping of the screenings.

During the World War, the government fixed a maximum price on coal. Today, the public interest would best be served by fixing a minimum price. Besides the benefit to the public of sane and conservative mining methods and more equitable prices for its fuel, there is that further assurance of continued and adequate supply which can obtain only by maintaining in reserve a potential capacity safely in excess of immediate requirements, and by the prevention of that monopolistic control which is so altogether inevitable if the present trend be continued.

Consumers of screenings could find no cause for complaint against such a law. They would obtain the minimum price and a product purchased at the cost of production would, assuredly, not be considered excessive in price. The destructive competition, which the President rightly recognizes as the fundamental ailment of our industry, finds its very roots in the insane policy of marketing screenings without regard to the cost of production. All would benefit by its restraint, and competition of the right kind would remain to stimulate a rejuvenated industry.

Labor, too, would benefit, because the present unsatisfactory status of coal-mine labor is, primarily, the result of the treadmill effect to outrace continually lowering realization by pushing wages downward at an even faster pace. If labor is to benefit, the industry to which it contributes must first find itself and red figures be changed to black.

There may be many who will say this suggestion is impractical. But can anyone suggest a solution which will better carry the universal benefits which are contained within it? No injustice would be done to anyone. There would be no opportunity to take unfair advantage of a competitor, or to mulct the public. The industry itself would take on renewed stability, and all business contacting with it would feel the stimulation. Financial interests would overcome their anxiety over the many bankrupts threatening their doorsteps and the counteraction to the present depression would be considerable.

This suggested remedy, it is true, would not increase the consumption of coal. Other methods should be prosecuted to do that. It promises, however, to yield a small profit to the present producers, instead of the losses now suffered by the great majority. Are we big enough to throw aside ancient inhibitions and manfully attack the problem at its source?

Vincennes, Ind. WALTER E. BUSS
Civil and Mining Engineer

COAL AGE

SYDNEY A. HALE, *Editor*

NEW YORK, DECEMBER, 1930

Our menacing returns

FOR many years our return airways were examples of the motto "Out of sight, out of mind." Toward them the air current swept all the fine dust of mining. Steadily and stealthily the deposits grew and nothing disturbed them till the day of reckoning—the day of wrath for that mine. And it was in the return and not in the intake that the maximum gas content was to be found. When it was not sampled and analyzed, it might be allowed to run to a goodly percentage, enough to be read by a safety lamp. So conditions favored an explosion. There lay the train of powder; and there flowed the gas in a steady stream, as tinder, to start the conflagration.

But, nevertheless, the management forgot the return and rock-dusted the intake, though that roadway had none of the impalpable levigated dust from the workings, had often clay floors and rock ballast to mingle with the floor dust, and had, moreover, little or no gas. The return which was forgotten did not forget, and it repeatedly avenged the oversight.

In some cases, it is true, the haulage was on the return. Wherever the roadway was rock-dusted and the mine was well ventilated, it was really safer perhaps to haul coal that way than to have the return in a heading unprotected by rock dust. Of course, it is now known by terrible demonstrations that the return should be better rock-dusted even than the intake, because there is more gas, and now that returns are being rock-dusted, the rule to haul in the intake still holds good.

With water on the cutter bar and on the coal shot down and with rock dust in the return to neutralize what little coal dust reaches it, danger seems likely to swing back to the intake, where coal dust lurks on crossbars and is swept off the tops of cars, and sometimes is bespread in even greater volume from rotary dumps improperly placed.

Coal, too

PUBLIC UTILITIES in the New York area are discovering a growing market for automatic gas heating among owners of the smaller type of dwellings. Surveys made by the Consolidated Gas Co. and affiliated interests reveal an increase in the number of installations since a reduction in rates last summer and a decrease in the average number of square feet of radiation per home taking this service. There is, remarks N. T. Sellman, director of sales and utilization, a "growing realization on the part of many home owners that the small servantless home needs automatic heat just as much as the larger home."

If there is a market here for automatic gas heat, there also is a market to be cultivated by coal—not only in the New York area but throughout the country. When fuel-oil competition seemed most menacing, the common cry in the coal industry was that the oil burner was robbing coal of its best customers—the largest domestic consumers. But the smaller consumer is equally important, and in numbers and total consumption outclasses the minority of fifty- and one-hundred-ton buyers. Is he to be passed by in sales drives for mechanized home heating until competitors spurred on by surveys similar to that of the Consolidated Gas Co. adopt the suggestion made by *Gas Age-Record* to revamp their sales appeal?

Despite mass demand for more of "the luxuries" of living, many promotional campaigns of intrinsically broad appeal still seem to be directed solely to the small group in the higher income brackets. Yet sales of automobiles, electric refrigeration, and radios have demonstrated that the thousands with smaller financial resources are not insensitive to the newer comforts and conveniences, nor without the means to satisfy their cravings for these things. The best and surest domestic customer the coal trade can have is the customer who has mechanized his coal burning. If the coal industry doesn't sell mechanized coal heating, eventually somebody else will sell him another type of automatic home heating.

What's wrong with water

POPULARLY it is thought that no medium for extinguishing flame is more ideal than water. In a degree its extremely high specific heat gives it that ability. Gases have a greater specific heat; notably air, which has a capacity about 40 per cent above that of water; but then it must be remembered that air is so light that per unit of volume—and it is volume that counts—it has an exceedingly small capacity. When it is considered further that for the evaporation from liquid to vapor water requires much heat, it seems difficult to question the value of water as a fire extinguisher.

Experience, however, has shown that water will not suppress a dust explosion as satisfactorily as rock dust. What is the reason for its inability to do so? Probably the principal reason is that though water has five times as much capacity for holding heat it weighs only one-half to one-third as much as rock dust and has only a little over one-sixth as much conductivity. These latter may be the determinative factors in an explosion, for the phenomenon is extremely brief. The relative ability of rock dust and water to absorb exterior heat per unit of time also enters into the problem, but data seem

lacking on this subject, experiments having relation to planished material and not to anything so irregular as dust. The rough material for which absorption figures are given does not include limestone or slate, but only chalk and field soil. The latter have about half the ability of water to absorb heat, whereas the rocks that are planished, but not shiny, have just about the same ability to receive heat as water. The condition of the surface has much to do with the rapidity of absorption.

Much depends on the way in which the water is raised into the face of the explosion. If it rises in sheets, or even in large drops, the conductivity is extremely important. Water in drops probably gets warm or even hot on the outside, due to fairly ready absorption, but it fails to warm on the inside because of the size of the drops and the lack of conductivity. If that be so, its ability to hold heat sensibly or as latent heat is not important, for little of it will be received. If, moreover, the water does not rise into the air, because it is held by the surface tension to coal or rock, then also it is useless. Even if it rises and does not fill the heading, it operates to little purpose. A little water in the track ballast is an agglutinant and merely prevents floor materials, for good or for bad, from taking part in the explosion.

They sold more cars

WHY doesn't the coal industry stimulate the use of coal as the automobile industry has stimulated the use of cars? The reflection of this question could be found in the thoughtful and thought-provoking address of James L. Walsh before the National Coal Association, but it has been asked by others again and again. C. E. Bockus, in "The Menace of Overproduction," answers it by saying: "The demand for bituminous coal is what economists call inelastic; that is, whether for domestic heating or for industrial purposes, consumers need and must have a definite amount of coal."

In this respect coal is sharply differentiated from automobiles. Automobile merchandising has consisted in selling cars and trucks, first to replace buggies and wagons, and second to supply transportation to those who had no aids but Shanks' mare, the bicycle, or the delivery boy. Coal had its day of displacement; now it must undertake to do a job much more recondite than the automobile industry has done if it is to provide for the enlargement of its market. It has to build up the cooling industry so as to make more business for the utilities in order that the utilities, restricted in their white-power capacity, will have to make more black power, and buy coal to make it. To this end the coal industry might establish the refrigerating companies and advertise, not the use of coal but the use of the electric power made by the public utilities. It has to advocate not the obvious, like transportation, but something so unusual as the heating of sidewalks, switches, stadiums, and roads. Not only must the coal industry invent a new means, like the automobile, but a new use for that means.

Despite all the encomiums of the automobile industry, it sold only cars. Truth to tell, it needed to sell nothing else, just as the coal men had nothing to do but sell coal until after the war. Now the coal industry, except for competition with natural gas and oil, must sell something more than coal and must sell through other and alien industries, or must get in those industries to sell the ideas and appliances. Even where coal has to displace and replace substitutes, it has to enter the manufacturing industry in order to enable the consumer to burn effectively the product that has been furnished. But because the job is unusual and difficult does not mean that it cannot be done.

Timber treatment grows

RECENT PROGRESS in the use of treated timbers by the mining industry has taken the preservation process out of the debatable field. Data compiled by the Forest Service of the U. S. Department of Agriculture show that mining enterprises of the country increased their consumption of this material last year nearly 135 per cent over 1928. Consumption of treated ties jumped from 3,704,805 board feet measure to 7,941,870; treated mine timbers from 5,579,295 to 13,614,075 board feet measure. While these figures relate to the mining industry as a whole, there is no reason for believing that the increase in coal-mine consumption was not on a par with the industry gain.

Observation of current field trends clearly indicates that coal operators have fallen into line with the railroads in protecting assets in timbers and ties. Companies large and small in almost every producing state are seizing the opportunity to conserve both material and the labor used in replacements. Pennsylvania and West Virginia mines are giving preservative treatment a bigger place in planning and operations; Illinois is doing more than thinking; mining fields west of the Mississippi River also are giving the question careful consideration.

However wide the opportunities, they should be approached circumspectly. Wholesale application of the process without due regard for procedure, purpose, and limiting factors is not without danger. No profit should be expected from treated timber until after the elapse of the years equivalent to the normal life of untreated material in the same service. Nor should any saving be anticipated if the untreated core of the timber is left exposed after trimming. Furthermore, no gain will be realized from the use of treated timber where fungi do not flourish or where the useful life of the treated material greatly exceeds the period of service required. Finally, the margin of profit will be narrowed if expensive woods are used where cheaper woods would serve the same purpose.

NOTES

. . . from Across the Sea

BACKFILLING is such a handicap in mine operation that even the Germans, its leading exponents, are now striving to get away from it. In the Ruhr, the settlement of the surface is followed by flooding, but, it is contended, some sinking is almost inevitable no matter how much care is taken, and some degree of flooding must, therefore, be expected. With tight backfilling the surface sinks only a few inches and the water has to be lifted accordingly, but it costs just about as much to pump the water as if it needed to be lifted several feet. Owners of mines connot see much advantage, therefore, in holding up the surface beneath which they are removing coal, unless there are buildings to be supported.

Operators in this country faced with the difficulties resulting from the undermining of towns have, as in Germany, an interest in any methods which will seem likely to reduce the cost of backfilling. Others are looking for an opportunity to place superfluous rock in old workings, in advancing rooms, or in the gob sides of advancing headings, and these may find an interest in certain German methods of rock stowing.

In a recent issue (May, 1930) of the *Eickhoff Mitteilungen* is described the so-called Krupp-Dr. Wemmer-Leyendecker gobbing machine, which has been operating at the Salzer & Neuack colliery. The stowing machine consists of a centrifugal head with hood, a motor, haulage mechanism, skids, and a belt conveyor for feeding the centrifugal head with material for gobbing.

This head (see Figs. 1 and 3) has a revolving disk made of special wear-resisting material. From this disk three powerful lugs project, which are known as ejectors. The material to be gobbed drops through an aperture in the upper part, or hood, onto the revolving disk, which spins around on its vertical axis at 450 r.p.m. The rock is caught by the ejectors and thrown with great force from the machine, traveling through the front opening of the centrifugal head at an initial speed of 75 ft. per second.

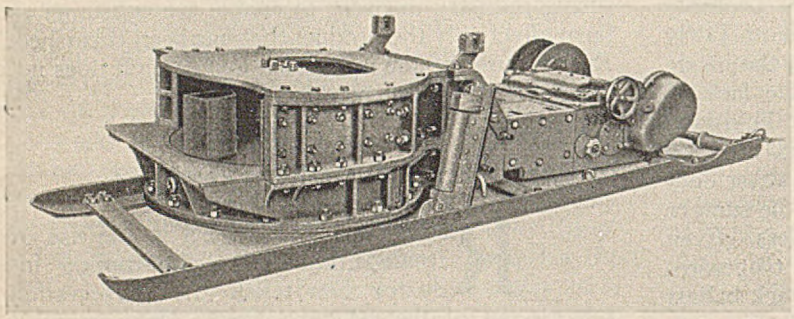


Fig. 1—Gobbing Machine. Rock Enters Through Hole in Head and Is Ejected at Front End

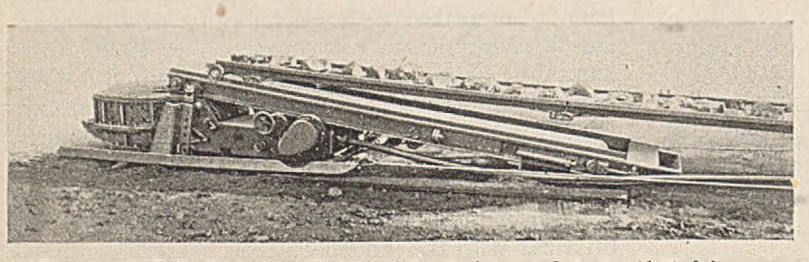


Fig. 2—A Belt Conveyor Delivers the Refuse and Is Itself Fed by a Shaking Conveyor Which, Mounted on the Belt-Conveyor Frame, Adjusts Itself to the Distance to Be Traversed

At the Salzer & Neuack colliery the goaf is stowed with varied material, of which part is obtained from screens and part from washery waste. However, the machine can handle without difficulty pieces up to 8x12 in., such as fall from the roof on the driving of headings. But with such large missiles hurtling through the air, props are torn down, so as far as possible, material of smaller size should be used.

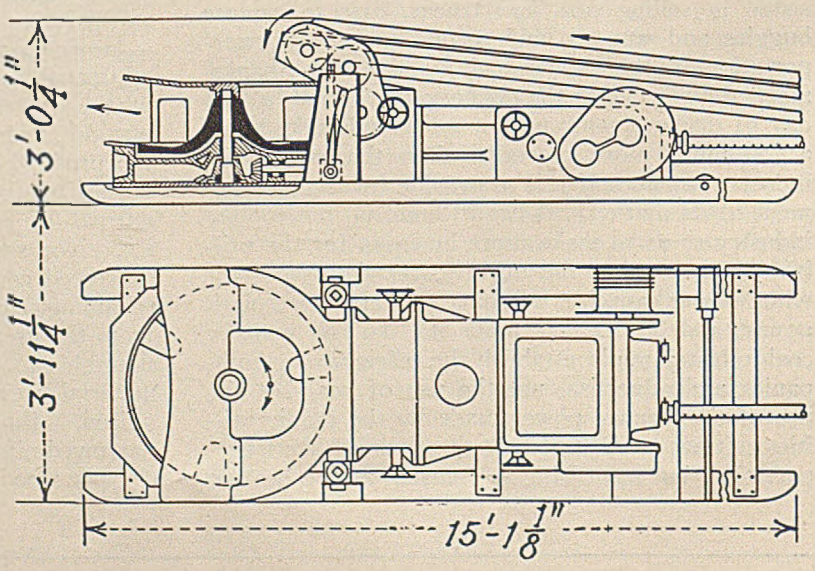
The exhaust from the driving motor is discharged into the small space between the revolving disk and the gear case. Thus the small stowing material is prevented from filling this space and interfering with the movement of the disk.

Between the centrifugal head and the driving unit is the gear box containing gears for reversing the direction of rotation of the centrifugal disk, for it runs in either direction. The waste material does not fly off the disk in a straight line, but scatters the rock over an angle of about 60 deg. In consequence, the direction of rotation must depend on the position of the machine in relation to the area being stowed.

Naturally, the scattering sector must be always in the direction of the gob. Looking from the rear of the machine toward its centrifugal head, if the gob is on the right, the centrifugal disk—seen from above—must revolve clockwise. Controls are located on both sides of the machine so that it can be worked at a place easy of access and entirely without hazard. The motor may be a compressed-air turbine motor of 30-hp. capacity operating at 60-lb. pressure, or an alternating motor.

The haulage mechanism is used for moving the machine as the work of

Fig. 3—Note the Three Ejector Lugs on the Revolving Disk. These Engage Rock and Throw it Into Area to Be Stowed



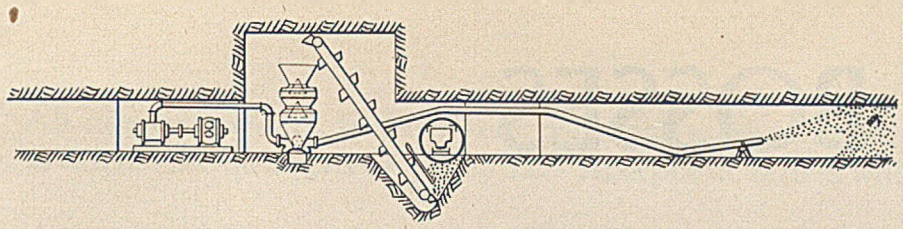


Fig. 4—A German System of Backfilling by Air With a Well Trapped Hopper

stowing progresses, and also for flitting it to a new district. The rope drum holds 390 ft. of rope and so can move the machine 195 ft. without it being necessary to change the rope posts. As will be noted, the machine moves on angle-iron skids. For adjusting the width and height of throw to accord with the thickness of the seam, an elevating device has been provided on the sledge which allows the machine to be inclined at the necessary angle. The stowing material can be brought to the centrifugal head by a short belt conveyor installed above the machine, which in turn receives its material from a shaker conveyor. The short belt conveyor is inserted in order to make the operation of the machine more continuous than it would otherwise be.

Experiments have been made at Derne to ascertain whether sparks which are caused by the discharge of the rocks will set fire to firedamp, but no ignition occurred.

Where small-size material is available, either hydraulic or pneumatic stowing is possible, and both have had their exemplification in Germany. Both have had use in the United States, for hydraulic stowing originated in the anthracite regions of Pennsylvania and has had extensive application where subsidence would otherwise have wrought excessive damage, and pneumatic stowing has been used for years in the mines of the Champion Copper Co., Painesdale, Mich., where mill tailings are dropped into the mine and distributed pneumatically. In this latter case the sand is allowed to fall into a tank. This is closed at the top and air is blown into it at the top and bottom. The upper pipe blows the sand out of the tank, and the lower, being directed longitudinally along the distribution pipe, forces the falling sand along the pipe line, which is of varying length up to 100 ft. The air pressure is about 70 lb. per square inch and the diameter of the pipe 4 in. Dresser couplings in the pipe permit it to be deflected a little in either direction.

To return to Germany: at the Grimberg shafts of the Monopol colliery, in Germany, backfilling was, and perhaps still is, moved by pneumatic methods. For the pneumatic filling, washery refuse was used or surface material of a diameter not exceeding 3⅛ in. The loads of backfilling material carried by the small-size tubs or cars that are so general in Germany were dumped into a hopper. The latter held the content of five cars. The rock fell onto a revolving plate located at the bottom of the hopper. A stationary scraper, which was adjustable, however, swept the rock into a little bin fitted with a star feeder. The installation was driven by a compressed-air motor of 6 horsepower.

At the Herringhaus mine, on the other hand, the backfilling material was dumped into a hopper which was connected at the bottom with a large pipe in which fitted a reciprocating piston. As the piston went back and forth it delivered a suitable quantity of refilling material to the pipe line, along which it was blown by air. Experience showed that the line should not exceed 900 or 1,200 ft. Whenever this distance was exceeded, the charging plant was moved forward toward the area to be filled. Cast-iron pipe was used in the roadways of an internal diameter of nearly 10 in. and over ½ in. thick. In the longwall working places, however, sheet-iron pipes were used which were easily assembled, torn apart, and transported.

The Ollrogge system uses a big pipe at the point of discharge of the backfilling equipment. The backfilling material travels in the upper half of the pipe and air travels in the lower part. The lower part, which is large and suddenly tapered, has at its end a small orifice. The air which passes out at this orifice serves both to sweep the material out of the distributing pipe and to suck in more material, thus acting as an injector.

With all forms of backfilling some difficulties are found. Filling by centrifugal force cuts, breaks, and dislodges timber. Hydraulic backfilling gives a difficult pumping problem and unpleasant working conditions. Pneumatic backfilling creates a dust which must be not only objectionable but injurious, though protective against coal-dust explosions. Of all methods perhaps none would appeal so much as some form of backfiller that would take the material, large or small, about as it finds it and pack it in place in the gob without pipes or other paraphernalia.

R Dawson Hall

On the ENGINEER'S BOOK SHELF

The Economics of the Coal Industry, by R. C. Smart, Vice-President, National Association of Colliery Managers. P. S. King & Son, Ltd., Westminster, London, England. 268 pp.; cloth.

Not very encouraging for British industry is this book by R. C. Smart. It deprecates legislative interference and advocates in its stead a progressive leadership among operators and men. As there is no organized conclusion perhaps the reviewer may be pardoned if he omits a few of the less obvious items. One point made is that the coal operators of Great Britain must increase their mechanization if they would compete with European countries, especially Germany; another, that miners and operators must realize that they are in the same boat, and whether they sink or float depends on their mutual forbearance and reasonable conduct; and a third, that less extravagant marketing methods must be adopted.

Unless the operators face the problem and mechanize, mend their industrial relations, and change their selling methods, they will face a continually decreasing foreign market. The possibilities of mechanization are exemplified by the experience of a concern with a 4 ft. 6 in. seam which is loading coal on conveyors. The men thus engaged load 15½ short tons per man-shift on a sort of longwall face with face conveyors which feed to a scraper conveyor, which delivers in turn to a 24-in. canvas-belt conveyor. This dumps the coal into half-ton capacity cars. But for fifteen coal-getters must be employed four mechanics, two men for timber transport, and two men inspecting; bringing down the tonnage to 10.22 short tons per man-shift. Development, haulage, surface work, and other items add other men, so that the tonnage per man employed is greatly reduced but is still much greater than 1.145 short tons, which was the average for the South Derbyshire, Leicester, Cannock Chase, and Warwickshire district during September, 1928, as quoted in this book.

The use of steel props as against timber at this plant has been another source of saving. The cost for steel props, including interest, repairing, replacements, and losses was 2.86c. per short ton, as against a cost of 17.86c. per short ton for timber, though this latter expenditure was somewhat high, 14.28c. being a more usual figure.

It is to be hoped that the British operator will take Mr. Smart's advice, but I fear there is in the book too much about the dilemma and too little about the cure. The operator understands the first. He knows he is in dire trouble, but he does not know the way out. He will hardly swallow the many pages of heavy economic disquisition in the hope of finding hidden therein the succulent small meats of the remedy.

R. Dawson Hall

THE BOSSES TALK IT OVER

Safety Inspectors—

Where Do They Fit In

"WHY the grouch, Mac?" asked Jim as he entered the foremen's hangout and found his lieutenant sullen.

"If you want to know," snapped back the foreman, "it's about that safety inspector the Old Man put on. He is forever in the way and causing trouble with his ideas about how the mine should be run and safety maintained."

"Well hasn't a man a right to his own opinion? No one man can have a monopoly on good ideas."

"Hell's toot! I've forgotten more than he knows about safety. Why doesn't the Old Man give me the inspector's salary to spend on safety. I can prevent more accidents than any safety inspector."

"Now, Mac, it isn't that the Old Man thinks the inspector knows any more than you do. He thinks the inspector will see dangerous practices that you might overlook. And he believes the inspector will more than earn his salary if he succeeds in preventing only one accident a month."

"All I have to say, Jim, is that if the inspector wants to keep healthy he will have to keep out of my business. I know when my men are safe."

WHAT DO YOU THINK?

1. Management believes that safety inspectors more than earn their salaries. Do you think so?

2. How should authority be divided between the inspector and the foreman?

3. To whom should the inspector report?

4. How should the inspector function?

5. Do mine foremen sometimes let their personal beliefs interfere with successful operation of the mine?

All superintendents, foremen, electrical and mechanical men are urged to discuss the questions on page 732. Acceptable letters will be paid for ▶▶▶▶

What is the best system to prevent the leaving of stumps in the gob and consequent pillar squeezes? Jim and Mac talked over this question in November. How the readers of *Coal Age* would handle the matter is told in the letters following.

