COAL AGE

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

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Machines—and the New Competition

MECHANIZATION has developed momentum at a most critical period in the history of coal. At the outset an individual advantage in competition between individual coal operators, the machine is coming to be recognized as the means by which the coal industry is enabled to compete successfully with rival fuels.

FURTHER MECHANIZATION is necessary, however, if the business now held by coal is to be retained and the jobs of the coal miners are to be made secure. True, some labor may be displaced by machinery, but a far greater number of men will be thrown out of employment if, for lack of mechanization, rival fuels gain any large part of the market now held by coal.

THE TIME to meet the competition of rival fuels with the full strength of coal is at the inception of their development as competitors. Once intrenched, dislodgment is not easy: the gas pipe line once laid, the oil burner once installed will not quickly be abandoned.

PRICE is one of the most potent weapons in the industry's armory. Consequently, immediate low producing costs for coal are essential, and mechanization alone can provide them. Records already made in underground mechanization and in modern stripping leave no doubt on that score.

SOMETHING MORE than low price, however, is imperative if the competitive battle is to be crowned with victory. That something is the frequently neglected item of profit. The cost of coal must be reasonably low to the consumer and the sales realization must also put new money in the producer's purse.

WITHOUT THE PROFIT ELEMENT, coal continues a wasting industry in a doubly tragic sense. With profit, the industry is in a position to make still further improvements both above and below ground which promise further reductions in cost to the consumer and a better product for the buyer's money.

MECHANIZATION—at a profit—points the way. Had the machine not arrived, the story of coal in 1929-1932 would have been far different from what it will be when the record of those years is finally written.

Underwood Colliery, Standing Out in Its Aluminum Coating

BETTER HOUSEKEEPING

+ Aids Safety and Efficiency

At Pittston Co.'s Collieries

By IVAN A. GIVEN

Assistant Editor, Coal Age

ALUMINUM PAINT is the mainstay of the housekeeping program of The Pittston Co., Scranton, Pa., which operates ten collieries in the northern anthracite field. Since July, 1929, the company has painted 7 breakers, 24 steel towers, 10 steam plants, 303 miscellaneous buildings, and 10 miles of steam and water lines at its various surface plants. In addition to the just-finished program of refinishing exteriors, interiors are constantly touched up for cleanliness and distinctiveness. To supplement the outside appearance, the company also has embarked on a movement to install distinctive descriptive signs on all its breakers to inform the public that the attractive plant they are looking at is one of the Pittston group. Painting-up also has been extended to underground offices, substations, and first-aid rooms, where, though the work is not apparent to the world at large, the effect is just as great.

In refinishing exteriors, both wood and steel, aluminum paint comprised the finishing coat. For steel, the initial coat also was aluminum, while wood structures were first covered with a priming coat. While The Pittston Co. furnished the paint, the work was let to two contractors, one in the northern and one in the southern division. Before beginning the project, buildings to be repainted at each colliery were selected and the painting program was based on this selection. Once the work was well under way, however, quite a few deviations from the outline were made. It was found that when painting was started, many buildings and other structures which, as a part of the ensemble, were formerly unnoticed, fairly demanded refinishing.

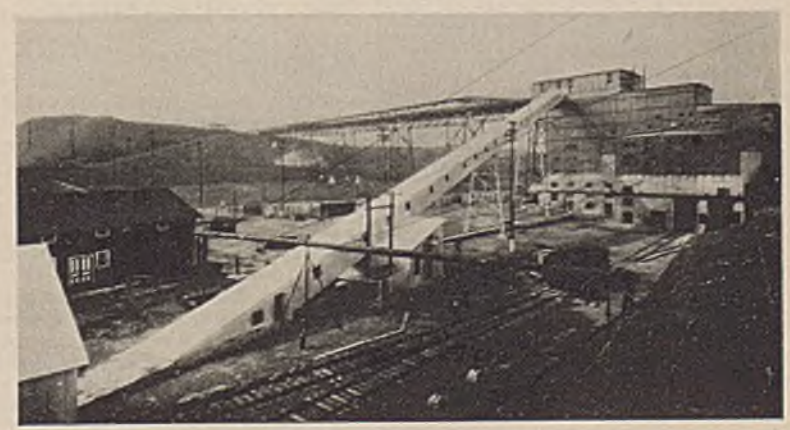
Specifications drawn up by the engineering department called for the first coat of paint or priming to be applied with a brush, for the reason that the workmen were less likely to cover up rusty or dirty spots. The finishing coat was applied with a spray. Before beginning the painting job, all steel surfaces were gone over with a wire brush to remove rust and scale. Wood surfaces received similar treatment. Window and door frames and similar construction in buildings other than of wood and steel also were gone over and refinished with aluminum paint.

The aluminum exterior coating was found to have high protective qualities in addition to its distinctive appearance. For instance, at the Pittston No. 9 colliery, Pittston, Pa., it was found that the blast from locomotive stacks had no appreciable effect over a period of months—aside from some discoloration—on the aluminum finish of a steel bridge leading from the mine to the dump in the top of the breaker. At close range, after a period of dry weather, dust may be noticed clinging to the finish. However, this is invisible at any distance, and the structures retain their distinctive finish at all times. Such dust as may collect on the paint always is washed off by the first dashing rain.

Distinctive identification signs for all the Pittston collieries have been included in the company's housekeeping program. At Pittston No. 9, and at No. 14 and Ewen collieries, in the southern division, Neon signs have been erected. Those at No. 9 and No. 14 have been installed at the top of the breakers, with the former facing the state highway. The sign at Ewen has been built on the ground in the outskirts of Pittston, also facing the road. It is the intention of the company to identify all the rest of the collieries with a sign that will stand out, though future installations may not necessarily be Neon equipment.

Finishing of interiors is a continuous process at all collieries. White glossy paint ordinarily is used for this purpose in all but the breaker interiors, where it would be subject

Pittston No. 9 Colliery, Showing the Contrast between Aluminum-Painted Surfaces and the Old Finish. When This Picture Was Taken, Only the Conveyor Gallery in the Foreground Had Been Painted.



Interior of the Generating Station, Underwood Colliery

to the action of water carrying fine coal. White is not a hard and fast rule, however, as the generating plant at Underwood colliery, Throop, Pa., has been finished in a panel effect (extending halfway up the wall) in light brown and cream. This interior is shown above.

Underground mine offices, substations, and first-aid rooms are not neglected in the campaign for distinctive appearance. Aluminum paint is used in a number of cases, but it is not standard for this work. White has been used at a number of mines to give a dazzling and spick-and-span interior. Floors are of concrete for cleanliness. Small, neatly lettered signs identify each of the underground offices and rooms. Surface buildings and offices are marked in the same manner.

Machinery receives a brightening touch when it is overhauled, though the color used varies. Turbines at the Underwood generating station were refinished in maroon, the original color. Units at certain other stations, which were the conventional bluish green, were refinished in the same shade when overhauled. Before turbines, motors, and similar equipment are refinished they are first coated with an iron-dust filler to remove the roughness of the original surface, after which the final coating is applied.

The exposed surfaces of concrete walls and foundations are hand-rubbed to a smooth finish immediately after the forms are removed. This is then covered in most instances with a cement wash, which gives it a pleasing white appearance. At No. 9 Avoca colliery, Hughestown, Pa., however, a slight amount of yellow ocher has been added to the wash used on all concrete work, giving it a smooth, light yellow cast.

Good housekeeping at the Pittston collieries also extends to the care of the grounds. At each operation a few men are carried in the labor budget for the express purpose of "policing up." Timber and rails are neatly stacked in designated places, and all other metal products, heavy machinery, and similar equipment which might suffer from exposure to the weather are placed under sheds or in totally inclosed buildings. Scrap copper is gathered up by the mine electrician and stored until enough accumulates for a carload shipment. All other scrap metal and machinery is collected by the workmen assigned to "policing-up" and piled in one place for shipment in railroad cars as junk when enough is on hand. Scrap lumber, timbers, and other pieces of wood are collected and piled to be hauled away for disposal, or it may, in some instances, be burned at the colliery. Mine and railroad tracks are kept free from coal and refuse.

Old buildings and machinery for which no further use can be found are not allowed to remain in the colliery grounds as an eyesore. All old buildings, including breakers, are torn down when they outlive their usefulness, and the wood parts are burned or disposed of as firewood, while the steel is cut up into scrap. After a structure is demolished, the site is leveled off. Old fences are torn down if not needed, or replaced by new ones of neat appearance. In certain cases, old wooden fences have been replaced by wire fences for both protection and appearance. Obsolete machinery is junked, and the site leveled off to conform with the surrounding grounds.

With the exception of the aluminum painting job and wrecking of obsolete structures and machinery installations, routine housekeeping is done at the collieries without any definite program of supervision or inspection. With the president and other high officials heartily in favor of the movement, the natural tendency of the colliery officials has had full play. Consequently, both groups have co-ordinated their efforts to attain the present stage of distinctive appearance plus neatly kept and clean grounds.

Naturally, a housekeeping program such as The Pittston Co. has adopted will yield few returns that can be computed in dollars and cents. However, aside from the natural desire to have properties that the company need not be ashamed of, certain indirect benefits have, in the opinion of the company officials, made the expenditures, both past and future, worth while. The benefits referred to head up mostly in the effect on the workers' thinking, and consequently their attitude toward their job. Underground men, both loaders and day men, the company has found, have developed a greater desire for neatness and cleanliness in their work. As a result, working places are kept in better shape, mine roads are cleaner, and generally better conditions abound. Consequently, the workmen are more efficient. Likewise, the breaker men have been so influenced by the housekeeping policy that it has become a matter of pride with them to see that every car of coal is as clean and well prepared as machinery and their own efforts can make it.