Go In and Get the Pillars When a Creep Starts Trouble

WHEN driving up a cross entry, the foreman should watch the room and entry pillars to see that they are left large enough to hold the weight of the roof. Don't take all the coal as you go, but leave good pillars to come back on, and when you start your second mining, take the coal clean on a straight line. Above all, do not leave small stumps, thinking that the top will hide them. It is better to spend $10,000 on the withdrawal of a few small stumps than to have the roof ride over to the next pocket and contribute to a general creep.

Some bosses leave the pillar operation up to the track men, who show an inclination to take out track from a place which shows signs of weight. When a ride starts, rush the work in the worst places, which procedure has a tendency to preserve the status of the places less seriously affected. Having taken the coal, it is necessary also to shoot the timbers. PORTER HALL

Tams, W. Va.

Pillaring Cannot Be Guided From Blueprints in Office

PILLARS should be inspected not less than three times each week, by a man who understands the importance of working them correctly and who will see that each stump is extracted clean, regardless of cost and labor. If the mine is a small one and cannot pay an extra man, the company should be positive that the foreman and super have backbone enough to pull pillars consistently. If it is a large mine a competent pillar inspector should be hired by the general manager and be required to report to him each week the condition of the pillars and percentage of recovery. The inspector should have no superior other than the general manager and should not be held responsible for costs. This may sound high-handed, but there is no other way out.

I do not think that too much dependence should be put on engineers' ideas on pillar work unless they have had much practical experience. Knowledge of the seam being worked and practical experience mean more in pillar work than technical knowledge alone. Many a good foreman has been blamed and his company bankrupted by being forced to pull pillars from the office. The blueprint looks good and does not show water, slate, bad top, and grades. Yet the engineers should keep a close check on the extraction and keep the maps posted closely.

I require the cut bosses to keep their pillars posted and always ask for their blueprint and check them when visiting their sections. When a ride starts I start with it and give it all my attention until it is stopped. I double the force and pull the timbers in the path of the ride as fast as possible, using just enough timbers to make the top safe and being sure to get each pillar out clean until I get a main fall or break. Then the ride is stopped. But the best thing is to use good judgment and be honest, and there will be no rides. WALTER HORNSBY.

Glo, Ky.

They Said It Couldn't Be Done

IT has been my experience to see pillars pulled successfully in a coal field where pillars had never been drawn before. The greatest factor in the success of the new management lay in their ability to get clean falls. This success was the beginning of a new era in the entire field, for when George did it every mine followed.

The coal was 42 in. high, covered with 10 ft. of slate and 40 ft. of sandstone. Pillar work was started at the property lines, coming back orderly by double shifting for three months. The result was a clean fall over the entire area. This work was under the immediate supervision of pillar bosses, and it was their business to see that every block of coal was taken out clean. Frequently small back stumps were lost, but in no case were they allowed to stand; they were shot out so as not to interfere with a clean break.

The engineering department checked the new pillars so closely that they knew beyond question the size of every peg that had to be shot out and left. They kept in close touch with all pillar work, particularly until a good fall had been made.

ADRIAN KENNETH DAUGHERTY.

Paintsville, Ky.

Roof Control Is Accomplished By Pulling Thick Pillars Clean

PILLAR extraction and roof control are engineering problems that should be tackled as soon as property lines are definitely known. The method of retreat should be supervised and checked every step of the way. If the coal is covered with thick slate followed by a heavy sandstone, or if the cover is great, the first step should be to provide pillars of a size commensurate with the depth of the overburden. The next step is to begin pillaring at the crop or property lines. Work every day and double-shift if necessary to insure a first fall; then place a man in immediate charge who has learned this one thing well: that is, if he loses a block of coal he is taking his first step toward a ride and causing pillar pulling to become a dangerous and costly business in that mine.

At this point the engineering department should decide whether the pillars are large enough. If the roof begins to cut and back stumps have to be shot out and lost, it is reasonable to believe the size of pillars is too small, or that they are not being taken clean. One-hundred-foot blocks are becoming common in coal fields where roof control is a big problem.

To insure keeping a straight line of retreat it is a good plan to divide each pillar into ten sections, numbering them consecutively. This will keep the cuts on the ends and dispense with the necessity for slabbing. Should a ride occur and get beyond control, it is best to pull out and begin again ahead of the ride. Double-shift this new section so as to remove sufficient areas to insure a fall when the ride reaches it.

Paintsville, Ky. GEORGE EDWARDS.

How to Stop the Pillar Ride Becomes a Serious Question

IF PILLARS are started systematically there should be no reason for rides. Unfortunately, we get in a hurry sometimes and allow the extraction of one pillar to fall behind and ultimately cause hindrance to the taking of another. This may be repeated a number of times and eventually the situation is created where one or more stumps are trapped and cannot be recovered except at the risk of accident to men or equipment.

It is then that the temptation comes to the face boss, suggested perhaps by the track layers, to pull the track from the place in the heavy pillar and lay it in No. 10. Generally such action is taken to speed up production after these

men have been hauled over the coals for allowing their tonnage to fall. The ride will surely come if this practice is long tolerated.

How to stop it then becomes the question. The old face boss is gone, and a new man takes his place who is in for one royal battle. A fall must be made, of course, but how to accomplish the desired end will depend entirely upon local conditions. Too frequently we just don't get the fall, and the trouble continues with us.

To avoid this embarrassment and to be in a position to place the blame where it belongs, frequent inspections by a man with authority should be made and all extractions posted regularly on a map. The face boss should be required to accompany this inspector and take his advice. If the advice seems impractical to the face boss, he should take up the matter with the general foreman, who thus will be brought in contact with specific conditions in the section and make the going a bit easier for all concerned. This viewpoint is of one face boss who has been through the mine from both ends.

C. E. MONTGOMERY.

Edwight, W. Va.

Engineers Rely on Prints And Don't See Everything

IF I were an operator or a mine superintendent, I would test the honesty and truthfulness of under officials and keep none in official positions whom I found wanting. Since it is by their mistakes that men learn most, they should own up to their mistakes. A superintendent fails in his duties when he holds his under officials in such confidence that he sees no necessity to observe for himself. In such matters as pillar drawing he should give direct supervision.

The engineering department should certainly check up on pillar extraction. Yet I often feel that the engineers are the cause of at least part of the trouble. They too frequently visualize the workings as they see them on the map, consisting of rooms and pillars lying flat and of uniform width. That is, they are not underground-minded.

My experience has been that rides are much more likely to occur in hilly workings than in flat lying seams, for then the pillars are subject not only to compression but to torsion also.

Linton, Ind. W. H. LUXTON.

What Else Can Be Expected?

THE desire of foremen to keep a uniform rate of production and the temptation to cut costs by taking the "easy" coal are frequently the root of pillar trouble. In the anthracite region, where frequently two or more beds are worked simultaneously, the foremen may take more coal from the lower bed than is advisable merely because the tonnage quota for the upper bed cannot be reached. Taking of pillar coal from the lower bed without regard for the effect on the upper bed sooner or later leads to crushing and squeezing and to irretrievable loss of coal.

To stop the squeezes, much expensive timbering must be done and lives of men unnecessarily jeopardized. Then, though the squeeze is seemingly quieted, there is no assurance that the opposing forces are in equilibrium.

Much of the trouble, of course, can be pinned to the ill-advised practice of section bosses of marking out lost pillars on the map as if they had been mined out. Roof balance is upset and retreat operations become more and more disorganized as the roof takes increasing weight.

JOHN J. CHIRE.

Hazleton, Pa.

Misunderstanding

Mac's dissatisfaction with the assignment of a safety inspector to his mine mirrors an all too common misunderstanding by foremen as to the motives of management in moves to improve operation. It is unfortunate that suspicion gains ascendancy over logic in cases of this kind. Whereas Mac should have welcomed the new inspector with an open mind, he showed resentment. The foreman assumed that his own authority was being challenged and viewed the broad situation short-sightedly. No foreman can depend on himself alone to manage underground activities and at the same time be the watchdog of safety. This is the belief of "Coal Age" editors. What is your belief? Send in your letters—today.

Study of Robbing Operation Must Be Constantly Made

ONCE put on the job, cut bosses should be trusted implicitly. Still, humans being what they are, Mac and all his colleagues would do well to take no chances. Official supervision at regular intervals is needed if only to manifest interest in the outcome of the operation. It is not a very flattering admission to make that on the strength of a trackman's tittle-tattle the Macs of the mining world are all too ready to wield the ax. Ordinary fairness would suggest an inquiry into the reason for such assertions by bringing the parties concerned together for the well-known tête-à-tête. Perhaps if Mac had been on the job a little more thoroughly this eagerly accepted liberal coating of backstairs whitewash would be as ineffective as it is vile.

Where it isn't possible for the mine foreman to visit the area where the pillar extraction is being carried out, it would be well for the cut boss to notify the mine foreman when he intends withdrawing the stumps preparatory to causing a cave-in. Thus informed, he would do well to make a habit of looking over the situation before and immediately after the event, to prevent a possible unwelcome contingency.

As a rule, the engineering force is not the best equipped to handle this job, neither having the time to take care of it advantageously, nor are they temperamentally fitted for the rough and tumble of coal getting at this critical time. In their chosen field of angles they are less likely to go off at a tangent.

A pillar ride is no joke, and its aftermath requires the serious consideration of alert and resourceful management.

ALEXANDER BENNETT

Panama, Ill.

Pillar Rides Best Handled By Avoiding Them Altogether

WITH a pillar ride, the coal is not only costly to mine but it loses the characteristic of being lumpy. Roof pressure is relieved only when the roof is broken and falls occur in pillared areas and, conversely, pillar rides are due primarily to the incomplete extraction, to peculiarities in the deposition of the coal bed, and to slate so piled up that it tends to support the roof, thereby preventing a fall. The deposition of the coal should be studied thoroughly in order to avoid pillar rides. If the coal has a uniform dip, a favorable condition exists, but when the bed is known to contain local dips forming large swags, then pillar robbing becomes a real problem.

The cut boss in charge of pillar work should be instructed to recover pillars completely. This at least should be the ultimate goal. The boss should be of a type to whom can be intrusted the job of making a complete recovery, and who is able to post his print as extractions are being made.

The engineering department should work hand in hand with the cut bosses and check the extraction independently. With these two records, a comparison can be made—results should be identical. It is part of the engineering department's job to know and record the progress of recovery and devise methods of recovering coal without pillar rides. But, it also is the cut boss's job to recover the coal without squeezing it; therefore, the two jobs are closely related.

The best way to quiet a pillar ride is not to have any; but when one does come, get busy. If any coal was left behind or is being left behind, recover it, even at a large cost, because the cost at times will save thousands of dollars and tons of coal.

DAVID A. LOSCALZO.

Raleigh, W. Va.

Be Systematic at All Times And Have No Pillar Trouble

THOUGH the initial cause of the pillar ride may be no fault of his, Mac no doubt will catch the devil. Probably the cause dates back to the leaving of pillars too small to support the overlying strata. Pillars that will be ample to hold 200 ft. of overburden will not be adequate under 500 to 1,000 ft. of cover. In all mines, pillars should be of sufficient width to allow splitting of them in case a heavy fall occurs which would be too expensive or impractical to screen up.

A competent practical man should have charge of this work. He should examine the progress of extraction each day and post it on a map. It might be all right to have engineers paint on the pillars the distance each fall is to go. However, I do not believe it to be a good policy to depend upon the engineering department to check up the extraction except on semi-yearly surveys, as they generally have enough other work to keep them employed. Many mines do not carry their own corps and have to hire a survey party. If this expense is incurred each week, production cost will go up.

It is well not to drive too many rooms up before a rib line is formed. All of this reverts back into a discussion of mining methods and layout, which depend entirely upon local conditions. A mine producing coking coal, of course, will not need rooms as wide as those in a mine producing lump coal. When a ride or squeeze has started, the section should be put on double or triple shifts; all standing timbers and stumps which cannot be withdrawn with safety should be blown out with permissible explosive; and it might be an advantage to drill holes in the top and shoot the roof to relieve the weight and induce a fall. The mine foreman should have sufficient help to enable him to visit pillar workings, checking up on conditions in general and the amount of material being recovered.

Smithfield, Pa. F. O. NICHOLS

Teach Safety in the Home

WHEN the superintendent proposed to speak to the family about the chances men take in their work he was getting off on the wrong foot. But even so, he suggested a new approach, one worthy of careful consideration by all of us. It may well be the means of eliminating accidents in the home as well as in the mine. W. J. LYKE.

Midway, Pa.

Men Will Resent Reprimands Made Behind Their Backs

JIM'S scheme of informing a worker's family when a man exposes himself to dangers has the germ of a good idea but it will fail utterly if executed as proposed. No attempt to curb a worker's dangerous habits by protest behind his back will succeed. The idea might be put over effectively in a general meeting to which the women folk are invited.

A few months ago the foreman of a certain mine began a talk on general safety before he dismissed the men from the man trip. During the delivery of his lecture, the foreman unconsciously brought both hands in contact with the trolley wire. His intentions in this case were good, but nevertheless the effect of his talk was lost. This incident shows how carefully an official must approach safety.

JAMES H. ATKINSON.

Mead, W. Va.

As Man to Man

THE super had absolutely no right to tell the worker's wife about the carelessness of her man. If that practice has no other effect, it will start gossip in the camp about the super calling on certain women and will lead to fights.

Why not reverse the angle of approach and speak seriously to the man of his responsibilities in providing for his family? Ask him what will happen to his loved ones if he is injured or killed. If direct approach bears no fruit, the man should be dismissed from the community. Let the super attend strictly to his business, which is at the mine.

Hooversville, Pa. JOHN BOHN.

Trade Literature

Ball Bearings. Norma-Hoffmann Bearings Corporation, Stamford, Conn., has issued a 7-pp. illustrated bulletin entitled "Greaseal Felt Protected Precision Ball Bearings, Closed Type."

Vibrating Screen. Deister Concentrator Co., Fort Wayne, Ind. Bulletin No. 12-E, 20 pp., illustrated, describes the open-type, totally inclosed, dustproof, single, double or triple surface, single vibrator and double vibrator types of the Leahy No-Blind Vibrating Screen.

Ace Hard Rubber Protection for Coal Mines. American Hard Rubber Co., New York City. Pp. 15, illustrated. Describes the advantages of hard rubber pipes and fittings for pumping problems.

Compressors—Vertical, High Pressure, Bulletin 83-Z, describing two-stage compressors, belt-driven and direct-connected for small unit capacities; "WG-6" Belt-Driven, Single Stage, Bulletin 83-X; and Vertical, Direct-Motor-Driven, types "WL-22," "WL-44," for moderate compressed air needs, Bulletin 83-T, are three illustrated publications recently issued by the Sullivan Machinery Co., Chicago.

Belt Conveyors. Link-Belt Co., Chicago. Data Book No. 1,615; 176 pp., illustrated. This book is designed to be helpful in the selection and application of the proper type of belt conveyor for handling any material in desired quantities.

Vertical Four-Cycle Air Injection Diesel Engines. Worthington Pump & Machinery Corporation, Harrison, N. J. Bulletin S-500 (superseding S-173); 43 pp., illustrated. Describes the construction and operation of this slow-speed, heavy duty, single-acting engine.

Mine and Industrial Locomotives. Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa. Special publication No. 1,873; 28 pp., illustrated. Covers the performance and electrical and mechanical construction of seventeen mine locomotives and seven industrial locomotives.

Heavy-Duty Box-Car Loader. Stephens-Adamson Mfg. Co., Aurora, Ill., has published two illustrated data sheets giving descriptions and specifications of its new heavy-duty box-car loader and its standard loader.

Better Welds With Armco Ingot Iron. American Rolling Mill Co., Middletown, Ohio. Pp. 40, illustrated.

Quimby Pneumatic Sump Pump. Chicago Pneumatic Tool Co., New York City. Leaflet illustrating and describing the advantages of this portable pump.

"Stringalite" Safety Lighting Cable. Sullivan Machinery Co., Chicago. Bulletin No. 100-A; leaflet, illustrated. Describes the advantages of this new cable, developed especially to withstand severe demands of underground lighting service.

Type MPC Direct-Current Motors of base and pedestal-bearing construction for moderate or heavy duty. General Electric Co., Schenectady, N. Y. GEA-1294; 4 pp., illustrated.

"Bulldozing in Pennsylvania" is the title of a 10-pp., illustrated bulletin issued by the La-Plant Choate Mfg. Co., Inc., Cedar Rapids, Iowa, showing the various uses to which these machines are put.

Recent Patents

Cutter Chain; 1,777,515. Frank Cartlidge, Cincinnati, Ohio, assignor to Bertrand P. Tracy, Pittsburgh, Pa. Oct. 7, 1930.

Coal-Cutting Machine; 1,777,621. Ernst F. Muller, Columbus, Ohio, assignor to Jeffrey Mfg. Co., Columbus, Ohio. Oct. 7, 1930.

Coal-Mining Machine; 1,778,298. Nils D. Levin, Columbus, Ohio, assignor to Jeffrey Mfg. Co., Columbus, Ohio. Oct. 14, 1930.

Loading Machine; 1,778,595. Andrew Hauge, Michigan City, Ind., assignor to Sullivan Machinery Co., Chicago. Oct. 14, 1930.

Control of Doors or Gates for Mining; 1,778,661. L. B. Childe and A. G. Kershaw, London, England, assignors to Union Switch & Signal Co., Swissvale, Pa. Oct. 14, 1930.

Rotary Car Dumper; 1,778,821. Andrews Allen, Glencoe, Ill., assignor to Allen & Garcia Co., Chicago. Oct. 21, 1930.

Rotary Car Dumper; 1,768,848. Elwin H. Kidder, Chicago, assignor to Link-Belt Co., Chicago. July 1, 1930.

Car Dumper; 1,768,849. Elwin H. Kidder, Chicago, assignor to Link-Belt Co., Chicago. July 1, 1930.

Loading Machine; 1,768,852. George Manierre, Milwaukee, Wis. July 1, 1930.

Protector for Mining Tools; 1,769,174. Lawrence C. Burks and John A. Buchheit, Uniontown, Pa. July 1, 1930.

Mine Car; 1,769,939. Abele Berasi, Freeport, Pa. July 1, 1930.

Apparatus for Coal Preparation; 1,770,027. George E. Dean, Scranton, Pa. July 8, 1930.

Apparatus for Marking Coal; 1,770,051. G. M. Thorn, Blackwood, Va.; H. W. Warden, Jr., Haverford, Pa.; and W. J. Blackburn and A. E. Shannon, Calvin, Va., assignors to Blackwood Coal & Coke Co., Blackwood, Va. July 8, 1930.

Coal Cutting and Loading Machine; 1,770,306. David Fleming, Colver, Pa., assignor to Ebensburg Coal Co., Colver, Pa. July 8, 1930.

Conveyor; 1,770,650. Nils D. Levin, Columbus, Ohio, assignor to Jeffrey Mfg. Co., Columbus, Ohio. July 15, 1930.

Method of Mining Coal; 1,770,934. Nils D. Levin, Columbus, Ohio, assignor to Jeffrey Mfg. Co., Columbus, Ohio. July 22, 1930.

Mining Prop; 1,770,978. Louis F. Gerdetz, Pittsburgh, Pa. July 22, 1930.

Locking Device for Conveyor Pans; 1,770,979. Louis F. Gerdetz, Pittsburgh, Pa. July 22, 1930.

Plant for Washing Coal and Other Minerals; 1,771,081. Antoine France, Liége, Belgium. July 22, 1930.

Conveying Link Construction; 1,771,411. Lee Llewellyn and Carl L. Kenney, Dormont, Pa. July 29, 1930.

Mine-Tie Clip; 1,711,819. Justus J. Ross, Huntington, W. Va. July 29, 1930.

Blasting Machine; 1,771,870. Charles P. Banzhof, Lancaster, Pa., assignor of three-fourths to Fidelity Electric Co., Lancaster, Pa. July 29, 1930.

Mining Apparatus; 1,776,799. Theodore K. Vogeley, Butler, Pa. Sept. 30, 1930.

OPERATING IDEAS

From PRODUCTION, ELECTRICAL And MECHANICAL MEN

Mine Blackboards Are Dubbed "Assistant Foremen"

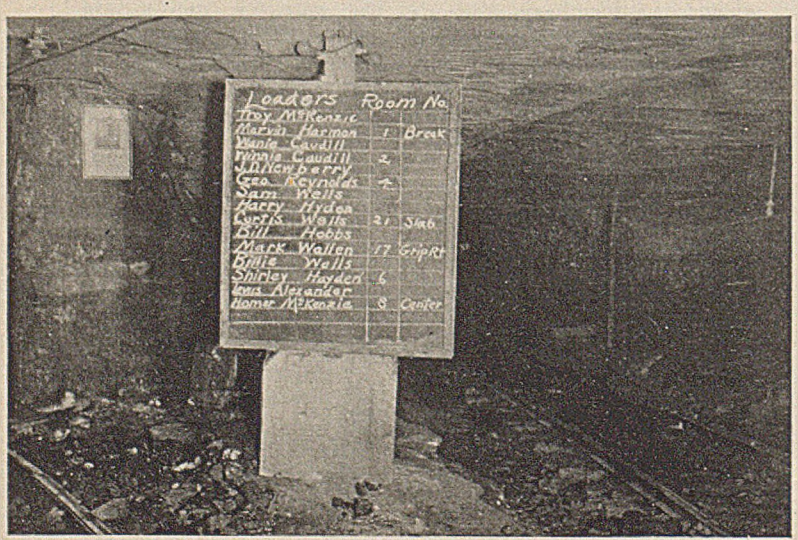
IN every section in the Auxier (Ky.) mine of the North East Coal Co. "assistant foremen" are employed. Locally they are also dubbed "silent foremen," and again are spoken of in the truer meaning as "machine boards" and "report boards." By their use this 1,600-ton mine is operated on a commendably efficient and safe basis with but two "walking" assistants to the mine foreman. The mine workings are rather scattered as compared to present-day ideas of concentration; therefore it is impracticable for two men to keep a close daily check on every working place.

A blackboard, of which the one illustrated is typical, is mounted at the road junction to each section. On it are posted with chalk the names of each loader working therein. When the loader leaves the section at the end of the shift he enters opposite his name the number of the room, if any, that he has cleaned up and wishes cut. In a space opposite the room number he places abbreviated remarks or special instructions, such as call for a cross-cut, a slab, or the gripping of one rib to maintain centers. Likewise he includes a warning of dangerous roof, if observed.

When the machine man leaves the section he simply erases from the board the numbers of those rooms which have been cut. If for any reason he fails to cut a room that was marked up, he leaves a note to that effect at the mine office outside.

Responsibility is thus passed to the loaders and machine men so far as possible, a method which is practicable only with the better type of labor. All employees at the mine are white and English speaking. Almost all are Americans and natives of the section. The labor turnover is practically nothing. Up to Oct. 1, the date of this writing, not a man was hired in 1930, and the force lacked but seven of where it stood at the beginning of the year.

Fifteen Loaders Working in This Section and Seven Rooms Reported Ready for Cutting

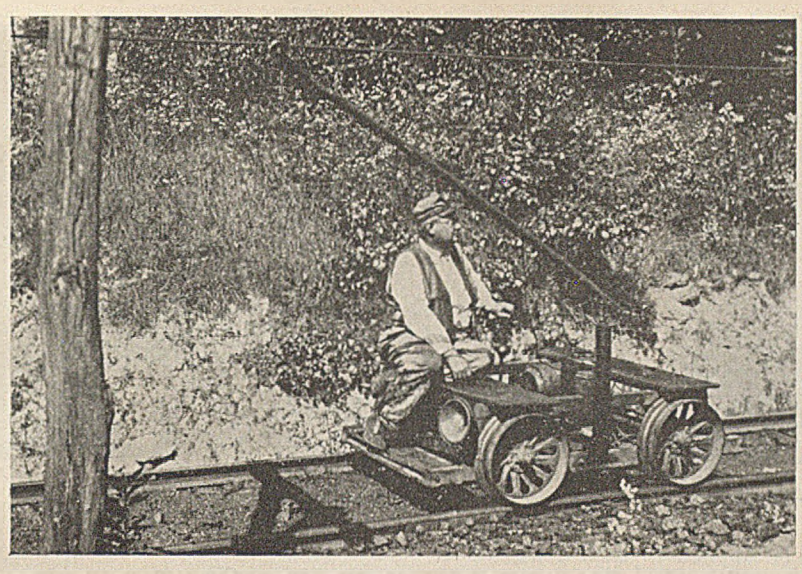


Automobile Parts Utilized To Make Electric Car

A few years ago a progressive superintendent who rigged up an electric "scooter" for efficient transportation of himself about the mine was ridiculed by not a few operators as an impractical coal man. The tables are turned today. Several of these light self-propelled cars are now in use, and at least one large manufacturer has added to its offerings a "superintendent's car" of efficient design for hauling several men and light repair materials. The accompanying photograph shows a home-made car of exceptionally light design but which has proved quite effective and satisfactory for the exclusive use of a superintendent.

W. B. Parks, superintendent of the Stotesbury (W. Va.) mine of the C.C.B. Smokeless Coal Co., is shown riding the car on the outside haulway leading to the mine drift. The drive consists of a 2-hp. 1,750-r.p.m. 250-volt d.c. ball-bearing motor connected by silent chain to an automobile transmission, which in turn is directly connected to the axle through a "Model T" differential case in which the ring gear is fastened solidly to the axle. The chain and sprockets are out of a Chandler car and the transmission is from a Gray car.

Full speed on level track is approximately 12 miles per hour. For severe grades the speed can be reduced and the axle torque proportionally increased by shifting the gears with the transmission lever. Ordinarily, the gears are not shifted for starting. A reversing drum controller affords starting and running speed control of the motor. The car weight is estimated at 350 lb. One man with a short pinch bar can shift it off of the track and push it along a plat-



Now the Superintendent Can Get There and Back Quickly When Necessary

form and into the shed, where it is kept under lock and key. A 4-in. filler sleeve or spacer at the top of the pipe which supports the trolley pole base can be removed quickly without the use of tools, to accommodate the car to restricted heights.

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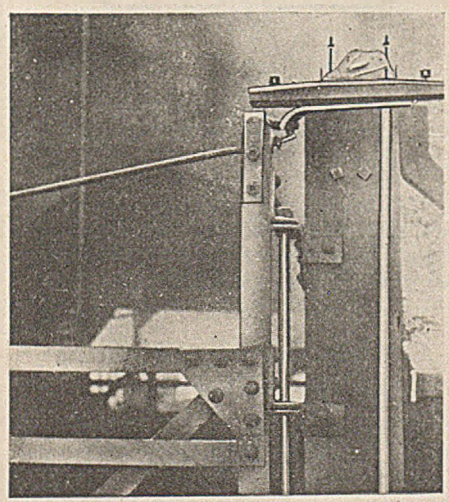
Hoist Control Interlocked With Surface Gates

Adoption of the automatic train stop can be cited as an indication of the superior reliability of modern electrical and mechanical equipment over the human element. Instructions can be issued that a hoist is never to be started unless the surface landing gates are closed, but the chances are that every so often someone will infringe the rules. Recently, electrical gate protection was installed at the auxiliary shaft Mine 261 of the Consolidation Coal Co., Caretta, W. Va.



Mercury Tube at Top of Hinge Post Is Tipped by Arm Connected to Gate

This protection consists of eight mercury tube contacts, one at each hinge and one at each latch of the four gates, all connected in series with a holding coil in the low-voltage release circuit of the hoist motor. When a gate latch is raised the tube at the latch is tippled, thus breaking the circuit and stopping operation of the hoist. Likewise, if the latch end of the gate is opened beyond 18 in. from the center post, the circuit is broken by the contact at the hinge. The latch contact can be operated by hand to allow moving of the cage, provided, however, that the gate is closed to within 18 in. of the post.

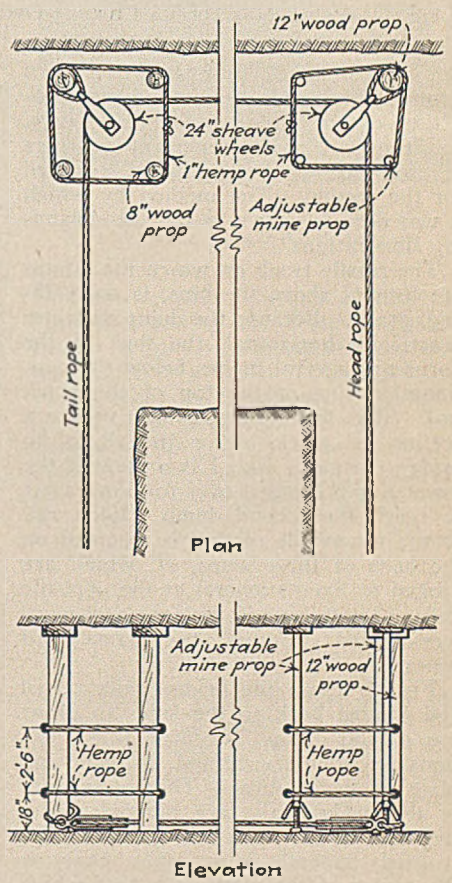
Bigger Salaries

An executive in the industry not long ago made the remark, "Our company pays twice as much salary to a maintenance man who produces, as to the mine-run type." That, incidentally, is the trend in the progressive companies today. They want men with good ideas gained through direct contact with the job and through reading. These pages of operating short cuts are the ideas that will help you on your job. *Coal Age* will appreciate your help in keeping these pages live by sending in original ideas. A minimum rate of $5 is paid for each accepted idea. Contributions requiring illustration should be accompanied by a photograph or rough pencil sketch.

If the Scraper Sheave Fails No Injury Will Occur

One of the regulations recently added to the book of standards of the Union Pacific Coal Co. governing the operations of its mines in Wyoming has to do with the fencing of sheaves in scraper loading. The post to which the sheave is attached is set up in the customary manner. Around each sheave are erected three additional posts (one inside the rope), and all are circled by two loops of 1-in. hemp rope.

Obviously, the purpose of this scheme is to prevent whipping of the rope across the working area, and consequent injury to employees, should the sheave fail. In the event that this happened, the rope would move to the inside post and be held in position by the anchorage of all four posts. Adjustable props are used, of course, in fencing the sheave holding the head rope.



Details of Sheave Fencing

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Hinged Rails Allow Use of Horn Dumps in Series

Development work at the bottom of a new manway slope of the C. C. B. Smokeless Coal Co., Helen, W. Va., called for a temporary and inexpensive arrangement at the portal whereby a car of rock or a car of coal hoisted on the single track could be dumped into a rock bin or coal bin, respectively. This

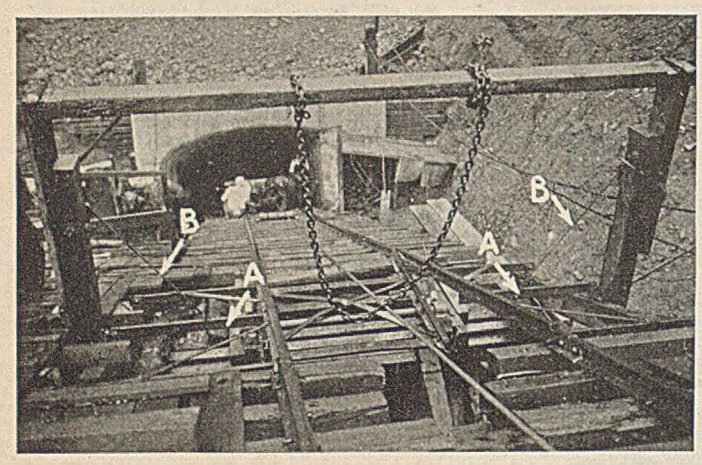


Fig. 1—Bridge Rails Form a Crossing Over the Horn Dump

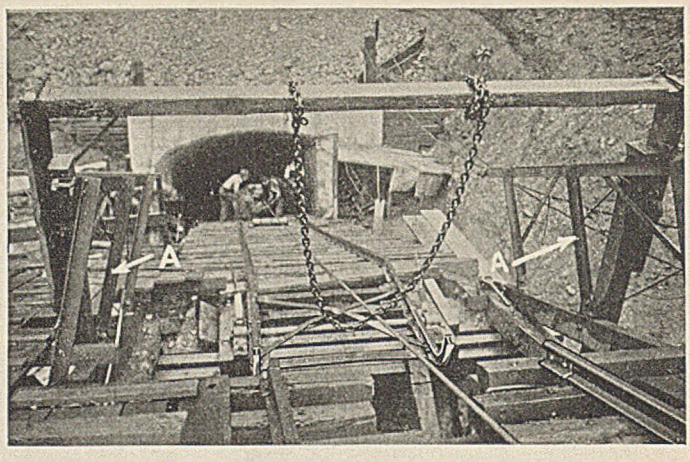


Fig. 2—Rails Are Raised, Allowing Use of the Dump

was accomplished by using two horn dumps mounted in series and close together on the same track. Obviously, this required an arrangement for cars to cross the first dump when destined for the second. The method by which it was done is shown in the accompanying illustrations.

The trestle track on which the dumps are located above the bins, is on a 25-deg. grade. Because the dump rails are practically horizontal, the tops of the horns are several inches below the continuation line of the top of the track rail. This makes it possible to place a section of track above the dump to bridge the gap. Fig. 1 is a view of the lower dump bridged over to allow a car to reach the second dump. Each rail of the removable section is mounted on the ends of three arms, *A*, which are hinged to fixed supports at the opposite ends. These hinged sections are counterweighted through the agency of ropes *B*.

Fig. 2 shows the bridge rails raised and hinged back to the sides to allow use of the dump. Because these sections are counterweighted, one man can raise or lower them. The lower ends of the bridge rails are tapered where they rest on the track rails so as to form a fairly smooth joint. The chain in the center of the pictures is that which holds the rising endgate of the car during dumping.

Metering "Dustless" Liquid Affords Check Data

Certain producers have started the practice of installing a meter in the calcium-chloride spray line to each loading boom equipped for loading treated coal. The meter is read at the start and again at the finish of loading each car, and these readings are recorded with the car number.

The principal reason for the meters is to have a positive check on cars in case a customer complains of excessive dust in a car purchased as treated coal. A means of measuring also facilitates determination of the proper amount that should be applied to each grade under various conditions.

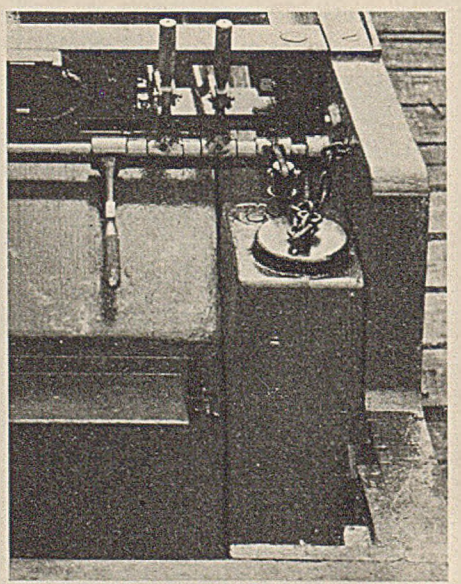
It is reported that special meters built of copper to resist corrosion are being used.

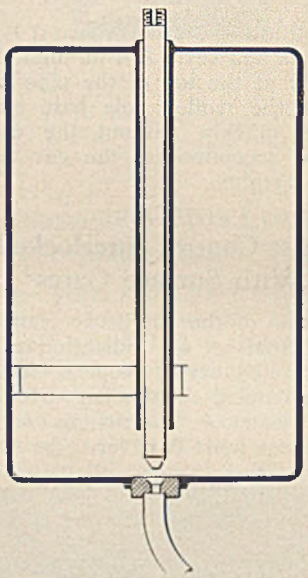
New Valve Has Eliminated Sanding Troubles

Several years ago a new type of sand box was applied to a locomotive of the Consolidation Coal Co. at Jenkins, Ky., which in regular service has proved to be superior to any other tried in that division. The valve operates easily, remains sand-tight, and has required no repairs. For that reason all equipment sent to the central shop for repairs and which has poor sand rigging is being fitted with the new sand boxes made in the shop.

The valve consists of a case-hardened seat set in the bottom of the box and of a 1$\frac{7}{16}$-in. rod with a case-hardened end which fits on the seat. The rod and seat are beveled to 60 deg. and the face of the seat is but $\frac{1}{32}$ in. wide. The rod is guided by a steel tubing 1$\frac{1}{4}$ in. inside diameter and 1$\frac{5}{8}$ in. outside diameter. A brace centers the tube, which extends to within 2 in. of the seat.

New Sand Rigging on a 10-Ton Locomotive





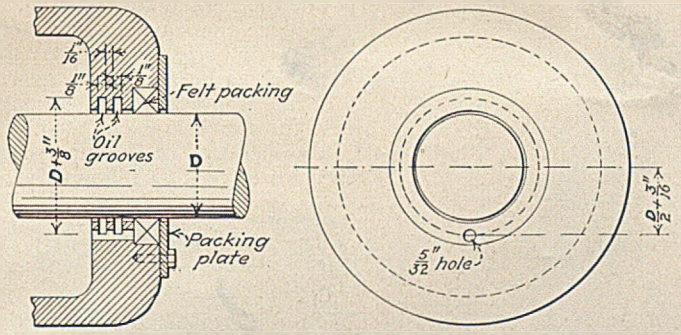
Inside Construction of Sand Box

Raising the rod opens the valve for sanding the locomotive and the valve closes by reason of the weight of the rod when the lever is released.

Grooves in Bearing Housing Stop Oil Leakage

What to do to prevent the leakage of oil and to keep out dirt from around the shaft at bearing housings has long been a problem. Felt rings may correct the trouble temporarily, but they soon become ineffective, either because of wear or of a change of composition under action of the oil. Frequent renewals would be a remedy, but consider the nuisance factor!

After considerable experimenting, it was found—according to David Fliegelman, of Worcester, Mass., in the Sept. 30 issue of *Power* — that peripheral grooves cut in the bearing housing served permanently to stop oil leakage. Grooves are cut $\frac{1}{8}$ in. wide and $\frac{7}{16}$ in.



Excess Oil Gathers in the Grooves and Flows Back Into the Bearing

deep, or to a diameter of $D + \frac{3}{8}$ in.; there should be at least two grooves; and a $\frac{5}{32}$-in. hole should be drilled in the housing, as shown in the figure.

Oil carried along the shaft is thrown off into the grooves by centrifugal force. As this oil accumulates it flows by gravity to the bottom, through the hole, and into the bearing. The wall between the grooves need be only $\frac{1}{8}$ in. thick. Should there not be sufficient stock in the housing for the oil grooves, the housing can be rebored to take a bushing long enough for the grooves.

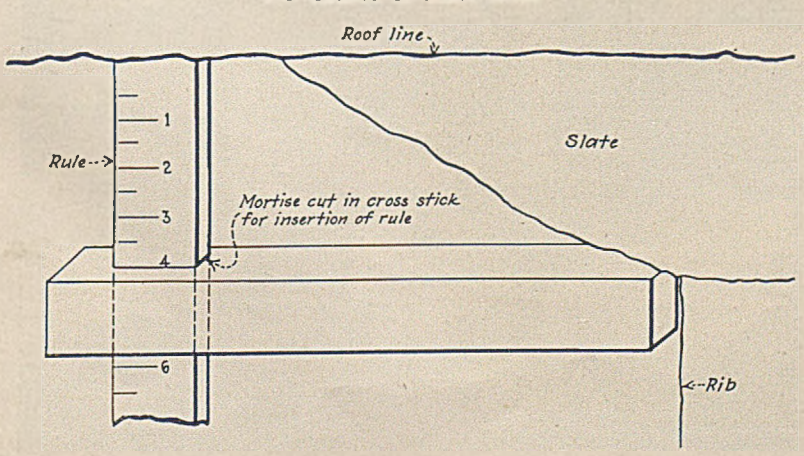
Tests have shown that no oil leaks out along the shaft from bearing housings provided with grooves, even when felt packing is not used. Packing and plates, however, are recommended to keep out dirt from the bearings.

Adjustable Square and Rule For Measuring Yardage

Most mining officials in measuring yardage hold a tape from the roof and with their eye sight to what they think is a level with the bottom of the slate. Then the man who has taken down the slate thinks he has not been given the proper thickness and an argument occurs. At best, this method of measuring yardage is inaccurate and difficult, because the slate from the roof often leaves a ragged edge which slopes away to the rib.

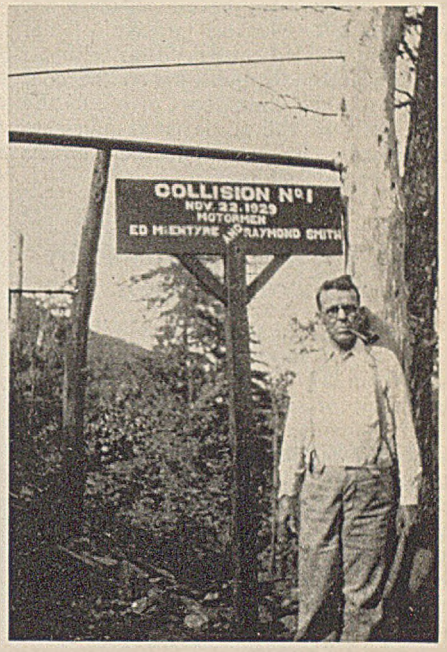
But with the adjustable square rule developed by Walter Hornsby, of Glo, Ky., there is no room for dispute and both the men and the company are sure that justice has been done. To make this rule (see sketch) take a yardstick 26 in. long and insert it in a mortise at the end of a hardwood straight-edge stick 30 in. long, 2 in. wide, and 1 in. thick, to form a perfect square. In measuring slate, the end of the rule is held against the roof at the outer edge of the ragged lip of the slate and the straight-edge is pushed upward to meet the bottom of the slate. This gives an exact reading and one which convinces the miner that the measurement has been taken accurately.

No Chance of Error Here



Signboard Locating Accident Warns Against Danger

On Nov. 22, 1929, a collision occurred on the main outside haulway at the Whitewell (Tenn.) operation of the Black Diamond Coal Mining Co. The point where this accident took place is marked by a signboard (see illustration) which is intended to keep employees on their guard against other accidents or collisions. Incidentally, this happened to be the first collision of the kind at this plant in a number of years. Commenting further, C. M. McFarlin, general superintendent, writes:

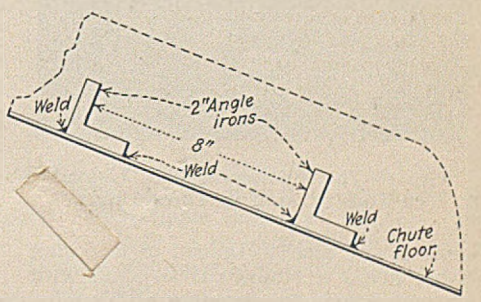


Collision No. 1 Is Recalled to Prevent Future Collisions

"Just a short while prior to the collision at our plant, on one of the main highways leading out of Birmingham, I passed a spot where an airplane pilot was killed in a crash. The exact spot was marked by a monument which, I learned on investigation, had been erected by the parents of the pilot. The idea so impressed me that later, when we had our collision, I decided to apply it."

Angle Irons in Chutes Minimize Wear

In chutes which handle large tonnages, the abrasive action of coal sliding on steel wears away the bottom plate and necessitates periodic replacement of the latter. Where this is the case,



Details of Chute Alteration

and the design of the chute is such that jamming or locking of the coal does not occur, the wear on the floor plate may be minimized by welding scrap angle irons at intervals crosswise of the chute run. Details of this scheme are provided by J. P. Waters, technical publicity department, Union Carbide Co.

Angle irons of 2x2-in. section are cut to lengths equal to the width of the

chute. These are placed about 8 in. apart on the wearing surface of the chute and welded into position with an oxyacetylene blowpipe. When the coal slides down the chute, part of it fills the space between the angle irons and acts as a surface upon which the moving stream of coal slides.

Sand Unloaded Mechanically By Bucket Elevator

Depending upon the shoveling capacity of an individual, it will take a man from 1½ to 2 days to unload a 50-ton car of sand for locomotive service at the mine. If the position of the railroad track with respect to the sand storage bin is not convenient for unloading, the man may spend as much as three days on this task. Furthermore, unless labor is plentiful and the time element is not important, the seemingly simple problem of unloading sand from a string of railroad cars indeed may become serious.

To assure a speedy, positive, and economical method of unloading sand at its Helvetia (Pa.) mine, the Helvetia Coal Mining Co. has installed a mechanical system of sand handling which

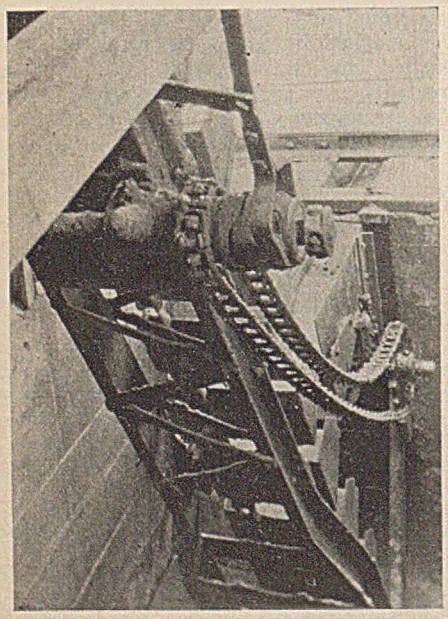


Fig. 1—This Equipment Will Unload 50 Tons of Sand in Three Hours

enables one man to unload in less than three hours a 50-ton car of sand with scarcely any hand shoveling. This mine is now producing about 3,500 tons of coal a day and receives five or more railroad cars of sand in a single shipment.

Sand is emptied from the gondola through the bottom doors, spotted over a reciprocating trough under the track, which discharges onto the bucket elevator, as shown in Fig. 1. This elevator is driven through a spur and gear by a 7½-hp., 550-volt compound-wound direct-current motor. The feeder trough is

Fig. 2—Sand House Structure

driven through a crankshaft which is powered by a chain from the countershaft driving the bucket elevator. Idling of the feeder trough while the bucket elevator is operating is accomplished by a jaw clutch on this countershaft. This equipment is the No. 12 Sunbury sand unloader.

Lathe Attachment Reduces Time to Cut Poles

Locomotive trolley poles are made at one sweep of the carriage by means of a "home-made" attachment for the engine lathe in the central shop of the West Virginia division of the Consolidation Coal Co., Monongah.

As shown in Fig. 1, a ring, *A*, in which are mounted three cutting tools similar to *B* is welded to plate *C*, which can be bolted to the lathe carriage beside the regular tool post, *D*. Cutters, [illegible] e luce the square stock piece to the ody size, which is the same [illegible] ter as the inside of the ring, thus [illegible] wing the latter to act as a steady rest for the heavy cut which is taken.

By operation of the taper attachment, the tool in post *D* follows the ring and

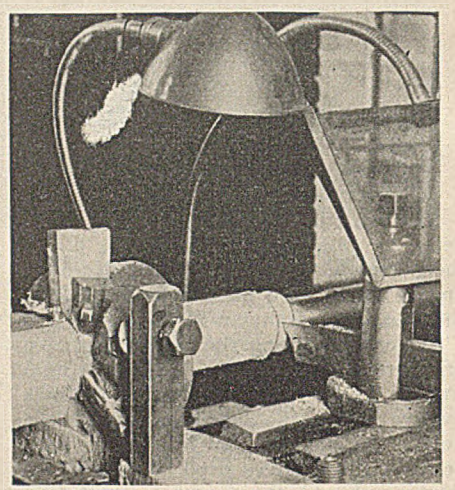
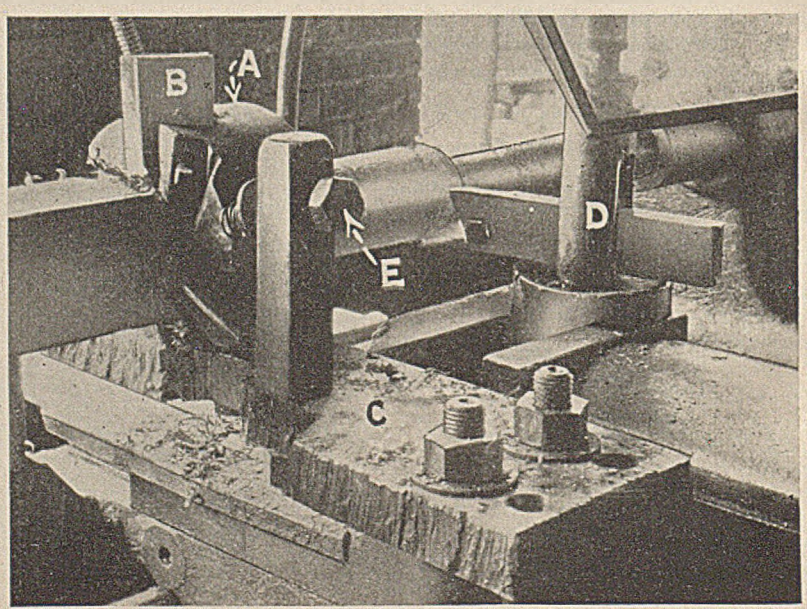


Fig. 2—Light and Eye Guard Stay in Position

cuts the taper on the harp end of the pole. When the carriage has reached a point 8 in. from the end of the cut, the lathe operative turns setscrew *E*, forcing an auxiliary tool against spring pressure and down through a hole in the ring so that this auxiliary tool cuts the remaining 8 in. of the pole about ¼ in. smaller in diameter than the body size made by cutters *B*. This forms the socket fit at the end of the pole.

Fig. 2 shows a shaded light and a glass guard with which the lathe carriage is equipped. These are on flexible mountings, permitting convenient adjustment. Because they are mounted on the carriage they remain in a constant position with regard to the cutting tools.

Fig. 1—Will Finish the Pole at One Pass of the Carriage



WORD from the FIELD

Kansas and Missouri Operators Adopt Trade Code

Operators representing an annual tonnage of 6,000,000, or 75 per cent of the production of the Kansas and Missouri coal fields, participated in a trade-practice conference, held in Kansas City, Nov. 19. The meeting, the second in the coal industry to be held under the auspices of the Federal Trade Commission, was arranged by Ira Clemens, Pittsburg, Kan., president of the Clemens Coal Co. and the Southwestern Interstate Coal Operators' Association, and W. L. A. Johnson, Kansas City, Mo., general commissioner of the association. Commissioner C. W. Hunt, of the Federal Trade Commission, presided, and was assisted by George McCorkle, first assistant director of the division of fair-trade practices.

The conference adopted a code similar to that in force in Utah, though there are only four Group Two rules, the other thirteen falling in Group One. Commissioner Hunt asserted that the latter could and would be enforced by the Federal Trade Commission, with the assistance of a committee of the operators.

Lambie Institute Organized

With approximately 250 persons from the coal fields of Wyoming and portions of Raleigh and Mercer counties present, the tentative organization of the R. M. Lambie Coal Mining Institute was perfected at a meeting at Mullens, W. Va., last month. Everett Stover, Mullens, mine inspector, eighteenth district, presided, with E. R. Lynch, Wyco, superintendent, Gulf Smokeless Coal Co., acting as secretary. L. T. Putman, Beckley, general superintendent, Raleigh-Wyoming Mining Co., was chosen as chairman of a committee to draw up a set of bylaws and make nominations for officers. Addresses were made by R. M. Lambie, Charleston, chief of the West Virginia Department of Mines; C. R. Stahl, Stotesbury, W. Va., division superintendent, C. C. B. Smokeless Coal Co.; E. H. Horne, Arista, superintendent, Weyanoke Coal & Coke Co.; W. H. Ruby, Mullens, vice-president, Nuriva Smokeless Coal Co.; Mr. Putman, and others.

Business Stagnant

"The beginning of December shows no significant change in the stagnant business situation, and few indications that any change is in early prospect," says *The Business Week* of Dec. 10. "One thing only may be said with some assurance, which is that the level at which business activity is running shows no sign of going much lower; probably can't, and probably won't, unless something has happened to the world that statistical yardsticks never had to measure before. Our index still fluctuates around a level 80 per cent of normal, dropping slightly from 80.8 per cent (revised) to 80.3 per cent (preliminary) for the week ended Nov. 29.

"General trade, reflected in merchandise car loadings and currency in circulation, is pointed up toward the holiday peak. Commodity prices, supported by special stabilization efforts, are steadier, but have not been fully tested as yet. Slow fulfillment of the promise of international co-operative effort to check deflation and rectify financial maladjustments is discouraging, and the prospect of increased taxes and congressional chaos are holes in the Christmas stocking. But it is nevertheless being gradually filled with hope, as business begins to look forward to the new year more calmly and courageously."

Kentucky Group Elects

The Kentucky River Mining Institute, an organization for the promotion of safety and reduction of accidents in the Hazard field of Kentucky, elected the following officers at a meeting last month: President, M. B. Connaway, Kenmont Coal Co., Jeff; first vice-president, J. M. Woods, Hatfield-Campbell Creek Coal Co., Glomawr; second vice-president, W. N. Roll, Harvey Coal Co., Harveyton; secretary, Thomas Donelson, Hardy-Burlingham Coal Co., Hardburley; and treasurer, Nick Gustat, Columbus Mining Co., Allais.

New Plant Construction

New contracts for topworks and construction under way or completed at various coal operations reported for the month of November are as follows:

American Coal Co. of Allegany County, Crane Creek mine, McComas, W. Va.; contract closed with the American Coal Cleaning Corporation for pneumatic coal-cleaning plant, consisting of eight Type R American air separators. This plant will clean $\frac{5}{8}$-in. to 0 coal, at the rate of 260 tons per hour. Coal from $\frac{1}{8}$ in. to 0 will be retreated. The plant includes a cyclone dust-collecting system, and will be completed Jan. 1.

Colorado Fuel & Iron Co.; new screening plant completed at Salida, Colo., to handle coal brought to it by railroad. Coal is dumped from the narrow-gage railroad cars by means of a portable transfer hopper car developed by the company. The plant is equipped with shaker screens, lump and egg and nut picking belts, shaker loader and Ottumwa scraper-line-conveyor, box-car loader for loading box cars, and loading booms. Nine sizes and combinations can be loaded over four railroad tracks, as follows: 5-in. lump; 3-in. lump; 5x3-in. egg; 3x$1\frac{1}{2}$-in. nut; $1\frac{1}{2}$-in. slack; mine-run; lump and nut; nut, pea, and slack; and egg, nut, pea, and slack.

Consolidated Coal Co. of St. Louis, No. 7 mine, Herrin, Ill., has purchased the Link-Belt tipple at the Bush No. 2 mine of the Western Coal & Mining Co., Bush, Ill., and will move the plant to the No. 7 mine to replace the old wooden tipple destroyed by fire. The Link-Belt Co. is remodelling the equipment and installing a six-bin rescreening plant.

Bethlehem-Fairmont Buys Coal

The Bethlehem-Fairmont Coal Co., Fairmont, W. Va., operating two mines at Shinnston, W. Va., has purchased 130 acres of coal from the Virginia-Maryland Coal Corporation, Clarksburg, W. Va., for $135,000. Included in the purchase are railroad tracks and sidings and general mine equipment. The acreage adjoins the Scott No. 2 mine of the Bethlehem company.

Southern Appalachian Operators Meet at Knoxville

In recognition of past safety efforts, the Premier Coal Co., Middlesboro, Ky., has received a silver loving cup awarded by the Provident Life & Accident Assurance Co., Chattanooga, Tenn., to the company making the greatest improvement in personal injuries during the year ended Sept. 30. The presentation took place at the annual meeting of the Southern Appalachian Coal Operators' Association, held in Knoxville, Tenn., Nov. 21. The winning company mined 116,000 tons during the year. The number of accidents was reduced 64.4 per cent, and the tons mined per accident was increased 163.4 per cent. Days lost per 1,000 tons mined were reduced 86.6 per cent. J. E. Hendren, superintendent, accepted the cup for the company.

Report of the association's secretary stated that the membership showed a net gain of six companies during the year, with seven firms joining and one resigning. The Southern Appalachian Efficiency Association was credited with a saving of $105,000 to members last year, as a result of accident prevention. Total man-days lost for the year ended Sept. 30 were reduced to 106,938, as compared to 177,250 for the preceding year. Each man-day of reduction, it was estimated, represented a saving of $1.50.

J. E. Butler, general manager, Stearns Coal & Lumber Co., Stearns, Ky., reported on the meeting of Southern producers and railroad traffic men held at Richmond, Va., to discuss losses to substitute fuel and water power.

At the annual election, the following were chosen as officers for the coming year: president, C. M. Moore, Knoxville, Tenn., president, Moore Coal Co.; vice-president, R. S. Young, Knoxville, secretary-treasurer, Blue Diamond Coal Co., and C. W. Rhodes, Middlesboro, Ky., vice-president, Fork Ridge Coal & Coke Co.; secretary-treasurer, R. E. Howe, Knoxville (re-elected).

General Strike Averted

A national strike against readjustments in hours and rates at British collieries was narrowly averted Dec. 4 when delegates to the Miners' Federation of Great Britain, meeting at London, vetoed a proposal for a general walkout by a vote of 230,000 to 209,000, with delegates from South Wales, representing 100,000 men, abstaining from voting. Scottish miners, who quit work on Dec. 1, voted on Dec. 6, to resume again on the following Monday.

Under the terms of the British Coal Mines Act of 1930 reducing the number of working hours from 8 to 7½, workers and employers were permitted to agree upon a redistribution of hours, provided the total number worked did not exceed 8 hours per day or 45 hours per week. Mine owners generally have been insisting that the workers accept either this "spread-over" clause for a redistribution of the weekly hours or a reduction in wages where the 7½-hour day was adopted.

Miners appealed to the Coal Mines National Industrial Board, but colliery owners declined to recognize the jurisdiction of the board. The board, nevertheless, in a decision announced Nov. 27, held that there should be no reduction in wages. The MacDonald government intervened in the situation the following day, and as a result of its request, the South Wales miners entered into a temporary agreement on the basis of a 7½-hour day. Lancashire miners rejected the owners' proposals, but allowed a breathing spell of one month, while in Warwickshire, Derbyshire, Cumberland, and North Wales, the miners either accepted the "spread-over" or patched up a truce with the owners.

Harlan Institute Banquets

More than 100 persons attended the second annual banquet of the Harlan County Mining Institute, held at Harlan, Ky., Nov. 21. Stephen Arnott, Wallins Creek, Ky., superintendent, Utilities Coal Corporation, presided. Remarks on safety were made by J. J. Forbes, supervising engineer, emergency section, Pittsburgh (Pa.) station, U. S. Bureau of Mines; E. R. Clayton and J. F. Bryson, Harlan, Ky., secretary and director of safety, respectively, Harlan County Coal Operators' Association; and C. B. Huntress, Washington, D. C., secretary, National Coal Association.

Mines Resume Work

Mines of the Red Jacket Consolidated Coal & Coke Co., in the Williamson field of West Virginia, resumed operation on a full-time basis last month, after the summer curtailment. Under the present schedule, 1,200 men will work six days a week. Early in November, the Jones & Laughlin Steel Corporation placed three of its mines, employing about 2,600 men, on full-time operation. Vesta Nos. 4, 5, and 6, at Richeyville, Vestaburgh, and Denbo, Pa., respectively, are brought into full production under the new schedule. Other mines in Fayette County, Pennsylvania, which resumed full-time operation included the Isabella operation of the Weirton Steel Co., Hillcoke, Pa., with 580 men, and the Revere, Perryopolis, and Allison Nos. 1 and 2 operations of the W. J. Rainey Co.

Sowards Buys Mine

The Sowards Coal Co., a wholesale firm at Louisville, Ky., has purchased the Zimmerman Marlowe Coal Co. mine at Letcher, Ky., an old operation in the Elkhorn seam. The new owner, it was stated, will work the mine and market the output.

Company to Stabilize Industry In Upper West Virginia

With the filing of incorporation papers for the Three Cities Fuel Corporation with the Secretary of State of West Virginia on Nov. 14, plans for the merging of 45 coal companies in the Monongahela Valley "to stabilize the coal industry in northern West Virginia" were announced. The incorporators listed in the application for a charter were: C. W. Watson, Fairmont, former president of the Consolidation Coal Co.; George M. Alexander, Fairmont, president, Monongahela West Penn Public Service Co.; J. H. Thomas, Fairmont, president, National Bank of Fairmont; C. W. Green, Fairmont, executive vice-president, Union National Bank of Fairmont; H. C. Greer, Morgantown, publisher, Morgantown *Post* and president, Preston County Coke Co. and Greer Gas Coal Co.; James R. Moreland, Morgantown, attorney; Carl L. Hornor, Clarksburg, president, Burrows Coal Co. and Maureen Coal Co.; and Louis A. Johnson, Clarksburg, attorney.

No information as to the identity of the companies to be merged is yet available. On Nov. 21, Mr. Alexander was elected president of the Three Cities company, and Mr. Watson was chosen as chairman of the executive committee. Other officers are: vice-president, Mr. Moreland; secretary, C. E. Smith; and treasurer, Mr. Johnson. Active appraisal of the properties was begun with completion of the formal organization of the company, with S. A. Taylor, consulting engineer, Pittsburgh, Pa., in charge. The individual properties will be purchased with stock in the company as soon as the valuations are agreed upon.

Support Mine School

West Virginia operators are supporting a move for an appropriation of $300,000 by the West Virginia Legislature next January to be devoted to the development of a School of Mines at West Virginia University, Morgantown, W. Va. It is proposed that a substantial portion of the funds be devoted to increasing the utilization of West Virginia coals.

Classification Group Meets

A meeting of the technical committee on scientific classification of coal, working under the sectional committee on coal classification of the American Society for Testing Materials, was held in Washington, D. C., Nov. 25. Howard N. Eavenson, Pittsburgh, Pa., president, Clover Splint Coal Co., represented the National Coal Association. Progress reports were received from subcommittees on the development of an accelerated slacking test and the relation of slacking properties to the rank of coals. A new method for determining mineral matter in coal, developed by Professor Stansfield of the University of Alberta, was brought before the meeting.

Varied Program Features Meeting Of West Virginia Institute

THOMAS G. FEAR, general manager of operations, Consolidation Coal Co., Fairmont, was elected president of the West Virginia Coal Mining Institute at the twenty-third annual meeting held at Huntington, Dec. 2 and 3. Several members separately expressed opinions that this was one of the best meetings of the institute in recent years. Seventy-five to one hundred men attended the two technical sessions on Dec. 2, and approximately 150 attended the evening banquet. The second day was given over to inspection trips to the West Virginia Rail Co., International Nickel Co. and Chesapeake & Ohio railroad shops.

"Will Natural Gas Dethrone Old King Coal?" a paper by James D. Sisler, state geologist, pictured a bright future for coal 40 to 50 years hence, when, according to his opinion, natural gas will be exhausted; but he held nothing promising as to increased consumption for the near future. After detailing the increases in the use of natural gas and oil, he concluded: "Although natural gas is now a menace to the coal industry, the throne of Old King Coal is by no means threatened. The most serious opponent of Old King Coal is oil, and oil affects only the domestic fuel market."

A. W. Hesse, chief mining engineer, Buckeye Coal Co., subsidiary of the Youngstown Sheet & Tube Co., Nemacolin, Pa., was not present to read his paper, "Coal Mine Ventilation." It was read by F. F. Jorgenson, division manager, Consolidation Coal Co., Fairmont. The paper warned against the invitation of disaster by the tendency to slight certain ventilation details to reduce cost, advocated operating rules more exacting than the state regulations, reproduced a table of maximum economical velocities for various distances of travel, and indicated the large expenditures justified for remedying an adverse ventilation condition that would otherwise obtain for a number of years.

By assuming certain figures it was shown that by tightening stoppings to force 80 per cent of the air to the faces instead of 40 per cent, and reducing the fan output to maintain the same amount of air at the faces, the power would be reduced to one-eighth. Included under the head of mine resistance was the statement, "It will pay any operator right now to check up on his fan performance and mine conditions, and may I suggest that the first step be to leave the fan running at its present speed and short-circuit the air in the mine so the return or outgoing air, to or from the fan, respectively, can be measured. It will perhaps surprise you what air the fan will handle. Then see what can be done to open the passageways for the air."

T. G. Fear led the ventilation discussion. He said that he found a mine with three or four open crosscuts near the face. The air was forced a long distance and then allowed to take a short cut close to the point where needed most. "One way to reduce power cost is to use air properly underground," was his statement. He thinks the time has arrived for protecting airways as they are driven so that they will be maintained on a par with haulways. This is being tried in certain Kentucky mines of the company. Locust posts with creosoted cap-pieces are being installed. Replying to a question regarding guniting, he said that its success depends entirely on the character of the roof, but using too thin a coating may be a cause of failure. Applying the coating immediately after a place was driven failed to aid in holding the coating on a frail roof.

At the opening of the afternoon session Dr. J. R. Turner, president of West Virginia University, spoke concerning the need for research fellowship at the university in order to develop methods and train men looking toward the establishment of industries in the state to manufacture finished products from coal and from the other natural resources instead of sending the raw materials of low realization out of the state to be converted elsewhere into materials of high value. The institute passed a resolution favoring an appropriation of funds by the next Legislature for establishing a research department at the university.

J. R. Campbell, bituminous representative Koppers - Rheolaveur Co., Pittsburgh, Pa., presented the paper, "Cost of Coal Preparation," which appears on pages 706-10 of this issue. In the discussion which followed, Mr. Campbell agreed that his set-up of costs should include a coal loss even for the highest type of cleaning equipment. As to why a drying charge should not be included if using a wet system, Mr. Campbell said that usually the water content disadvantage is offset by the lower ash in the cleaned coal as compared to the dry method. Answering another question, by Mr. Fear, he admitted that it is not possible to set both limits—ash in coal and coal in refuse—if the impurities cling to the coal.

Ray W. Arms, Roberts & Schaefer Co., Chicago, said that the paper left out transportation cost to a central plant and that the problems involved are considerably different at a smaller plant of about 100 tons per hour. "There is a certain cost in a small cleaning plant beyond which you cannot go regardless of the perfection of cleaning. If the plant is to run but a few days per week it is out of the question to go to the higher type of equipment," and he concluded with the statement that "the higher type of treatment may not pay with coal that is easily broken."

John Maurice, American Coal Cleaning Corporation, asked Mr. Campbell: "With wet washing, when you said that the detrimental water is overcome by the better cleaning as compared to the dry method, would that apply to 1-in. to 0 Pocahontas coals?" The reply was that drying apparatus will bring the moisture down to approximately 5 per cent, and if that is not satisfactory it would be advisable to use one of the less efficient types of cleaners. Mr. Campbell said his remarks applied largely to 4-in. or 5-in. to 0 size.

"Job Training as Applied to Coal Mining," by Ellsworth H. Shriver, superintendent Nellis (W. Va.) mines, American Rolling Mill Co., traced the progress of the industry in bringing safety and efficiency to its present level, then declared that responsibility does not lie entirely with the workman until the company has taught him the methods by which it expects him to attain the standard degree of perfection. Job training of the motor crews at Nellis was outlined. The haulage system at this mine has not suffered a lost-time accident for 19 months, during which time approximately 550,000 tons has been hauled. In 1930 the mine has encountered but seven lost-time accidents, an improvement of 50 per cent over 1929. The record is clean for the last 133 days. Operation five days per week at about 75 per cent capacity, 65 per cent of the coal coming from pillars, and a very tender roof, are a few of the unfavorable conditions.

The claim of so many job applicants that they can do anything that is to be done in a mine is in itself "a jack of all trades and master of none" indication that inside workers lack the job training necessary to make them experts in a particular work. "When a round-table discussion decides on the best way to do a particular job, there is no reason for one of the group not doing it that way," and "men do take pride in a job well done according to standards, and they like to be told about it," were some of Mr. Shriver's comments.

F. E. Bedale, safety engineer, Consolidation Coal Co., Fairmont, said he thinks little can be achieved in safety if accident prevention work is divorced from the operating department. He has observed that men respond to safety training in

Bureau of Mines Issues Permissible Plates

Three approvals of permissible equipment were issued by the U. S. Bureau of Mines in October, as follows:

(1) Goodman Mfg. Co.; Type 312-E.J. shortwall mining machine; 50-hp. motor, 210 volts, d.c.; Approval 204; Oct. 13.

(2) Bertrand P. Tracy Co.; conveyor; 1-hp. motor, 500 volts, d.c.; Approval 187-A; Oct. 17.

(3) Gellatly & Co.; conveyor; 5-hp. motor, 230 volts, d.c.; Approval 205; Oct. 30.

proportion to that which the company will do to meet the man in making the work safe, improving living conditions, and so on. He contends that money spent to comply with or go beyond the safety requirements of the law is returned in operating efficiency.

J. H. Edwards, associate editor *Coal Age*, presented a paper, "Trends and Practices, Coal Mine Electrical Equipment and Methods." In this he dealt briefly with a number of topics: Kilowatt-hours per ton in West Virginia; substation practices, including converters versus motor-generators; preferred voltages for stationary a.c. motors; synchronous motor applications; power factor and its regulation and relation to practical operating problems; demand limiters; mine lighting; and the use of electricity to detect explosive gas and warn of suspensions to ventilation.

E. L. Griffiths, of Clarksburg, retiring president, presided at the two sessions. Officers for the coming year, in addition to Mr. Fear as president, are: M. L. Garvey, Charleston, first vice-president; John Kock, Wheeling, second vice-president; E. H. Shriver, Nellis, third vice-president; D. L. Brown, Grant Town, fourth vice-president; James Sisler, Morgantown, fifth vice-president; Charles E. Lawall, Morgantown, secretary-treasurer; executive committee, J. W. Bischoff, Omar; Lee S. Taylor, Widen; Raymond Salvatti, Bartley; and Robert Lilly, Mt. Hope.

Preparation Plant Installed

A new washery, designed and built by the Link-Belt Co., has been installed at Keota, Mo., by the Central Coal & Coke Co. to replace an old plant employing basket-type jigs, which was destroyed by fire last year. In the new plant, washing is done in a five-compartment Simon-Carves washer. Either 2½-in. or ⅞-in. screenings from the tipple at the Bevier (Mo.) mine are cleaned in the plant, to which they are brought a distance of four miles in railroad cars. The screenings are fed to the washer at the rate of 100 tons per hour. Cleaned coal goes to a pair of shaker screens for sizing. When 2½-in. screenings are handled, the shakers separate the product into 2½x⅞-in. nut and resultant for shipment. Three men are employed to operate the washer, load the coal, and dispose of the refuse.

Gilbert-Davis Sold

Properties of the Gilbert-Davis Coal Co., operating in the Scotts Run field in northern West Virginia, were sold at auction at Morgantown, W. Va., Nov. 17. The No. 1 mine and equipment was purchased by Curtis G. Jackson and Adam Grow, trading as Jackson & Grow. The Bierer Coal Co., Morgantown, paid $32,000 to protect liens against other portions of the bankrupt's property. Appraised value of the holding of the Gilbert-Davis company was $375,000.

Hoover Advocates Investigation Of Trust Law Workings

An inquiry into some aspects of the economic working of the anti-trust laws was recommended by President Hoover on Dec. 2 in his message to Congress. "I do not favor repeal of the Sherman act," he said. "The prevention of monopolies is of most vital public importance. Competition is not only the basis of protection to the consumer but is the incentive to progress. However, the interpretation of these laws by the courts, the changes in business, especially in the economic effects upon those enterprises closely related to the use of the natural resources of the country, make such an inquiry advisable.

"The producers of these materials assert that certain unfortunate results of wasteful and destructive use of these natural resources, together with a destructive competition that impoverishes both operator and worker, cannot be remedied because of the prohibitive interpretation of the anti-trust laws. The well-known condition of the bituminous coal industry is an illustration.

"The people have a vital interest in the conservation of their natural resources, in the prevention of wasteful practices, in conditions of wasteful competition which may impoverish the producer and the wage earner, and they have an equal interest in maintaining adequate competition. I therefore suggest that an inquiry be directed especially to the effect of the workings of the anti-trust laws in these particular fields to determine if these evils can be remedied without sacrifice of the fundamental purpose of these laws."

Natural Gas Sales Decrease

Sales of natural gas by a group of companies representing 80 per cent of the utility distribution dropped 7.6 per cent to 31,775,231,000 cu.ft. in September, the American Gas Association reports. Reflecting the general business depression, the most marked decline—14 per cent—was in sales to industrial users. However, for the nine months ended Sept. 30, subsidiaries and affiliates of the Appalachian Gas Corporation report sales of 13,241,827,000 cu.ft. of natural gas, a gain of 1,994,748,000 cu.ft. over the same period in 1929. Also, the Memphis Natural Gas Co., for the first ten months of 1930, reports a 53 per cent increase in sales. Sales this year were 7,097,431,000 cu.ft.

Out in Nebraska, the people of Omaha, on Nov. 25, overwhelmingly rejected a proposal to introduce natural gas. The city owns an artificial gas plant. The verdict was credited to the efforts made to fully inform the citizens on the probable cost and results. On the other hand, the Oklahoma Natural Gas Corporation signed a contract with the Oklahoma Gas & Electric Co. to supply 7,000,000 to 10,000,000 cu.ft. of natural gas daily to the Riverbank generating plant at Muskogee. In Illinois, the Utilities Gas & Electric Co., Chicago, announced that twelve plants are to be built in the towns of Maryville, Murfreesboro, and Columbia, Tenn.; Eldorado and Harrisburg, Ill.; and Hendersonville, N. C., for the distribution of liquefied petroleum (butane-air) gas.

A partial list of new natural-gas pipe lines reported in November is as follows: Completed—New Mexico field to Santa Fe, Farmington, and Albuquerque, N. M., 390 miles; Greenville to Greenwood, Miss., 1,000,000 cu.ft. annually; under construction—Texas to Joliet and Will counties, Illinois, 24-in. line; Texas Panhandle through Kansas, Nebraska, and Iowa, 24-in., 450-mile line; southern Pennsylvania lines to Washington, D. C., 20-in. line (first unit in a system to extend to the Eastern seaboard); construction decided upon—Reagan County to San Angelo, Texas, 12-in. line, and to Girvin, Texas, 8-in. line; proposed—line to Huntsville, Riverside, Trinity, Groveton, Lovelady, Crockett, Grapeland, and Elkhart, Texas, 350 miles.

Sunday Creek Blast Blamed On Broken Trolley

Contact between a trolley wire, broken by a fall of slate 150 ft. from the twenty-first east entry, and the rail, with consequent ignition of a gas pocket by the arc, was found to be the cause of the explosion in the No. 6 mine of the Sunday Creek Coal Co., Millfield, Ohio, Nov. 6, which killed 83 men, according to the report of E. W. Smith, Columbus, chief of the Ohio Division of Mines. The open lights carried by an inspection party, headed by W. E. Tytus, Columbus, president of the company, who, with the others, was killed in the blast, were in no way responsible for the explosion, Mr. Smith said.

New officers chosen in the reorganization of the operating and sales personnel of the company are: president, George K. Smith, chairman of the board, in place of Mr. Tytus; vice-president, Chester C. Cook, formerly store buyer; manager of steam sales, George F. Schwartz, vice the late P. A. Coen; secretary, Seymour G. Hughes; chief engineer, Frank L. Knox, formerly safety engineer, Ohio Division of Mines, vice H. E. Lancaster, killed in the explosion. All are residents of Columbus.

Carnegie Holdings Sold

Holdings of the Carnegie Coal Co., formerly controlled by John A. Bell, Pittsburgh, Pa., were taken over by the Carnegie Coal Corporation, of Pittsburgh, on Nov. 21. The new corporation, capitalized at $6,000,000, received properties once appraised at $13,000,000. Twelve thousand acres of coal land in Allegheny and Washington counties, Pennsylvania, were sold to the Manor Real Estate & Trust Co., Philadelphia, Pa., for $1,000,000 to liquidate taxes and other debts of the reorganized company. Dock properties were mortgaged for $750,000 to provide working capital.

Swarthmore, With All Sides Represented, Analyzes Coal Problem

THAT the Romans were well advised in reserving all minerals for the benefit of the state and that the right to private ownership of natural resources in the United States should be denied, was the declaration of Norman Thomas, director, League of Industrial Democracy, New York City, at the Conference on the Bituminous Coal Industry held Nov. 7 and 8 at Swarthmore College, Swarthmore, Pa., to discuss "Mines, Miners, and the Public."

Mr. Thomas made the closing address. Joseph H. Willits, professor of industry, University of Pennsylvania, Philadelphia, Pa., opened up the meeting with a description of the entire problem confronting the industry. Allen H. Willett, director, Bureau of Coal Economics, National Coal Association, Washington, D. C., discussed "What's Wrong With Coal—As the Operator Sees It." He declared the circumstance that the coal industry failed to render and adequate return to the labor and capital engaged in it—a fact almost universally admitted—did not "justify the statement sometimes made that bituminous mining is the worst managed industry in the country, especially in view of the fact that it fulfills completely its most essential duty, that of meeting all demands for its product promptly, adequately and cheaply. . . . In view of the recent records of the cotton, silk, lumber, copper, and rubber industries, and of many others too numerous to mention," he added, "it is impossible to hold that condition to be in any way peculiar to bituminous mining."

Mr. Willett is by no means sure that we now have any too many mines. What he laid stress on was that capacity must at times exceed demand, at least temporarily, and that with a product the sale of which could not exceed the nation's willingness to purchase at any time such an excess production must inevitably result in price demoralization. He added that many people favored a modification of the more extreme anti-combination provisions of the Sherman and Clayton acts. Low prices made it difficult for the coal-mine owner to keep his mine in good operating condition and lowered percentages of recovery. Low prices also lower the incentive toward economy in consumption.

Van A. Bitner, chief representative of the United Mine Workers of America in northern West Virginia, devoted his time to discussing the difficulties of the operators and the union, due to decreased production and invasion of competitive fuels. He said that the coal industry was indirectly and innocently abetting the progress of the use of natural gas, for the companies laying such gas lines had the possibility of piping manufactured gas as a backlog in case natural gas failed. He said the union had been looking for a protagonist to present a bill for a national coal commission to regulate the coal industry for the benefit of all concerned. As no one had come forward, the union had, with Senator Watson, of Indiana, prepared such a measure. Prof. Carter Goodrich, University of Michigan, Ann Arbor, Mich., said that he feared there were many mines not listed as operating that were ready to go into production should conditions in the industry improve.

IN THE meeting of the following morning, presided over by H. S. Person, managing director, Taylor Society, New York City, Professor Goodrich read a paper on industrial relations, in which he pointed out certain faults of omission and commission in the conduct of the operators and the union. "Irresponsible criticism," he termed it. The operators, Mr. Goodrich said, had almost entirely overlooked the Taylor movement. However, the speaker later had kindly words to said of the "miner's freedom"—the privilege the miner had acquired of working at his own sweet will. The operator had lately largely rid himself of the union. Freed of that restraint, will the operator seize the opportunity to restore an atmosphere of good will? The union, he felt sure, would come back; what kind of union it would be would depend on the breadth of view of the present management.

Harry N. Taylor, president, Sheridan-Wyoming Coal Co., New York City, declared that bad as were conditions in the coal industry today, they were better, nevertheless, than in 1897, when the operators and men, weary of prices below production and wage levels too low for sustenance, got together and made arrangements for a meeting to establish the Central Competitive agreement. New men—alas !—had come into the industry who did not recognize the value of that contract and of maintaining the spirit in which it was written. Meantime, the market had drifted to other fields. How much more grief, said he, must industry face before it is ready to go back to 1897 and take up again the principles that governed those contracting parties!

IN THE afternoon, with Jacob Billikopf, impartial chairman, Men's Clothing Industry in New York, New York City, in the chair, Roger N. Baldwin and Arthur Garfield Hays, director and counsel, respectively, of the American Civil Liberties Union, New York City, addressed the meeting on "Feudalism in the Coal Fields" and "The Coal and Iron Police." John A. Fitch, New York School for Social Work, discussed "The Company Town." He said that the operator had to build such towns and to erect stores. The fault was not so much in the feudal relation as in the misuse of power which that relation created. Tenure of a home at the will of the owner, he said, should be made illegal; all roads leading to and through villages should be made public highways and all policing should be subjected to public control and be paid for by the public.

On behalf of Col. W. M. Wiley, vice-president, Boone County Coal Corporation, Sharples, W. Va., William J. Clothier, president of the company, Philadelphia, Pa., read a paper on "Civil Liberties and the Company Town." Mr. Hays took exception to a clause reading: "Every man from the president of the company down to the office boy must obey the laws which are written down for the proper conduct of the town," saying that he drew from that passage the conclusion that not only the miner but the president and general manager also were restrained from joining the union.

AT THE evening session Dr. E. M. Patterson, president, the American Academy of Political and Social Sciences, Philadelphia, Pa., occupied the chair and George J. Anderson, president, the Consolidation Coal Co., New York City, discussed "Remedies and a Sick Industry." He said that the complications due to the varied character of the coals mined, and the importance and difficulty of balancing the sizes produced made any new way out of the present difficulties hazardous in the extreme. He declared that the freight rate on coal averaged 1½ times the price of the coal at the mines, thus masking from the public the fact that coal was being sold at a remarkably low price. He questioned whether the public would be pleased with any adjustment that would raise the cost of the national coal bill $500,000,000, annually which would be the case if the nation undertook to run the mines or regulate them.

Prof. H. S. Raushenbush, assistant professor of citizenship, Dartmouth College, Hanover, N. H., said that there might soon be no coal industry as that expression has hitherto been understood but instead vertical trusts which would produce coal merely as incidental to other more important operations. He thought that the high-cost mines should be closed and that those who owned them should be offered under a ten-year contract a quantity of coal equal to that which the mines had been producing at a cost about a cent a ton below the cost at which they had been able to produce. The mines being closed, the other mines would run steadily and with greater efficiency. No wrong would in this way be done to the men whose mines were shut down.

In the discussion Mr. Raushenbush declared that the price for coal should be cost plus a profit, except where the cost was excessive for the coal obtained. He conceded that the better grade coal should sell at a better price.

Williamson Operators Meet

Optimism was the dominant note at the eighteenth annual meeting of the Operators' Association of the Williamson Field, held at the Mountaineer Hotel, Williamson, W. Va., Nov. 25. L. E. Woods, Welch, W. Va., Crystal Block Coal & Coke Co., told the members that the executive committee of the association has named a committee to consider the advisability of an enlarged system of cost accounts, in consultation with Allan H. Willett, director of the bureau of coal economics of the National Coal Association. Ways and means of slack storage were considered, and a committee dealing with that work was directed to continue with its efforts. Mine safety measures in the Williamson field were discussed, with the result that a committee will be formed to develop a safety program.

John Daniel, Lexington, Ky., chief mine inspector for Kentucky, urged the Williamson operators to foster the organization of an efficiency association, and praised the safety work being done by the Southern Appalachian and Harlan associations. C. B. Huntress, Washington, D. C., secretary, National Coal Association, called attention to the need for more combustion engineers in the coal industry, and suggested that the operators seriously consider the employment of such an expert.

At the annual election, the following officers were chosen: president, W. A. Richards, Bluefield, W. Va., president, Majestic Collieries Co.; vice-president, M. W. Stark, Columbus, Ohio, vice-president, Red Jacket Consolidated Coal & Coke Co.; treasurer, W. S. Leckie, Columbus, Ohio, general manager, Leckie Collieries Co.; and secretary, Joseph J. Ardigo, Williamson (re-elected).

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C.F.&I. Forms Mine Department

The Colorado Fuel & Iron Co., Denver, Colo., on Dec. 1, created a mining department to consolidate coal mines, quarries, and iron mines into a single operating unit. George H. Rupp, formerly superintendent of iron mines and quarries, has been named manager of the new department. R. L. Hair was continued as general superintendent of fuel department operations, while D. A. Stout will remain as chief engineer of the mining department.

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Kanawha Institute Elects

New officers elected by the Kanawha Valley Mining Institute at the annual meeting last month were: president, K. D. Quarrier, general superintendent, Carbon Fuel Co., Carbon, W. Va.; vice-presidents, R. H. Morris, general manager, Gauley Mountain Coal Co., Ansted, W. Va., and R. A. Supplee, division superintendent, Elkhorn Piney Coal Mining Co., Stanaford, W. Va.; secretary-treasurer, C. O. Morris, Charleston, W. Va., West Virginia Department of Mines.

Patrick J. Quealy

P. J. Quealy Passes

Patrick J. Quealy, pioneer private operator in the Rock Springs (Wyo.) field, died at his home at Kemmerer, Wyo., Nov. 17, at the age of 73. Mr. Quealy's connection with the bituminous industry extended over a period of 60 years. In 1870, he worked at mines in Missouri, and in 1875, went to Wyoming, where, with the exception of two short periods spent in British Columbia, Washington, and Montana, he actively engaged in the development of the field. He organized the Rock Springs Coal Co. in 1887, the first private operation in the Rock Springs field, and, in 1907, formed the Gunn-Quealy Coal Co. In addition to his coal mining interests, Mr. Quealy was active in the banking, timber, and livestock industries. He served continuously on the board of directors of the National Coal Association since its formation, and was vice-president for two years.

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Death Takes T. B. Mahan

T. B. Mahan, pioneer coal operator in southeastern Kentucky, died at the Fort Sanders Hospital, Knoxville, Tenn., Nov. 23, following an operation. Mr. Mahan, who was 74 years old, was born near Williamsburg, Ky., and first became interested in coal mining when he started the Central Jellico Coal Co., near the town of his birth, over 40 years ago. At the time of his death, he was president of the Southern Mining Co., Mahan Jellico Coal Co., Mahan-Ellison Coal Co., Fork Mountain Coal Co., and Black Diamond Collieries.

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Indiana Operators Elect

At the annual meeting of the Indiana Coal Operators' Association, held in Terre Haute, Ind., Nov. 21, the following officers were re-elected: president, Homer B. Talley, president, Coal Bluff Mining Co.; vice-president, J. A. Templeton, president, Linton Summit Coal Co.; and secretary, Harvey Cartwright. All are residents of Terre Haute.

Obituary

R. Floyd Clinch, president, Crerar-Clinch Coal Co., died suddenly at his office in Chicago, on Nov. 7. Mr. Clinch, who was 65, first entered business with the Joliet Steel Co., forming in 1889 the coal company which bears his name. In addition to his coal activities, he was president of two Chicago transit companies and was a director of several corporations and banks.

E. E. White, 72, founder of the E. E. White Coal Co., Glen White, W. Va., died at his home in Mt. Carmel, Pa., Nov. 15.

Mary (Mother) Jones, once a leader of the United Mine Workers, died Nov. 30 at the home of friends at Silver Springs, Md., after being confined to her bed for over a year. Mother Jones, who was 100 years old, came into prominence in coal circles in the six-weeks anthracite strike in 1900. Later, her activities took her to Montana, West Virginia, eastern Pennsylvania, Tennessee, southern Colorado, and other states.

Edward L. Prentiss, 61, president of the Routt County Coal Co., Denver, Colo., died at a Los Angeles (Calif.) hospital on Nov. 14. He had been ill for several months prior to his death.

H. B. Beury, 52, Charleston, W. Va., president, Turkey Knob Coal Co., Beechwood Coal & Coke Co., and Little Fire Creek Coal Co., died Nov. 10 of gunshot wounds, believed by the Kanawha County coroner to have been self-inflicted. His death followed several weeks of suffering from pneumonia.

Harvey Trent, 43, superintendent and part owner of the Trent Pocahontas Coal Co., died Nov. 3 as the result of a fall from the top of the company's tipple at Wilmore, W. Va.

Linton Trivette, vice-president, Elkhorn Marrowbone Coal Co., Pikeville, Ky., died Nov. 8, following an operation on Oct. 20. Mr. Trivette, who was 46, also was vice-president of the Pikeville National Bank.

William J. Davison, superintendent of the Olyphant (Pa.) colliery of the Hudson Coal Co., died at his home in Carbondale, Pa., Nov. 6, as a result of an infection which set in after his leg was amputated. Mr. Davison had been with the Hudson company 35 years.

J. S. Williams, 50, general superintendent, Maryland Coal Co. of West Virginia, died suddenly of heart failure on Nov. 18 at the company's mine at Wendel, W. Va. Mr. Williams had been with the company 20 years.

L. H. Faust, general superintendent, Guaranty Coal Co., Worthington, Pa., died Nov. 17 of blood poisoning from a gunshot wound which he received on a hunting trip.

John Seger, president, Ligonier Diamond Coal Co., St. Clair Fuel Co., Seger Bros. Coal Co., Seger Fuel Co., and Vogele Coal Co., died Nov. 27, at Ligonier, Pa., after a brief illness of pneumonia.

Illinois Strike Threat Fades

A scheduled strike of miners in Illinois against the use of mechanical loaders failed to materialize on Nov. 15, the date previously set. None of the workers responded to the call of the leaders of the insurgent group of the United Mine Workers. Nearly 1,000 miners of the local at the No. 18 mine of the Peabody Coal Co., West Frankfort, voted to return to work, after a walkout directed against the machines. Labor conditions over the state were quiet in November, and the miners appeared more eager to work than strike.

Operators in western Kentucky continued in their refusal to recognize the union last month. With the exception of representatives of a few companies that signed up in September, officials of all the operations declined to attend a meeting called by Ed. J. Morgan, provisional president, District 23, U.M.W., at Owensboro, Ky., Nov. 11, to discuss wage scales, recognition of the union, and other questions.

An agreement between striking miners and the Big Vein Coal Co., Lonaconing, Md., was reached on Nov. 17, when the men, who have been on strike since May, accepted the following wage scale: loading, 50c. a ton; motormen, $4 a day; brakemen, $3.50 a day; general labor, $3 a day. In Ohio, 350 men employed at two mines of the Manhattan Coal Co., Tropic, returned to work at a wage scale carrying 45c. for loading and $3.60 for day labor. The former scale, abandonment of which caused a two weeks' strike, was 48c. for loading and $4 for day labor.

A truce between the Kellys Creek Colliery Co. and 800 striking miners at Ward, W. Va., was declared late in November. Termination of the walkout, which was conducted by leaders of the insurgent United Mine Workers, was contingent upon abandonment of the "clean-up" system by the company, dismissal of eviction cases against the miners, and agreement to attend a conference on wages and working conditions with Frank Keeney, insurgent president in West Virginia. Future strikes, it is said, will depend upon the results of the conference.

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T. W. Guthrie Dies

Tracy W. Guthrie, vice-president of the Hillman Coal & Coke Co., died suddenly at his home in Sewickley, Pa., Nov. 15, at the age of 64. Mr. Guthrie, who retired two years ago from the presidency of the Hillman company, because of ill health, began his business life in railroad service in the Hocking Valley district of Ohio. He was a former president of the Sunday Creek Coal Co., and, when the United Coal Corporation was formed in Pittsburgh, Pa., in 1916, became president, retaining the office when the United company was absorbed by Hillman. Mr. Guthrie was for seven years a director of the National Coal Association.

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Oklahoma Blast Kills Fifteen

Fifteen miners were killed in an explosion of gas in the No. 5 mine of the Hailey-Ola Coal Co., Wilburton, Okla., Nov. 29. Two other men were severely burned, while 38 miners escaped unhurt. Miners expressed the belief that the gas was ignited by a shot. The mine was heavily rock-dusted, and this condition was credited with confining the blast to the area in which it occurred. Little physical damage was done.

Harlan Operators Elect

At the annual meeting of the Harlan County Coal Operators' Association, held at Harlan, Ky., Nov. 21, the following officers were re-elected: president, D. B. Cornett, Louisville, Ky., president, Cornett-Lewis Coal Co.; vice-president, S. J. Dickenson, Coalgood, Ky., general manager, Mary Helen Coal Corporation; secretary-treasurer, E. R. Clayton, Harlan, Ky.

Immediately following the operators' meeting, the Harlan Coal Bureau re-elected its officers for the coming year, as follows: president, R. C. Tway, Louisville, Ky., president, R. C. Tway Coal Co.; vice-president, W. J. Cunningham, Crummies, Ky., president, Crummies Creek Coal Co.; commissioner, E. R. Clayton. Members expressed the belief that the work of the bureau had been most beneficial in the past, and voiced the conviction that increased benefits would accrue in the future.

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Fires Destroy Tipples

Fire of unknown origin destroyed the tipple of the R. C. Tway Coal Co., Harlan, Ky., Nov. 26, with a loss estimated at $75,000. It was stated that several hundred miners would be thrown out of work, pending completion of a temporary structure.

Fire of unknown origin destroyed the tipple of the Shallmar Mining Corporation, Shallmar, Md., last month. The loss, partly covered by insurance, was estimated at $50,000.

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Personal Notes

J. E. McClurg, vice-president in charge of operations, Dominion Steel & Coal Corporation, Dominion Coal Co., Nova Scotia Coal & Steel Co., and subsidiary companies, Sydney, Nova Scotia, has resigned.

Ben Davis has been made general superintendent of the coal mines of the Sloss Sheffield Steel & Iron Co., Birmingham, Ala.

R. R. Estill, formerly with the Inland Steel Co., Wheelwright, Ky., has been made division superintendent of the Kingston Pocahontas Coal Co., with headquarters at the Kingston plant, Kingston, W. Va.

A. B. McElvany has resigned as secretary of the Western Pennsylvania Coal Traffic Bureau to accept a position as traffic manager of the Rochester & Pittsburgh Coal Co., with headquarters at Indiana, Pa.

Ralph H. Sweetser, New York City, has announced a consulting service in blast furnace practice, dealing especially in problems of raw materials, production, and uses of pig iron and coke. In problems of mining and preparation of metallurgical coals. Mr. Sweetser will be associated with Stuart, James & Cooke, Inc.

King Coal's Calendar for November

Nov. 6—Explosion in No. 6 mine of the Sunday Creek Coal Co., Millfield, Ohio, said to have been caused by an arc from a broken trolley. Kills 83 men. Included in the list of the dead was: W. E. Tytus, Columbus, Ohio, president of the company; P. A. Coen, Columbus, vice-president in charge of sales; Howard Upson, Newark, field manager; H. E. Lancaster, Athens, chief engineer; and Walter Hayden, Athens, mine superintendent.

Nov. 8—Pioneer movement in the transportation of coal and the development of water-borne transportation inaugurated with the trial run of the steamship "H. F. DeBardeleben" at New Orleans, La. The "H. F. DeBardeleben," the first of a number of remodeled ships to be put in operation by the Bulk Transportation Co., a subsidiary of the DeBardeleben Coal Corporation, Birmingham, Ala., is said to be the first American-owned, self-trimming, and self-discharging vessel on the Atlantic, Gulf, and Pacific seaboards, and the first pulverized-fuel-burning vessel in Gulf waters.

Nov. 13—Incorporation papers for the Three Cities Fuel Corporation, Fairmont, W. Va., filed with the Secretary of State of West Virginia. Purpose of the formation of the company is said to be the merging of 45 companies with an estimated annual production of 5,000,000 tons "to stabilize the coal industry in northern West Virginia."

Nov. 13—Twenty thousand miners in the Asturias coal field of Spain strike. The walkout was quiet.

Nov. 19—Operators representing an annual tonnage of 6,000,000, or 75 per cent of the Kansas and Missouri coal fields, at a conference in Kansas City, Mo., under the auspices of the Federal Trade Commission, adopt a code of fair trade practices.

Nov. 24—Coal operators, Congressmen, lawyers, and laymen, at a meeting in Pikeville, Ky., urge improvement of the Levisa Fork and Tug Fork of the Big Sandy River to revive barge shipments of coal.

Nov. 29—Gas explosion in the No. 5 mine of the Hailey-Ola Coal Co., Wilburton, Okla., kills fifteen miners. Thirty-eight other men in the mine, which was heavily rock-dusted, escape.

Nov. 29—Ninety-two thousand miners in Scotland directed to strike on Dec. 1, in protest against owners' insistence on applying the "spread-over" clause in the British Coal Mines Bill of 1930 to enforce an eight-hour day with a Saturday half day instead of the straight 7½-hour day favored by the miners. Workers also objected to the contention of the owners that the daily wage must be cut.

Coal Mine Fatality Rate Increases in October; Higher Than in September or Year Ago

REPORTS received by the U. S. Bureau of Mines, from State mine inspectors, covering fatal accidents at coal mines in the United States, showed a higher death rate per million tons of coal mined in October, 1930, than in the preceding month or October a year ago. The higher rate prevailed for the industry as a whole and for bituminous mines considered as a separate group, but the rate for anthracite mines, although higher than that for October a year ago, was lower than for September of the current year. Actual number of men killed in all coal mines in the United States in October, 1930, was 188, or 9 less than in October, 1929, but 48 more than in September, 1930. Production of coal was 51,726,000 tons in October of the present year, 43,925,000 tons in September, 1930, and 60,200,000 tons in October, 1929.

For bituminous mines, the death rate was 3.24, based on 143 deaths and 44,150,000 tons of coal produced. This fatality rate indicated an increase of slightly more than 21 per cent over September, 1930, with 103 deaths and 38,632,000 tons, and an increase of about 11 per cent over the rate for October, 1929, which was based on 153 fatalities and 52,174,000 tons of coal.

In the anthracite mines there were 45 deaths during October of the present year, and a production of 7,576,000 tons, indicating a fatality rate of 5.94, as compared with 37 deaths and a rate of 6.99 for September, 1930, when the output of coal was 5,293,000 tons. A year ago the anthracite record for October was 44 deaths, 8,026,000 tons, and a death rate per million tons of 5.48.

During the period from January to October, 1930, there were 1,635 deaths in all coal mines in the United States, and during this period 442,301,000 tons of coal was mined; the record for the same ten months last year showed 1,760 deaths and a production of 502,060,000 tons. While there was a decrease of 125 in the number of deaths, there was a larger proportionate decline in the amount of coal produced, which resulted in an increase in the 10-month fatality rate for 1930. Both the bituminous and anthracite rates, considered separately, showed an increase over the 10-month period of a year ago.

There was one major disaster—that is a disaster in which five or more lives were lost—during October, 1930. This was an explosion at McAlester, Okla., on Oct. 27, which caused the loss of 30 lives. October, 1929, was free from such disasters. During the period from January to October, 1930, there were 9 major disasters, causing 126 deaths. For the same period in 1929, there were 5 major disasters which resulted in 83 deaths. Based exclusively on these major disasters, the fatality rates per million tons of coal produced during the two 10-month periods were 0.165 last year and 0.285 this year.

Coal Conference Scheduled

The third international conference on bituminous coal will be held at the Carnegie Institute of Technology in November, 1931, according to the president, Dr. Thomas S. Baker. The purpose of the meeting will be the same as that of previous conferences held in 1926 and 1928—presentation of the results of recent studies of coal. Particular attention will be paid to the economics of the new methods and processes evolved in recent years. Discussion will be confined to coal above the ground, where every phase of distribution and consumption will be treated by authorities in the several fields. Among the subjects are listed: carbonization; liquefaction and gasification of coal; byproducts; the mechanism of combustion; cleaning of coal and its preparation for the market; pulverized fuel; power plants; and heating.

The comparative rates for the 10-month periods of 1929 and 1930 are as follows:

Cause	1929	Jan.-Oct. 1929	Jan.-Oct. 1930
All causes	3.592	3.506	3.697
Falls of roof and coal	1.941	1.910	2.037
Haulage	.678	.669	.577
Gas or dust explosions:			
Local explosions	.082	.084	.129
Major explosions	.238	.153	.260
Explosives	.145	.148	.140
Electricity	.133	.142	.142
Miscellaneous	.375	.400	.412

Coal Mine Fatalities During October, 1930, by Causes and States

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

State	Underground												Shaft					Surface							Total by States	
	Falls of roof (coal, rock, etc.)	Falls of face or pillar coal	Mine cars and locomotives	Explosions of gas or coal dust	Explosives	Suffocation from mine gases	Electricity	Animals	Mining Machines	Mine fires (burned, suffocated, etc.)	Other causes	Total	Falling down shafts or slopes	Objects falling down shafts or slopes	Cage, skip, or bucket	Other causes	Total	Mine cars and mine locomotives	Electricity	Machinery	Boiler explosions or bursting steam pipes	Railway cars and locomotives	Other causes	Total	1930	1929
Alabama	3						1					4													4	6
Alaska																									0	0
Arkansas	1											1													1	2
Colorado	1	2	2								1	6													6	2
Illinois	9		1									10													10	13
Indiana	3											3													3	2
Iowa	1							1				2													2	4
Kansas																									0	0
Kentucky	15		1									16						2						2	18	27
Maryland																									0	0
Michigan																									0	0
Missouri	1											1													1	1
Montana																									0	0
New Mexico			1									1													1	1
North Dakota																									0	0
Ohio	8		1			3						12													12	5
Oklahoma				30								30													30	2
Pennsylvania (bituminous)	9	4	4								1	18											1	1	19	21
South Dakota																									0	0
Tennessee	2		1									3													3	3
Texas																									0	1
Utah	2											2													2	4
Virginia	2											2													2	2
Washington	1											1													1	0
West Virginia	11	7	4		1				1		3	27						1						1	38	56
Wyoming																									0	1
Total (bituminous)	69	13	15	30	1	3	1	1	1		5	139						3					1	4	143	153
Pennsylvania (anthracite)	17	7	3	5	2	2	1				3	40						1		2			2	5	45	44
Total, October, 1930	86	20	18	35	3	5	2	1	1		8	179						4		2			3	9	188	
Total, October, 1929	103	14	43	3	6	1	8	1	1		3	183	1				1	5	1	2	1	2	2	13		97

Standardized Depreciation Rates Not Contemplated

As the outcome of a conference between officials of the Bureau of Internal Revenue and representatives of the Cotton Textile Institute, at which the cotton industry presented a brief strongly opposing the application of standardized rates of depreciation, the bureau last month gave assurance that such standard rates will not be applied, but that consideration will be given to the peculiar conditions affecting the accounts of each taxpayer. The conference was attended by representatives of the National Coal Association, and the latter group later filed a brief in which it was stated that conditions vary too widely in the coal-mining industry to permit application of depreciation rates in any way approaching uniformity.

On Oct. 15, Commissioner Burnet informed counsel for the textile industry that "the bureau has at no time had under consideration the establishment of standard fixed rates of depreciation to be applied in all cases, either in the cotton textile or any other industry. In his letter the Commissioner recognized that conditions affecting the individual property should be recognized in every case.

The Commissioner's letter also called attention to the fact that differing rates should be applied where repairs and replacements are charged against the accumulated depreciation reserve fund. A fundamental difference exists in the accounting in manufacturing and mining, in that in the first a depreciation reserve is set up to permit replacements of worn-out and obsolete equipment to be charged against the reserve and thus permit the concern to stay in business indefinitely, whereas in mining, because of the wasting of the assets, there must be a complete and final recovery within the period fixed by the minable product.

Efficiency Association Meets

A feature of the annual meeting of the Southern Appalachian Efficiency Association, held at the Andrew Johnson Hotel, Knoxville, Tenn., Nov. 22, was a class in management, one of a series conducted by J. Norman Spond, educational director, Champion Fiber Co. Mr. Spond made use of a crayon in presenting his material. Under the headings "Things I did not like about my boss" and "The things I liked about my boss," he listed personal experiences from the memory of those present. In this way, desirable and undesirable characteristics of a foreman were catalogued and emphasized.

J. E. Hendren, superintendent, Premier Coal Co., Middlesboro, Ky., explained that the safety record at his mine, which resulted in the award of the Provident Life & Accident Co. cup for greatest improvement in the personal injury record over the preceding year, was based on 100 per cent first-aid training, backed up by "talking safety from morning until night." Other speakers at the meeting were: M. L. Mowery, U. S. Bureau of Mines, Washington, D. C.; and Sydney A. Hale, New York City, and J. H. Edwards, Huntington, W. Va., editor and associate editor, respectively, of *Coal Age*.

At the annual election, L. S. Safriet, Gatliff, Ky., general manager, Gatliff Coal Co., was chosen president for the coming year. W. A. Woody, Fork Ridge, Tenn., general superintendent, Fork Ridge Coal Co., was elected vice-president. Harry R. Smith, John W. Howe, and H. E. Grace, were chosen to serve on the executive committee.

Protest Trade Rule Revision

Representatives of 128 industries which have adopted trade-practice codes presented Nov. 25, at Washington, D. C., their objections to the revisions proposed by the Federal Trade Commission. They were informed by Chairman Garland S. Ferguson, Jr., that the Commission cannot force any industry to accept changes in rules. The Commission can withdraw its approval, but the industries can continue to enforce them. The Commission feels, he added, that several of the rules as they now stand would contravene the anti-trust laws and that others are questionable. He did not specify the rules in question.

Counsel for the industries urged that the Commission use its trade-practice-conference procedure to prevent unfair and uneconomic practices but should not anticipate, by disapproval, that rules not illegal on their face might possibly result in restraint of trade when in operation.

The Commission was requested to standardize the form and meaning of its so-called Group 1 rules, condemning practices legally declared to be unfair methods of competition. These concern, among other things, commercial bribery and price discrimination that, on the whole, are readily understood. Industries should be permitted, on the other hand, to state in their own language so-called Group 2 rules, framed to deal with conditions peculiar to them individually. Such rules, it was argued, are informatory only; they are not rules of law and the Commission should not revise or reject them without a knowledge of surrounding facts.

Industrial Notes

LEE F. ADAMS, commercial engineer, General Electric Co., Schenectady, N. Y., has been awarded the Manufacturers' Medal and Purse, given under the James H. McGraw Award, as a result of "outstanding and unselfish service to the manufacturing branch of the electrical industry."

SOUTHERN TRACTOR SUPPLY CO., Durham, N. C., has been appointed exclusive representative for the sale of "Amsco" manganese steel crawler tractor links and sprockets, made by the American Manganese Steel Co., in the District of Columbia, North and South Carolina, eastern Tennessee, Virginia, and West Virginia.

WILLARD H. DOW, for eight years a member of the board of directors of the Dow Chemical Co., Midland, Mich., has been elected president of the company, vice Dr. Herbert H. Dow, deceased. The new president also was assistant general manager and assistant treasurer of the company.

DRENDELL ELECTRICAL MFG. CO., San Francisco, Calif., manufacturer of panels and switchboards, has been purchased by the Trumbull Electric Mfg. Co., Plainville, Conn. The new name of the Drendell company is the Drendell-Trumbull Electric Mfg. Co.

THE ROCK SPRINGS LOADER CO., Rock Springs, Wyo., together with the rights to manufacture and sell the Universal shaker loader, or "Duckbill," and the "MacHatson" conveyor trough fastener, have been sold to the Goodman Mfg. Co., Chicago.

H. S. GREENE, formerly general sales manager of the Barbour-Greene Co., Aurora, Ill., has been appointed to a similar position with the Chain Belt Co., Milwaukee, Wis.

GEORGE A. MACDONALD, formerly vice-president, John Hawkes Wilson & Co., New York City, has been made president, vice John H. Wilson, retired.

GENFIRE STEEL CO. has been incorporated as a part of the Truscon Steel Co., Youngstown, Ohio, and will function as its dealer and commodity division, under the direction of W. B. Turner, manager of the old Genfire company.

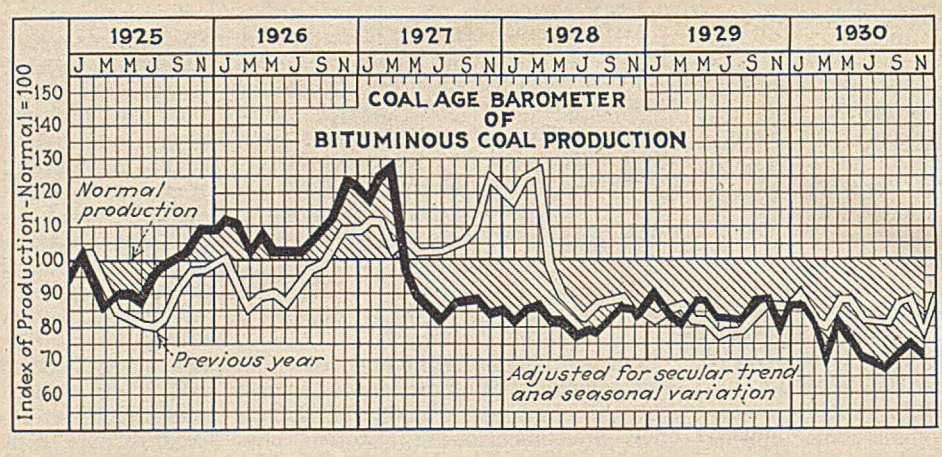
JOSEPH T. RYERSON & CO., INC., Chicago, has acquired the stock and good will of the sheet metal division of the Richards Steel Co., Boston, Mass.

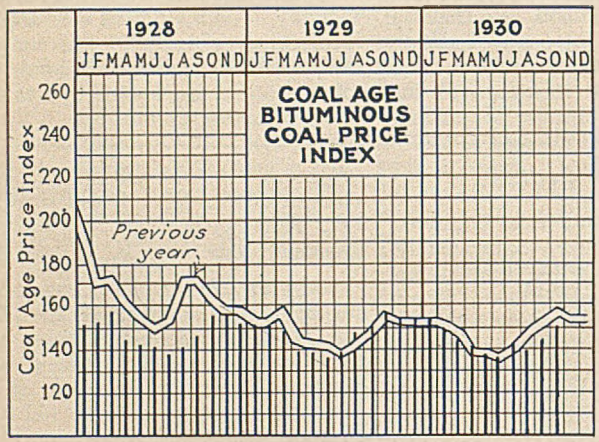
EDWIN CORNING, formerly president of the Ludlum Steel Co., Albany, N. Y., has been elected to the newly created office of chairman of the board. H. G. BATCHELLER, vice-president, took over the office vacated by Mr. Corning.

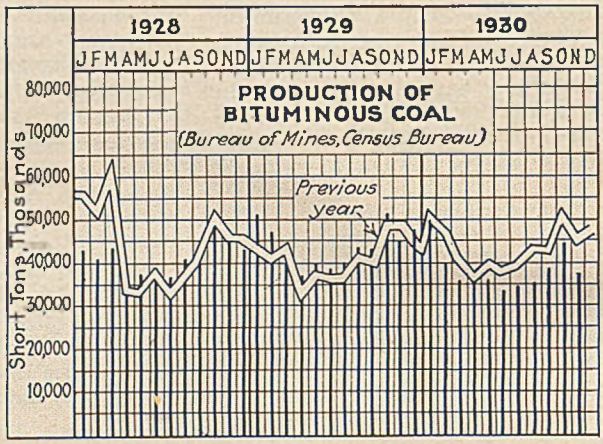
P. N. GUTHRIE, JR., formerly vice-president in charge of sales, has been elected president of the Reading Iron Co., Reading, Pa. In addition to other interests, Mr. Guthrie served in a sales capacity with the Longmead Iron Co. and the Chester Tube Co., for several years before going with Reading in 1929. R. W. THOMPSON, advertising and cut-nail sales manager, as well as manager of sales for the Stoyestown (Pa.) coal properties of the company, has been appointed to the additional post of director of public relations. HAROLD S. BARD, salesman in the New York City territory for seven years, has been made district sales manager, with offices in Chicago.

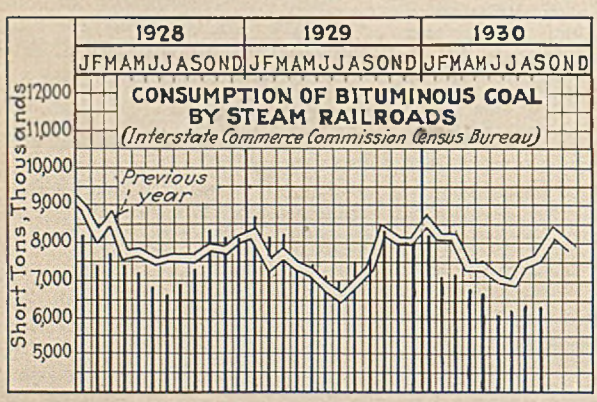
JOHN A. ROEBLING'S SONS CO., Trenton, N. J., has taken over the New Jersey Wire Cloth Co., a subsidiary, and will continue the distribution of its products through the Roebling organization.

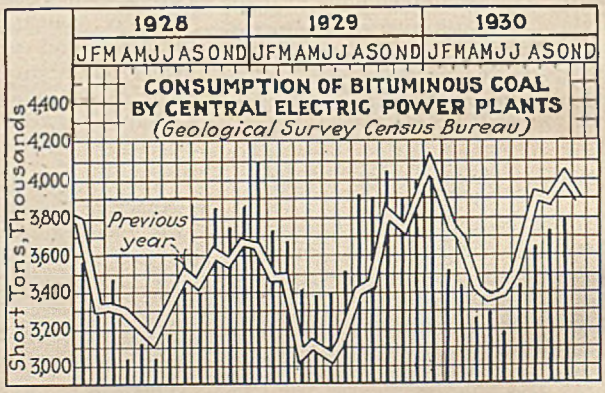
Indicators of Activities in the Coal Industry

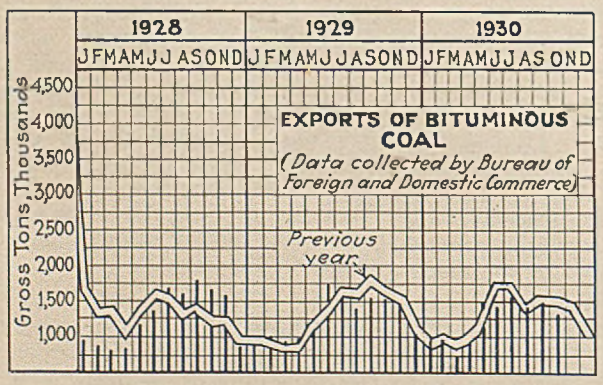


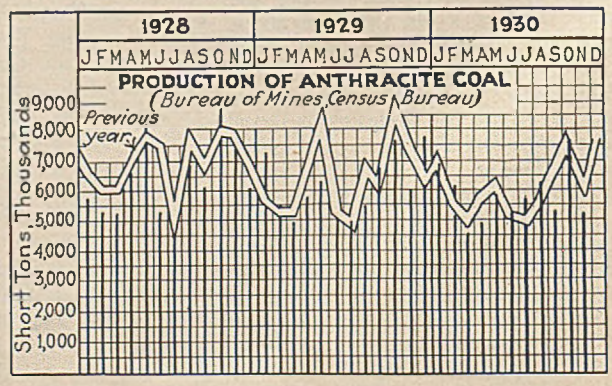












MARKETS in Review

COLD weather in the last week of November caused a sharp increase in activity in the bituminous coal markets of the country, as compared to what was otherwise an uneventful month. However, demand was largely confined to domestic sizes, as the business depression continued to militate against any real buying for industrial use. Slack and screenings still were the stumbling block in the market. Former efforts to stabilize the position of these sizes by curtailments in production were nullified by the increased demand for domestic coals, with the result that they lost ground as the month wore on.

November production of bituminous coal is estimated by the U. S. Bureau of Mines at 37,422,000 net tons, a decrease of 6,728,000 tons and 9,092,000 tons, respectively, from the totals for the preceding month and November, 1929. Anthracite production is estimated at 5,207,000 net tons for November. This compares with 7,576,000 tons in the preceding month, and 5,820,000 tons in November, 1929.

Coal Age Index of spot bituminous prices (preliminary) was: 147, Nov. 1, 8, and 15; and 145, Nov. 22 and 29. Corresponding weighted average prices were: $1.78, Nov. 1 and 8; $1.77, Nov. 15; and $1.75, Nov. 22 and 29. Revised Index figures for October were: 148, Oct. 4; 149, Oct. 11; 148, Oct. 18; and 154, Oct. 25. Corresponding weighted average prices were: $1.79, Oct. 4; $1.80, Oct. 11; $1.79, Oct. 18; and $1.86, Oct. 25. The monthly Index for October was 149¾, as compared to the unrevised figure of 146½ for November.

Dumpings at the lower Lake ports were at a lower level in November than in the same month last year. Total dumpings to Dec. 1 were: cargo, 36,763,435 tons; fuel, 1,311,537 tons; total, 38,074,972 tons. In the same period in 1929, dumpings were: cargo, 37,703,107 tons; fuel, 1,440,638 tons; total, 39,143,745 tons.

Commercial stocks of bituminous coal used largely for industrial purposes amounted to 351,900 tons on Oct. 1, according to the quarterly survey of the U. S. Bureau of Mines. This is an increase of 3,700,000 tons over the July 1 total, but is a decrease of 1,600,000 tons from the quantity on hand on Oct. 1, 1929.

Mild weather and purchases for stocks in October had an adverse effect on the anthracite markets in November. However, a cold snap at the end of the month stimulated retail buying and, to some extent, industrial purchases. Chestnut, stove, and egg were the leading domestic sizes. Egg was difficult to move. In the steam division, buckwheat, as usual, was the leader. Rice and barley were weak.

SNOW and cold weather came to the rescue of the Chicago market at the end of November. All fields shared in the increased business, with Illinois, Indiana, and western Kentucky leading. Eastern coals were hampered by the fact that retailers had on hand large stocks of these varieties when the cold snap occurred. However, these reserves melted away rapidly in the last days of the month, allowing Eastern producers to obtain a larger share of the available tonnage. Screenings, because of the negligible industrial demand, failed to sell at anything like reasonable prices at any time during the month. Southern Illinois varieties were held fairly well at $1.20@$1.60, with independents asking $1 up. At the first of the month, some sales on Belleville screenings were made for the freight alone. However, when production increased at the end of the month, Belleville screenings moved up 5@10c. to $2@$2.25, delivered at Chicago. Western Kentucky screenings sold consistently at 15@25c.

Larger Mid-western companies held domestic prices well in hand, though some other interests took a reduction of 15@25c. Western Kentucky lump sold at $2, and egg went for $1.85. Central Illinois lump sold as low as $1.50 in one case, though most producers asked from $2.25 to $2.60. Indiana No. 5 lump was offered freely all the way from $2.25 up to $3, while No. 4 lump and screenings were fairly tight at $2.50@$3 and $1.10@$1.40, respectively. Smokeless prepared coals were easy at 75c. to $1.25 below contract prices on lump and egg. Mine-run also was easy, with quotations at $1.75@$2.25. Eastern high-volatiles were dull, and neither block nor egg could be moved. Premium coals even were affected by the slack demand. But in spite of the depressed domestic market, the close of navigation on the Great Lakes weakened slack from both high- and low-volatile mines. High-volatile slack, which formerly sold at about 40c., dropped to 15c. and less on distress shipments. Smokeless slack was offered freely at prices ranging from 40c. up, though byproduct grades were held firmly at the contract prices of $1.35@$1.50. Production was curtailed to keep from jeopardizing the market, with the result that lump, egg, and nut were scarce.

FREEZING temperatures in St. Louis at the end of November brought in their train increased demand for domestic coal, reviving a somnolent market. However, the quiet early weeks

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

		Week Ended					
		Nov. 1, 1930		Nov. 8, 1930	Nov. 15, 1930	Nov. 22, 1930	Nov. 29, 1930	
	Market Quoted	Independent	Company	Independent	Independent	Independent	Independent	Company
Broken	New York	.....	$8.50	.....	.....	.....	.....	$8.50
Egg	New York	$8.40@$8.65	8.65	$8.40@$8.65	$8.40@$8.65	$8.30@$8.65	$8.30@$8.65	8.65
Egg	Philadelphia	8.65@ 8.90	8.65	8.65@ 8.90	8.65@ 8.90	8.65@ 8.90	8.65@ 8.90	8.65
Egg	Chicago*	7.77	7.77	7.77	7.77	7.77	7.77	7.77
Stove	New York	9.15	9.15	9.15	9.15	9.00@ 9.15	9.00@ 9.15	9.15
Stove	Philadelphia	9.15@ 9.40	9.15	9.15@ 9.40	9.15@ 9.40	9.15@ 9.40	9.15@ 9.40	9.15
Stove	Chicago*	8.21	8.21	8.21	8.21	8.21	8.21	8.21
Chestnut	New York	8.65	8.65	8.65	8.65	8.65	8.65	8.65
Chestnut	Philadelphia	8.65@ 8.90	8.65	8.65@ 8.90	8.65@ 8.90	8.65@ 8.90	8.65@ 8.90	8.65
Chestnut	Chicago*	7.77	7.77	7.77	7.77	7.77	7.77	7.77
Pea	New York	4.85@ 5.00	5.00	5.00	4.75@ 5.00	4.75@ 5.00	5.00	5.00
Pea	Philadelphia	5.00@ 5.25	5.00	5.00@ 5.25	5.00@ 5.25	5.00@ 5.25	5.00@ 5.25	5.00
Pea	Chicago*	4.46	4.46	4.46	4.46	4.46	4.46	4.46
Buckwheat	New York	3.00@ 3.10	3.00†	3.00	3.00	3.00	3.00	3.00†
Buckwheat	Philadelphia	3.00@ 3.25	3.00	3.00@ 3.25	3.00@ 3.25	3.00@ 3.25	3.00@ 3.25	3.00
Rice	New York	1.65@ 1.90	2.00	1.65@ 1.90	1.65@ 1.90	1.60@ 1.85	1.60@ 1.85	2.50
Rice	Philadelphia	2.00@ 2.10	2.00	2.00@ 2.10	2.00@ 2.10	2.00@ 2.10	2.00@ 2.10	2.00
Barley	New York	1.15@ 1.40	1.50	1.15@ 1.40	1.15@ 1.40	1.15@ 1.40	1.15@ 1.40	1.50
Barley	Philadelphia	1.50@ 1.60	1.50	1.50@ 1.60	1.50@ 1.60	1.50@ 1.60	1.50@ 1.60	1.50

*Net tons, f.o.b. mines. †Domestic buckwheat, $3.50 (D. L. & W.)

enabled producers to work off surpluses of slack, with the result that the price level advanced slightly.

Cold weather at the end of November caught dealers and consumers in the territory served by the Head of the Lakes napping, and as a result dock operators were extended to supply the sudden demand. Urgent orders from interests with light stocks generated a demand which led dock officials to believe that shipments of 28,537 cars in October and 29,428 cars in November, 1929, would be exceeded. Prices were firm and unchanged, as compared to previous months.

Freezing temperatures at the end of November brought little satisfaction to the trade in the Southwest. Retail dealers, with moderate stocks, were able to take care of household orders without help from the producers. Consequently, production was actually curtailed at some mines. Prices were unchanged, as compared to the preceding month.

Cold weather in the last weeks of November brought new life to the previously quiet Colorado market. Domestic sales showed a material increase, while steam varieties picked up to a lesser extent. Prices were unchanged from those prevailing in preceding months.

Despite cold snaps in November, the buyers ruled the Louisville market. Industrial demand was low, while retail purchases failed to come up to expectations. Block from all Kentucky fields was firm, at $2@$2.50 for anything but specialty grades. Egg quotations were off, with prices as follows: Harlan, $1.50@$1.85; Hazard and Elkhorn, $1.25@$1.75; western Kentucky, $1.75@$2. Mine-run was firm, at $1.40 up for Harlan; $1.35 up for Hazard and Elkhorn; and $1 up for western Kentucky. Nut sold at $1.25@$1.50, while small lump was quoted at $1.75@$2. Screenings continued to be the stumbling block in the market, selling as follows: Harlan, 50@75c.; Elkhorn, 35@50c.; Hazard, 25@50c.; and western Kentucky, where demand was light, 15@30c.

Usual business guideposts meant almost nothing in the Cincinnati market in November. Smokeless and high-grade high-volatile prices were well maintained, eliminating the usual decrease for the time of year. On the other hand, high-volatile nut-and-slack and slack sold at ruinous figures. Even the gradual drop in coal moving to the lakes, with a corresponding curtailment of production at the mines, failed to lift the small sizes out of the slump. With so many disturbing factors present, the trade felt its way along on the theory that the market was of the "hand-to-mouth" variety.

WARMER weather at the first of the month forced smokeless producers to abandon advances of 25@50c. over maximum contract prices and brought circulars down to $3.50 for lump and $3.75 for egg. Spot prices on stove also declined. Mine-run, when the anticipated demand from rescreening plants failed to materialize, also softened. Producers of high-grade by-product screenings asserted that the price level of $1.25@$1.35 was maintained, but off-grades sold down to 75c. Premium block and lump led the high-volatile list. The former held firm throughout the month, though the latter eased 25c. in places where orders had outstripped sales. Price concessions failed to create any great demand for medium and low-grade egg. Mine-run, moving in well-defined channels, showed little change. Small sizes were a drug on the market. High-grade varieties commonly sold at 25c. at times of distress.

While somewhat under the influence of warm weather over the greater part of November, domestic demand was fairly strong in the Columbus market. Smokeless, splint, and Kentucky varieties were the leaders, though Hocking, Cambridge, and Pomeroy coals increased their share of the business as the month wore on. Screenings proved to be the stumbling block which kept producers in difficulties. However, despite a slump for a short time after the middle of the month, the tone was definitely stronger in this size.

All classes of coal, except mine-run, bettered their position in the Cleveland market in November. Slack, especially, which in October was drug on the market, tightened up considerably, though there was no in-

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

LOW-VOLATILE, EASTERN	Market Quoted	Week Ended Nov. 1, 1930	Nov. 8, 1930	Nov. 15, 1930	Nov. 22, 1930	Nov. 29, 1930
Smokeless lump	Chicago	$3.50@$3.75	$3.50@$3.75	$3.50@$3.75	$3.50@$3.75	$3.50@$3.75
Smokeless egg	Chicago	3.75@ 3.90	3.75@ 3.90	3.75@ 3.90	3.75@ 3.90	3.75@ 3.90
Smokeless stove	Chicago	3.50	3.50	3.50	3.50	3.50
Smokeless nut	Chicago	3.25	3.25	3.25	3.25	3.25
Smokeless pea	Chicago	2.25	2.25	2.25	2.25	2.25
Smokeless mine-run	Chicago	1.75@ 2.25	1.75@ 2.25	1.75@ 2.25	1.75@ 2.25	1.75@ 2.25
Smokeless slack	Chicago	.50@ 1.50	.50@ 1.50	.50@ 1.50	.50@ 1.50	.50@ 1.50
Smokeless lump	Cincinnati	3.50@ 4.00	3.50@ 3.75	3.50@ 3.75	3.50	3.50
Smokeless egg	Cincinnati	3.75@ 4.25	3.75@ 4.00	3.75@ 4.00	3.75	3.75
Smokeless stove	Cincinnati	3.00@ 3.50	3.00@ 3.50	3.00@ 3.50	2.85@ 3.50	2.85@ 3.50
Smokeless nut	Cincinnati	2.25	2.25	2.00@ 2.25	2.10@ 2.25	2.10@ 2.25
Smokeless mine-run	Cincinnati	2.00@ 2.25	2.00@ 2.25	2.00@ 2.25	1.85@ 2.25	1.85@ 2.25
Smokeless slack	Cincinnati	1.00@ 1.35	1.00@ 1.35	1.00@ 1.35	.75@ 1.35	.75@ 1.35
*Smokeless nut-and-slack	Boston	3.60@ 3.70	3.50@ 3.60	3.40@ 3.50	3.35@ 3.40	3.35@ 3.40
*Smokeless mine-run	Boston	4.10@ 4.25	4.10@ 4.25	4.15@ 4.25	4.15@ 4.25	4.20@ 4.30
Clearfield mine-run	Boston	1.35@ 1.60	1.35@ 1.60	1.35@ 1.60	1.35@ 1.60	1.30@ 1.55
Clearfield mine-run	New York	1.75@ 2.00	1.75@ 2.00	1.75@ 2.00	1.75@ 2.00	1.75@ 2.00
Cambria mine-run	Boston	1.65@ 2.00	1.65@ 2.00	1.65@ 2.00	1.65@ 2.00	1.60@ 1.95
Somerset mine-run	Boston	1.55@ 1.80	1.55@ 1.80	1.50@ 1.75	1.50@ 1.75	1.50@ 1.75
Pool 1 (Navy Standard)	New York	2.25@ 2.50	2.25@ 2.50	2.15@ 2.35	2.15@ 2.35	2.15@ 2.35
Pool 1 (Navy Standard)	Philadelphia	2.15@ 2.45	2.15@ 2.45	2.15@ 2.45	2.15@ 2.45	2.15@ 2.45
Pool 9 (super low-vol.)	New York	1.75@ 2.00	1.75@ 2.00	1.75@ 2.00	1.75@ 2.00	1.75@ 2.00
Pool 9 (super low-vol.)	Philadelphia	1.75@ 2.00	1.75@ 2.00	1.75@ 2.00	1.75@ 2.00	1.75@ 2.00
Pool 10 (h. gr. low.-vol.)	New York	1.60@ 1.75	1.60@ 1.75	1.60@ 1.75	1.60@ 1.75	1.60@ 1.75
Pool 10 (h. gr. low-vol.)	Philadelphia	1.60@ 1.75	1.60@ 1.75	1.60@ 1.75	1.60@ 1.75	1.60@ 1.75
Pool 11 (low-vol.)	New York	1.40@ 1.60	1.40@ 1.60	1.40@ 1.50	1.40@ 1.50	1.40@ 1.50
Pool 11 (low-vol.)	Philadelphia	1.45@ 1.60	1.45@ 1.60	1.45@ 1.60	1.45@ 1.60	1.45@ 1.60
HIGH-VOLATILE, EASTERN						
Pool 54-64 (gas and st.)	New York	$0.95@$1.15	$0.95@$1.15	$0.95@$1.15	$0.95@$1.15	$0.95@$1.15
Pool 54-64 (gas and st.)	Philadelphia	1.00@ 1.15	1.00@ 1.15	1.00@ 1.15	1.00@ 1.15	1.00@ 1.15
Pittsburgh sc'd gas	Pittsburgh	1.70@ 1.80	1.70@ 1.80	1.70@ 1.80	1.70@ 1.80	1.70@ 1.80
Pittsburgh gas mine-run	Pittsburgh	1.50@ 1.60	1.45@ 1.60	1.45@ 1.60	1.45@ 1.60	1.45@ 1.60
Pittsburgh mine-run	Pittsburgh	1.30@ 1.60	1.30@ 1.60	1.30@ 1.60	1.30@ 1.60	1.30@ 1.60
Pittsburgh slack	Pittsburgh	.85@ 1.00	.85@ 1.00	.75@ 1.00	.75@ 1.00	.80@ 1.00
Connellsville coking coal	Pittsburgh	1.40@ 1.75	1.40@ 1.75	1.40@ 1.75	1.40@ 1.75	1.40@ 1.75
Westmoreland lump	Philadelphia	2.25@ 2.50	2.25@ 2.50	2.25@ 2.50	2.25@ 2.50	2.25@ 2.50
Westmoreland egg	Philadelphia	1.75@ 1.85	1.75@ 1.85	1.75@ 1.85	1.75@ 1.85	1.75@ 1.85
Westmoreland ¾-in. lump	Philadelphia	1.80@ 1.90	1.80@ 1.90	1.80@ 1.90	1.80@ 1.90	1.80@ 1.90
Westmoreland mine-run	Philadelphia	1.65@ 1.75	1.65@ 1.75	1.65@ 1.75	1.65@ 1.75	1.65@ 1.75
Westmoreland slack	Philadelphia	1.05@ 1.25	1.05@ 1.25	1.05@ 1.25	1.05@ 1.25	1.05@ 1.25
Fairmont lump	Fairmont	1.65@ 2.00	1.65@ 2.00	1.75@ 2.25	1.75@ 2.25	1.75@ 2.25
Fairmont ¾-in. lump	Fairmont	1.35@ 1.60	1.35@ 1.65	1.35@ 1.75	1.35@ 1.75	1.35@ 1.75
Fairmont mine-run	Fairmont	1.00@ 1.30	1.05@ 1.35	1.10@ 1.35	1.10@ 1.35	1.10@ 1.35
Fairmont slack	Fairmont	.50@ .90	.45@ .90	.30@ .80	.30@ .80	.35@ .80
Kanawha lump	Cincinnati	2.00@ 2.75	2.00@ 2.75	1.85@ 2.75	1.85@ 2.50	1.85@ 2.75
Kanawha egg	Cincinnati	1.25@ 1.50	1.25@ 1.50	1.25@ 1.50	1.25@ 1.50	1.25@ 1.50
Kanawha nut-and-slack	Cincinnati	.35@ .50	.35@ .50	.35@ .50	.35@ .50	.30@ .50
Kanawha mine-run (gas)	Cincinnati	1.35@ 1.60	1.35@ 1.60	1.30@ 1.60	1.35@ 1.60	1.35@ 1.60
Kanawha mine-run (st.)	Cincinnati	1.10@ 1.35	1.10@ 1.35	1.10@ 1.35	1.10@ 1.35	1.10@ 1.35
Williamson (W. Va.) lump	Cincinnati	1.75@ 2.75	1.75@ 2.75	1.75@ 2.50	1.75@ 2.50	1.75@ 2.50
Williamson (W. Va.) egg	Cincinnati	1.25@ 1.60	1.35@ 1.60	1.30@ 1.65	1.35@ 1.60	1.35@ 1.60
Williamson (W. Va.) nut-and-slack	Cincinnati	.30@ .50	.30@ .50	.30@ .50	.25@ .50	.30@ .50
Williamson (W. Va.) mine-run (gas)	Cincinnati	1.40@ 1.60	1.35@ 1.60	1.35@ 1.60	1.35@ 1.60	1.35@ 1.60
Williamson (W. Va.) mine-run (st.)	Cincinnati	1.10@ 1.35	1.10@ 1.35	1.10@ 1.35	1.10@ 1.35	1.10@ 1.35
Logan (W. Va.) lump	Cincinnati	1.75@ 2.50	1.75@ 2.50	1.75@ 2.50	1.75@ 2.50	1.75@ 2.50
Logan (W. Va.) egg	Cincinnati	1.25@ 1.50	1.25@ 1.50	1.25@ 1.60	1.25@ 1.60	1.25@ 1.50
Logan (W. Va.) nut-and-slack	Cincinnati	.35@ .60	.30@ .50	.30@ .50	.30@ .50	.30@ .50
Logan (W. Va.) mine-run	Cincinnati	1.10@ 1.35	1.10@ 1.35	1.10@ 1.35	1.10@ 1.35	1.10@ 1.35
Logan (W. Va.) slack	Cincinnati	.30@ .50	.30@ .50	.25@ .50	.25@ .50	.35@ .50
Hocking (Ohio) lump	Columbus	1.90@ 2.00	1.90@ 2.00	1.90@ 2.00	1.80@ 1.90	1.80@ 1.90
Hocking (Ohio) nut-and-slack	Columbus	.75@ 1.00	.75@ 1.00	.75@ 1.00	.65@ 1.00	.65@ 1.00
Hocking (Ohio) mine-run	Columbus	1.40@ 1.65	1.40@ 1.65	1.40@ 1.65	1.40@ 1.65	1.40@ 1.65
Pitts. No. 8 (Ohio) lump	Cleveland	1.40@ 1.50	1.40@ 1.50	1.40@ 1.50	1.40@ 1.50	1.40@ 1.50
Pitts. No. 8 (Ohio) ¾-in. lump	Cleveland	1.25@ 1.35	1.25@ 1.35	1.25@ 1.35	1.25@ 1.35	1.25@ 1.35
Pitts. No. 8 (Ohio) mine-run	Cleveland	1.10@ 1.15	1.10@ 1.15	1.10@ 1.15	1.10@ 1.15	1.10@ 1.15
Pitts. No. 8 (Ohio) slack	Cleveland	.50@ .60	.50@ .60	.50@ .60	.50@ .60	.50@ .60

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

crease in prices. Supplies were plentiful, while industrial and railroad buying continued on a hand-to-mouth basis.

Zero temperatures at the end of November managed to instill some life into the Pittsburgh market. With the advent of the cold spell domestic demand picked up immediately, and was accompanied by a moderate increase in industrial and railroad sales. A slight shortage in steam slack developed at the end of the month, bringing the price level up to 65@80c. from the former figure of 50c. Gas slack was unchanged. Prices on domestic lump failed to respond to increased demand, and continued at $2@$2.35. Some contracts for mine-run coking coal were signed for the coming year, though the price did not change from $1.40@$1.75.

After a period of weakness caused by the slack situation, prepared sizes improved their position in the northern West Virginia market at the end of November, with spot lump sometimes commanding $2.25. As a result, slack prices slumped, and the size proved hard to move.

After a slow start at the beginning of November, conditions in the central Pennsylvania market, under the stimulus of colder weather, improved as the month wore along. Prepared sizes, in particular, finished the month in much better shape. Ruling prices at the end of the month were: Pool 1, $2.30@$2.55; Pool 71, $2.15@$2.25; Pool 9, $1.80@$2; Pool 10, $1.65@$1.75; Pools 11 and 18, $1.50@$1.65.

Colder weather at the end of November resulted in a little improvement in the former quiet market in New England, though there was little change in prices. No. 1 Navy Standard mine-run was quoted at $4.20@$4.30 per gross ton, f.o.b. vessels at Hampton Roads, while stoker coal sold at $3.55@$3.40. All-rail coal from central Pennsylvania was extremely dull. Prices were at a minimum and the movement was light.

RETAIL demand slowed down in the New York market in November, with the result that quotations on lump and egg were slightly lower. Curtailed production, however, resulted in an improvement in the slack situation and steadied prices. Mine-run prices showed little change. In the absence of any increase in industrial activity, steam buyers showed a tendency to decrease orders in November, placing buying on the basis of current requirements.

Balmy weather resulted in a dull situation in the Philadelphia market, which was unrelieved by a few cold days at the beginning and end of the month. Both industrial and domestic demand lagged. Tidewater business showed no notable change from the previous low level, with bunkering the chief activity, though even that showed signs of shrinkage.

Despite a cold snap at the end of November, business in the Birmingham domestic market was unsatisfactory. Movement was comparatively light, with medium grades leading. Industrial sales continued in the doldrums. Stocking was at a minimum, and consumers relied on hand-to-mouth buying.

Unseasonable temperatures over the greater part of November had an adverse effect on demand in the New York anthracite market. Buying for storage was considerably less than in October, as most dealers and consumers were in possession of adequate stocks. Cold weather at the end of the month stimulated retail sales, which were reflected, in a measure, in the whoesale demand. Chestnut led the domestic list, with pea closely following. Stove proved to be troublesome, and difficulty was encountered in moving egg. With company buckwheat in amply supply, independent tonnage ceased to command a premium. Rice and barley were soft.

Though cold weather at the end of November in the Philadelphia anthracite market brought in its train an increase in demand, the month proved disappointng, largely because of the diminished buying power of the public. All sizes were plentiful, with chestnut far ahead of the others. The latter also was most freely ordered, with stove and pea closely following. Egg was difficult to move. Buckwheat was the leader in the steam division. Rice and barley were plentiful.

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

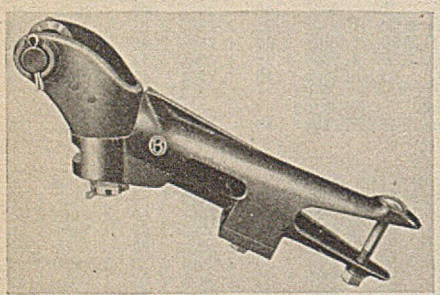
	Market	Week Ended				
MIDDLE WEST	Quoted	Nov. 1, 1930	Nov. 8, 1930	Nov. 15, 1930	Nov. 22, 1930	Nov. 29, 1930
Franklin (Ill.) lump	Chicago	$3.25	$3.25	$3.25	$3.25	$3.25
Franklin (Ill.) egg	Chicago	2.75@ 3.00	2.75@ 3.00	2.75@ 3.00	2.75@ 3.00	2.75@ 3.00
Franklin (Ill.) mine-run	Chicago	2.15	2.15	2.15	2.15	2.15
Franklin (Ill.) screenings	Chicago	1.00@ 1.60	1.00@ 1.60	1.00@ 1.60	1.10@ 1.60	1.10@ 1.60
Central Ill. lump	Chicago	2.40@ 2.65	2.40@ 2.65	2.40@ 2.65	2.40@ 2.65	2.40@ 2.65
Central Ill. egg	Chicago	1.85@ 2.40	1.85@ 2.40	1.85@ 2.40	1.85@ 2.40	1.85@ 2.40
Central Ill. mine-run	Chicago	1.70	1.70	1.70	1.70	1.70
Central Ill. screenings	Chicago	.25@ 1.00	.25@ 1.00	.30@ 1.00	.75@ 1.00	.75@ 1.00
Ind. 4th Vein lump	Chicago	2.50@ 2.75	2.50@ 2.75	2.50@ 2.75	2.50@ 2.75	2.50@ 2.75
Ind. 4th Vein egg	Chicago	2.25@ 2.50	2.25@ 2.50	1.60@ 1.85	2.30@ 2.50	2.30@ 2.50
Ind. 4th Vein mine-run	Chicago	1.65@ 2.00	1.65@ 2.00	1.65@ 2.00	1.65@ 2.00	1.65@ 2.00
Ind. 4th Vein screenings	Chicago	.90@ 1.40	.90@ 1.40	.90@ 1.40	1.00@ 1.40	1.00@ 1.40
Ind. 5th Vein lump	Chicago	2.00@ 2.50	2.00@ 2.50	2.00@ 2.50	2.00@ 2.50	2.00@ 2.50
Ind. 5th Vein egg	Chicago	2.00@ 2.15	2.00@ 2.15	2.00@ 2.15	2.00@ 2.15	2.00@ 2.15
Ind. 5th Vein mine-run	Chicago	1.50@ 1.85	1.50@ 1.85	1.50@ 1.85	1.50@ 1.85	1.50@ 1.85
Ind. 5th Vein screenings	Chicago	.30@ 1.10	.30@ 1.10	.35@ 1.10	.35@ 1.10	.35@ 1.10
Mt. Olive (Ill.) lump	St. Louis	2.50	2.50	2.50	2.50	2.50
Mt. Olive (Ill.) egg	St. Louis	2.25	2.25	2.25	2.25	2.25
Mt. Olive (Ill.) mine-run	St. Louis	1.65@ 1.80	1.65@ 1.80	1.65@ 1.80	1.65@ 1.80	1.65@ 1.80
Mt. Olive (Ill.) screenings	St. Louis	.20@ .40	.20@ .40	.30@ .60	.30@ .60	.35@ .60
Standard (Ill.) lump	St. Louis	2.25	2.25	2.25	2.25	2.25
Standard (Ill.) egg	St. Louis	1.75@ 2.10	1.75@ 2.10	1.75@ 2.10	1.75@ 2.10	1.75@ 2.10
Standard (Ill.) mine-run	St. Louis	1.35@ 1.60	1.35@ 1.60	1.35@ 1.60	1.35@ 1.60	1.35@ 1.60
Standard (Ill.) screenings	St. Louis	.10@ .30	.15@ .30	.20@ .60	.20@ .60	.20@ .60
West Ky. lump	Louisville	1.75@ 2.25	1.75@ 2.25	1.75@ 2.25	1.75@ 2.25	1.75@ 2.25
West Ky. egg	Louisville	1.75@ 2.00	1.75@ 2.00	1.75@ 2.00	1.75@ 2.00	1.75@ 2.00
West Ky. mine-run	Louisville	1.00@ 1.25	1.00@ 1.35	1.00@ 1.35	1.00@ 1.35	1.00@ 1.35
West Ky. slack	Louisville	.20@ .40	.25@ .40	.25@ .40	.25@ .40	.15@ .30
West Ky. lump	Chicago	2.25	2.25	2.25	2.25	2.25
West Ky. egg	Chicago	2.00	2.00	2.00	2.00	2.00
West Ky. slack	Chicago	.15@ .45	.15@ .45	.15@ .45	.15@ .45	.15@ .45
SOUTH AND SOUTHWEST						
Big Seam lump	Birmingham	$2.25	$2.25	$2.25	$2.25	$2.25
Big Seam mine-run	Birmingham	1.60@ 1.75	1.60@ 1.75	1.60@ 1.75	1.60@ 1.75	1.60@ 1.75
Harlan (Ky.) block	Chicago	2.50@ 2.75	2.50@ 2.75	2.50@ 2.75	2.50@ 2.75	2.50@ 2.75
Harlan (Ky.) egg	Chicago	1.50@ 1.85	1.50@ 1.85	1.50@ 1.85	1.50@ 1.85	1.50@ 1.85
Harlan (Ky.) slack	Chicago	.50@ .90	.50@ .90	.50@ .90	.50@ .90	.50@ .90
Harlan (Ky.) block	Louisville	2.25@ 2.50	2.25@ 2.50	2.25@ 2.50	2.25@ 2.50	2.25@ 2.50
Harlan (Ky.) egg	Louisville	1.75@ 2.00	1.50@ 1.85	1.50@ 1.85	1.50@ 1.85	1.50@ 1.85
Harlan (Ky.) nut-and-slack	Louisville	.50@ .90	.50@ .75	.50@ .75	.50@ .75	.50@ .75
Harlan (Ky.) mine-run	Louisville	1.40@ 1.65	1.40@ 1.65	1.40@ 1.65	1.40@ 1.65	1.40@ 1.65
Harlan (Ky.) block	Cincinnati	2.00@ 3.25	2.00@ 3.25	2.00@ 3.25	2.00@ 3.25	2.00@ 3.25
Harlan (Ky.) egg	Cincinnati	1.35@ 1.75	1.30@ 1.75	1.35@ 1.75	1.35@ 1.75	1.30@ 1.75
Harlan (Ky.) nut-and-slack	Cincinnati	.50@ .75	.40@ .75	.35@ .60	.30@ .50	.45@ .75
Harlan (Ky.) mine-run	Cincinnati	1.25@ 1.60	1.25@ 1.60	1.25@ 1.65	1.25@ 1.65	1.25@ 1.65
Hazard (Ky.) block	Chicago	2.50@ 2.75	2.50@ 2.75	2.50@ 2.75	2.50@ 2.75	2.50@ 2.75
Hazard (Ky.) egg	Chicago	1.50@ 1.85	1.50@ 1.85	1.50@ 1.65	1.50@ 1.65	1.50@ 1.65
Hazard (Ky.) slack	Chicago	.50@ .90	.50@ .90	.50@ .80	.15@ .80	.15@ .80
Hazard (Ky.) block	Louisville	2.00@ 2.50	2.00@ 2.50	2.00@ 2.50	2.00@ 2.50	2.00@ 2.50
Hazard (Ky.) egg	Louisville	1.35@ 1.75	1.30@ 1.75	1.30@ 1.75	1.25@ 1.75	1.25@ 1.75
Hazard (Ky.) nut-and-slack	Louisville	.30@ .65	.25@ .50	.25@ .50	.25@ .50	.25@ .50
Hazard (Ky.) mine-run	Louisville	1.30@ 1.50	1.30@ 1.60	1.35@ 1.60	1.35@ 1.65	1.35@ 1.65
Hazard (Ky.) block	Cincinnati	2.00@ 2.75	2.00@ 2.75	2.00@ 2.75	2.00@ 2.50	2.00@ 2.50
Hazard (Ky.) egg	Cincinnati	1.25@ 1.65	1.25@ 1.65	1.35@ 1.60	1.30@ 1.60	1.30@ 1.60
Hazard (Ky.) nut-and-slack	Cincinnati	.40@ .65	.35@ .60	.30@ .60	.25@ .50	.35@ .60
Hazard (Ky.) mine-run	Cincinnati	1.10@ 1.35	1.10@ 1.35	1.10@ 1.35	1.10@ 1.35	1.10@ 1.35
Elkhorn (Ky.) block	Chicago	2.25@ 2.50	2.25@ 2.50	2.25@ 2.50	2.25@ 2.50	2.25@ 2.50
Elkhorn (Ky.) egg	Chicago	1.75@ 2.00	1.75@ 2.00	1.75@ 2.00	1.75@ 2.00	1.75@ 2.00
Elkhorn (Ky.) slack	Chicago	.85@ 1.25	.85@ 1.25	.60@ 1.00	.50@ 1.00	.50@ 1.00
Elkhorn (Ky.) block	Louisville	2.00@ 2.50	2.00@ 2.50	2.00@ 2.50	2.00@ 2.50	2.00@ 2.50
Elkhorn (Ky.) egg	Louisville	1.35@ 1.60	1.50@ 1.85	1.50@ 1.85	1.25@ 1.75	1.25@ 1.75
Elkhorn (Ky.) nut-and-slack	Louisville	.40@ .75	.35@ .50	.35@ .50	.35@ .50	.35@ .50
Elkhorn (Ky.) mine-run	Louisville	1.35@ 1.60	1.35@ 1.60	1.35@ 1.60	1.35@ 1.65	1.35@ 1.65
Elkhorn (Ky.) block	Cincinnati	2.00@ 3.50	2.00@ 3.50	2.00@ 3.50	2.00@ 3.50	2.00@ 3.50
Elkhorn (Ky.) egg	Cincinnati	1.30@ 2.00	1.25@ 2.00	1.30@ 2.00	1.30@ 2.00	1.35@ 2.00
Elkhorn (Ky.) nut-and-slack	Cincinnati	.50@ .75	.40@ .75	.40@ .75	.40@ .75	.50@ .75
Elkhorn (Ky.) mine-run	Cincinnati	1.15@ 1.65	1.15@ 1.65	1.10@ 1.65	1.10@ 1.65	1.15@ 1.65
Kansas shaft lump	Kansas City	3.75@ 4.00	3.75@ 4.00	3.75@ 4.00	3.75@ 4.00	3.75@ 4.00
Kansas strip lump	Kansas City	3.00@ 3.25	3.00@ 3.25	3.00@ 3.25	3.00@ 3.25	3.00@ 3.25
Kansas mine-run	Kansas City	2.50	2.50	2.50	2.50	2.50
Kansas screenings	Kansas City	1.50	1.50	1.50	1.50	1.50

WHAT'S NEW
IN COAL-MINING EQUIPMENT

Mine Harp Designed for Use On Low or High Wire

Adaptability to a wide range of trolley-wire heights is claimed for the new "Universal" mine harp of the Ohio Brass Co., Mansfield, Ohio. According to the company, the harp, though designed primarily for use in low seams of coal, can be used with various wire heights from those where the trolley pole is horizontal up to a maximum of 6 ft. above the ground. Two types are available, it is said. One is a self-aligning design, so constructed that the head always tends to assume a position parallel to the pole under the compulsion of a coil spring contained in the bearing. The other type is similar in all respects except that it is non-aligning. According to the company, the latter type is free-trailing and will follow wires, frogs, and special installations with ease and certainty. Also, it is said, neither type has any protruding angles to catch on I-beams or overhead timbers in case of dewirement.

Either trolley wheels or shoes may be accommodated in the harp head, the maker states. In the event the shoe is

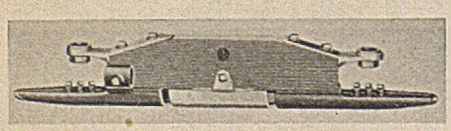


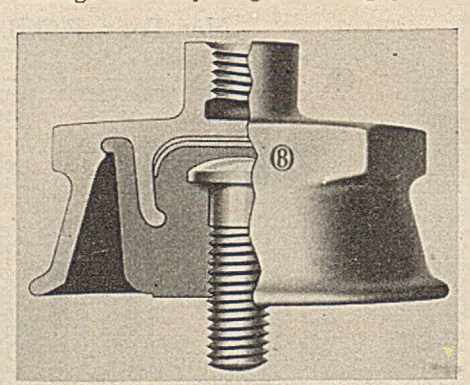
Ohio Brass "Universal" Mine Harp

used with extra heavy currents, a pig tail shunt can be furnished on order. Copper contact bearing washers, for use between the ball-and-socket connections between the harp and shoe, are regularly furnished with either steel or bronze trolley shoes. Both the harp and polehead are made of "Flecto" malleable iron.

For interrupting the trolley circuit in mines, the Ohio Brass Co. offers a metal underrun section insulator in combination with a sectionalizing switch. End runners are of bronze, while the center runner and supporting castings are of "Flecto" malleable iron, hot-dip galvanized. All wearing parts, it is claimed, are quickly and easily renewed. The metal underrun feature, the company states, in addition to being more wear-resisting than fiber or other insulating materials, has the added advantage of interposing two air gaps between the live parts of the equipment. Thus, it is claimed, perfect insulation is assured at all times.

Metal Underrun Section Insulator



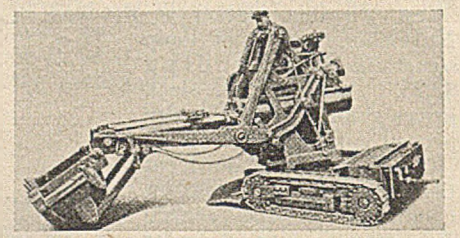


K-Type, Air-Gap Mine Hanger

The Ohio Brass Co. also has developed a new K-Type air-gap mine hanger. According to the company, an air gap between the insulation and hanger shell provides additional leakage distance and appreciably raises the wet flash-over value of the hanger. The gap also restricts the formation of any conducting deposit across the face of the insulator, it is declared. This hanger is designed for direct attachment to the mine roof by an expansion bolt. Hanger shells are made of "Flecto" malleable iron, hot-dip galvanized, with "Dirigo" insulation permanently molded in. The hanger is rated for all currents on voltages up to 550, the company says.

Crawler Mounting Developed For Underground Shovel

The Nordberg Mfg. Co., Milwaukee, Wis., is now offering the Nordberg-Butler shovel with a crawler mounting. This machine supplements the standard rail-mounted type and, like the latter, may, according to the company, be used for driving rock headings, picking up rock falls, and similar work where compressed air is available. It is asserted that the machine with the crawler mounting will do everything the track-mounted type is able to do, and, in addition, can be handled with greater convenience. To handle loaded cars, it is only necessary, according to the makers, to lay down short sections of track until the machine has gone forward far enough for a full-length rail. Loading time is cut in half with the crawler mounting, the company reports, and the full-revolving shovel will load cars from both sides.

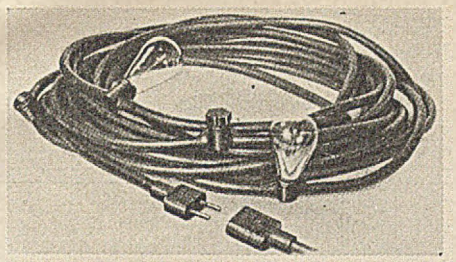


Nordberg-Butler Crawler-Mounted Underground Shovel

The crawler is of all-steel construction, with special alloy-steel treads. Each tread is driven by a separate, four-cylinder air motor, so arranged that the treads can be run in either direction or in opposite directions. It is asserted that the shovel can be turned in an 8-ft. circle. In front of the mounting is a wide shoe which takes the downward strain of the dipper in digging. It can be raised, if necessary, in moving. Movements of the dipper are actuated by a direct-acting thrust cylinder. According to the company, the shovel will operate in an opening 6 ft. wide at the dipper height. With crawler, the machine weighs 7,500 pounds.

Safety Lighting Cable Offered

"Stringalite," a new safety lighting cable, is now offered by the Sullivan Machinery Co., New York City. According to the company, the cable has been developed to withstand the severe demands of underground lighting service. One outstanding advantage claimed for the equipment is that it offers the safety and utility of a permanent installation, together with the simplicity and economy of a temporary job. Other features stressed by the company are: ease of installation, extension, and removal; elimination of special brackets, fixtures, or insulators, as well as taped joints; 100 per cent salvage value;



Coil of "Stringalite" Cable, Showing Light Sockets and End Connector

ample light where it is needed; unlimited extension from the current source; practically unbreakable sockets and connections; adaptable to use with standard lamp guards; perfect insulation and protection against moisture, corrosion, and rough-handling are provided by a heavy coat of tough, molded rubber. "Stringalite" is carried in lengths of 100 ft. and 300 ft., with three lamp sockets every 100 ft. End connectors are attached, and side connectors or odd lengths may be had if desired.

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Corona and Ozone Troubles Stopped by New Insulation

The Simplex Wire & Cable Co., Boston, Mass., has developed a new type of rubber insulation called "Anoroc" (corona from another angle) which, it claims, does away with corona and ozone troubles on high-voltage cables insulated with rubber compounds. "Anoroc" is not said to be ozone-proof, ozone-repelling, or ozone-resisting. It absolutely prevents the formation of ozone in or about a cable at normal operating voltage, the company declares, making all ozone-proof or ozone-resisting qualities superfluous. It removes, the maker states, the only objection to rubber insulation for high-voltage conductors and retains all of the electrical, chemical, and physical characteristics which have made rubber the most desirable insulation for cables.

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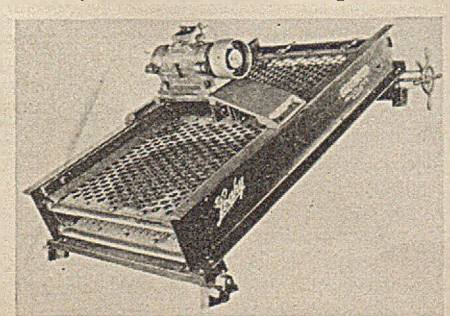
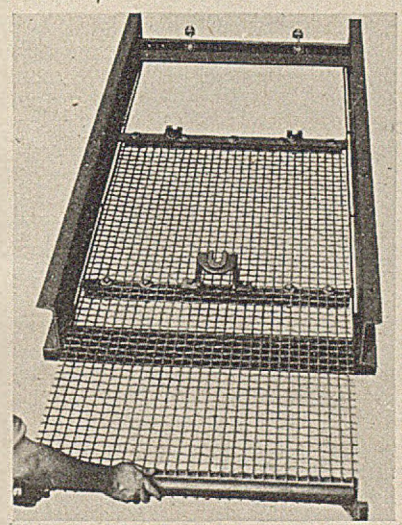
Removable Screening Surface Offered With Vibrator

An all-steel, electrically welded frame built of heavy, structural channel and angle members is one of the features which the Deister Concentrator Co., Fort Wayne, Ind., asserts has been provided for maximum strength and rigidity of the new Leahy "NO-Blind" vibrating screen. This frame, the company says, remains absolutely stationary while the screen is operating, and supports at its mid-section the vibrator assembly, as well as carrying, longitudinally, within its inclosing members, the screen-jacket assembly. Another feature stressed by the makers is a guard to protect the tappet and coil spring. This protects the latter from accumulations of material which might affect the vibratory action, and keeps large pieces which might bounce up from the screen surface from injuring the spring or tappet parts.

Leahy, "NO-Blind" Vibrating Screen





Removing Screen-Jacket Assembly

A further improvement noted by the company is in the screen jacket suspension to allow the operative to change the screening surface with minimum effort and greatest ease. To change the screen jacket assembly, according to the maker, it is only necessary to release the two nuts directly above the yoke and then slack-off the two nuts on the jacket tightening bolts. Then the tightening bolts are lifted out of the upper mounting bar socket clamps, entirely freeing the jacket. The latter then slides out of the frame by gravity, while its weight is carried by slide rails. A new assembly is then put in the frame by reversing the above process.

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Conveyor Scale Totals Material Weight

John Chatillon & Sons, New York City, offer a conveyor scale, the "Telepoise," which they state is an electrically operated instrument for totaling the weight of coal and other materials transported on conveyors. Total weight is shown on a continuous register in pounds, tons, metric tons, or barrels. Daily operation is recorded on a 24-hour time chart. Both the register and recorder, it is claimed, may be installed at any distance from the scale or from other units. Installation may be made without interruption of the operation of the conveyor, the company states. The "Telepoise" is shipped as a complete machine, permanently calibrated. It operates on 6 to 24 volts and a fraction of an ampere, either direct or alternating current, according to claims.

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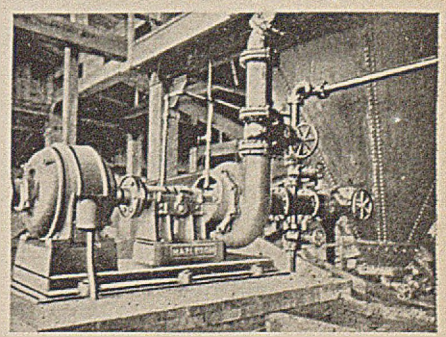
Sludge Pumps Lately Developed For Acid or Gritty Water

Barrett, Haentjens & Co., Hazleton, Pa., have developed the Hazleton sludge pump to handle acid mine water carrying in suspension a considerable quantity of abrasive materials, such as silt, sand, crushed rock, or ashes. Construction details, as outlined by the company, follow:

The casing is a plain shell of practically uniform thickness, made of chrome iron. Brackets for supporting the casing are not cast integrally with it, as the metal is likely to become spongy where casing and brackets join. The casing rests on the base and the construction is such that pipe strains cannot throw the pump out of alignment if the bedplate is set on a good foundation. New casings will always fit exactly in place with this system. The impeller also is made of chrome iron and is provided with an extra long intake nozzle, which serves as a seal ring. To compensate for wear, the impeller may be moved toward the casing by an adjusting sleeve, an opening in the casing gives easy access to the sleeve for adjustment. The seal ring is so proportioned that it will last longer than the vanes and side

Ball bearings are installed to carry the thrust load, thus obviating the necessity for holes in the back of the impeller for relief and eliminating leakage from the back of the impeller into the suction. The stainless steel shaft is supported by heavy bearings and has a short overhang. The stuffing box is so arranged that grit and solids are driven away from the packing by a stream of clean water. Clean water also is introduced into the casing through holes in the casing ring, thinning the mixture on both sides of the impeller and minimizing wear.

Hazleton Sludge Pump



casing walls. Inspection of the interior can be made by removing the motor from the bedplate and pulling the pedestal complete with side head and impeller out of the pump. No pipe connections have to be broken. A new impeller can be put in a 2,000-g.p.m. pump in less than two hours.

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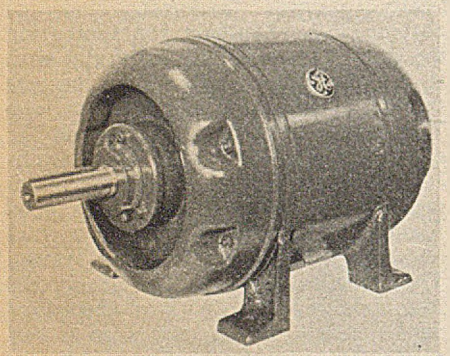
Equipment for the Use and Control of Power Offered Coal-Mining Men

THE General Electric Co., Schenectady, N. Y., has developed a new line of totally inclosed, fan-cooled motors for hazardous conditions as specified in Class 1 of the National Electrical Code which, it states, conforms to the modern trend on induction motor construction. In most of the ratings, the company says, the motors have the same mounting dimensions as the open, general-purpose types. The polyphase motors at present include ratings of



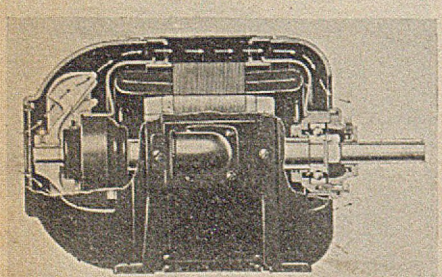
General Electric, Type K-326, Squirrel-Cage, Totally Inclosed Fan-Cooled Induction Motor

from ¾ to 30 hp. in the popular speeds, and are especially designed, it is said, for use in explosive gas. They are suitable, it is stated, for either indoor or outdoor operation, and eliminate the necessity for firewalls and other arrangements necessary with the ordinary open or inclosed types. In the single-phase motors, ratings at present available range from ½ to 2 hp. Fractional horsepower ratings may be obtained of from ¼ to ½, the latter in either repulsion induction or direct-current types.

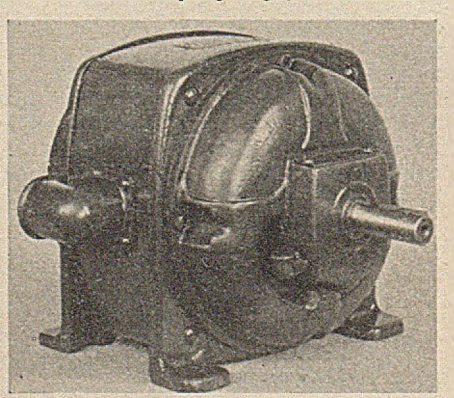
A new line of dust-tight, totally inclosed, fan-cooled induction motors, equipped with ball bearings in "cartridge housings," is offered by the General Electric Co. These motors utilize a single ventilating fan located outside the inclosure proper. A point stressed by the company is the fact that the new line provides a totally inclosed motor of the same mounting dimensions, rating for rating, as the standard, open-type, horizontal, general-purpose motors rated at ¾ to 50 hp. in the popular speeds.

Size and weight are minimized in these motors, the company asserts. The ventilating fan is attached to a short shaft extension opposite the driving end. Air passages are provided in a double frame. All inclosing parts, it is stated, are of substantial steel or cast-iron construction, and the fan is housed in a cast-iron inclosure with a heavy screen over the large intake opening. Air is blown through the passages and out the driving end. Tearing down or assembling the motors is facilitated by simple mechanical construction, the company declares, and the process is further aided by the use of the dust-tight cartridge-type ball-bearing housings, which permit removal of the rotor without exposing the bearings to dust or dirt. The motor is indorsed by the Underwriters' Laboratories for the hazardous dust conditions specified in Class 2 of the National Electrical Code, the company says.

Air Circulation in General Electric, Totally Inclosed Fan-Cooled Induction Motor

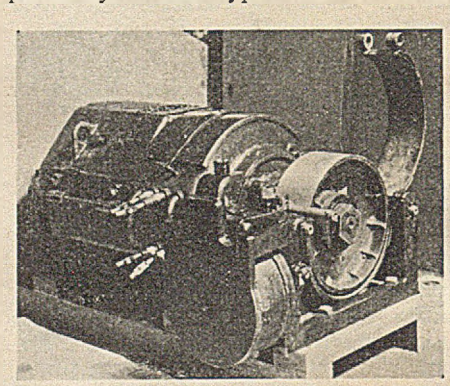


A new line of single-phase, repulsion induction motors (Type SCA), capable of frequent reversal, has been brought out by the General Electric Co. These motors, the company says, are mechanically interchangeable in all respects with motors of corresponding horsepower and speed ratings of the Type SCR, general-purpose, single-phase equipment. Available ratings range from ¾ to 5 hp. at 1,800 r.p.m., and from ½ to 2 hp. at 1,200 r.p.m. All mechanical modifications for the SCR motors may be applied to the Type SCA equipment, the company states. In addition, it states that the starting torque is high, ranging from 225 to 275 per cent, depending upon the rating, of the full-load running torque.



Type SCA Reversing Motor

The General Electric Co. announces a new line of band-type, clapper-magnet-operated brakes for direct-current motors. These brakes, designated as CR-9517, were designed, the company says, for heavy-duty crane and hoist service and for similar purposes. Simplicity and long life are claimed. The brake operates in the same manner as the external-contracting, band-type, automobile brakes, and is applied by a spring and released by a magnet. It can be connected either to operate in synchronism with the starting and stopping of the motor, or to operate independently. One type uses a series wound coil and the other uses a shunt-wound coil. For independent action, the motor control is provided with a "drift" point, which takes power from the motor, but does not apply the brake.



CR-9517 Magnet-Operated Brake

Construction features outlined by the company are: bar stock used in fabrication to give strength; bolt heads and nuts are all the same size; coil terminals are secured to the magnet frame, and the coil magnet is mounted so that terminals can be brought out from either side of the brake; coils are form-wound, vacuum-treated, and compounded in the magnet frame to eliminate moisture and add strength; balanced steel wheels are used; and the brakes are so constructed that they can be installed where there is little headroom.

In operation, the company states, there is little wear on the brakes, as 90 per cent of the wheel surface is used for braking, making the pressure 15 to 18 lb. per square inch for a 30-minute rating. Bands, both top and bottom, are interchangeable, and braking, it is said, is positive in either direction. By throwing back the top band, the brake wheel can be lifted out vertically, thus, according to the company, facilitating adjustment. It is further claimed that the magnet can be replaced without changing the brake adjustment.