Improvements from a safety standpoint also may be traced back through the new attitude of the man toward his job to the influence of clean and distinctive surface surroundings. With a workman interested in keeping his surroundings in order, safety naturally is promoted, with resulting benefit to the company and the workers' families.

WILL REVIEW 1930 IN FEBRUARY ISSUE

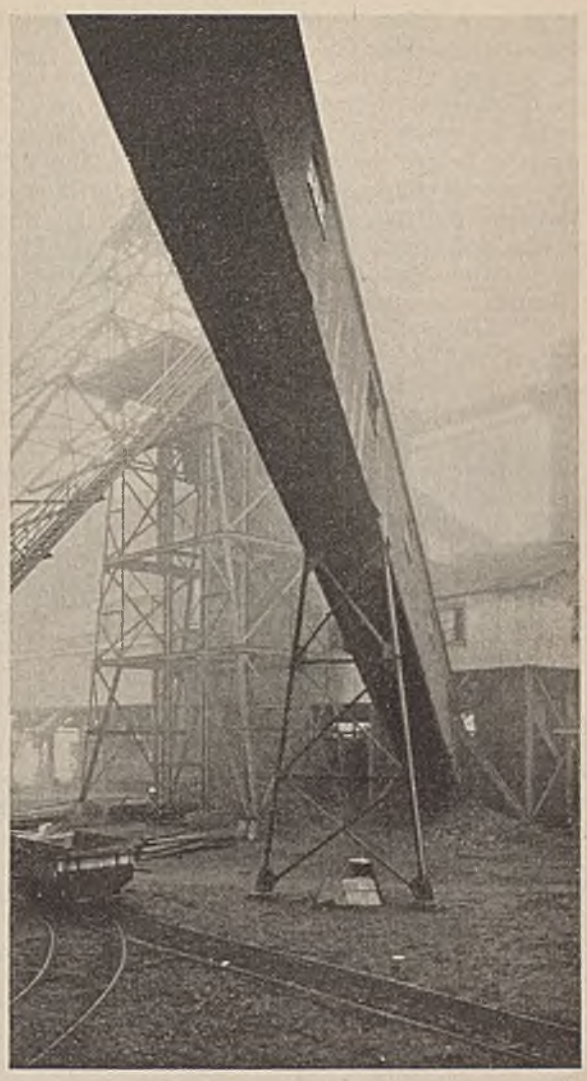
In the past, reviews of the year, especially in industries other than coal, could be as satisfactorily prepared in the first week of the year as a few weeks later. But in any industry that has excellent statistics collected with promptitude the reader is advantaged if publication is delayed for a few weeks till more complete figures are available. *Coal Age* has, therefore, determined to publish its Twentieth Annual Review and Progress Number in February. This issue will contain careful surveys of the activities of 1930 derived from a conspectus made of the entire field.

PREPARATION FACILITIES DOUBLED

+ Following Mechanization Of Illinois Mine

By ALPHONSE F. BROSKY

Associate Editor, Coal Age



WHEN the Consolidated Coal Co. of St. Louis two years ago swung from hand shoveling to 100 per cent machine loading in its No. 15 shaft mine, at Mt. Olive, Ill., it found that facilities for removing refuse in the 5,000-ton tipple were less than half sufficient for the new operating condition. With hand loading, 100 to 125 tons of a 4,000- to 5,000-ton input, or 2½ per cent, was rejected as refuse. Machine loading increased the rejection to between 200 and 250 tons, or about 5 per cent of the input. Accordingly, it was decided practically to double the preparation facilities, both in man power and in equipment. This tipple project, incidentally, was one of the first entered into as a result of loading mechanization in Illinois.

No. 6 seam coal, with an average thickness of 7½ ft., is mined. The blue band, characteristic of this seam, is 1½ in. thick and occurs about 14 in. from the floor. Face preparation consists of cutting with shortwall machines and leaving about 4 in. of bottom coal, snubbing by explosives, and removing the blue band before the main body of the coal is blasted. Coal is put into the mine cars by mobile type loading machines.

At this mine is a company-owned and operated power plant which burns the combustible reject from the tipple. It is a turbo-generator plant of 3,500-kw. capacity, which furnishes power to several near-by towns as well as to the mine. Reject from the main picking tables is conveyed to a refuse picking table 4 ft. wide and 30 ft. long, where pure rock is discarded. The combustible material remaining is reduced to 1¼-in. screenings in a 36x36-in. two-roll crusher, and conveyed to the power plant. In a test run for one day, during which 4,600 tons was hoisted, rejected material amounted to 240 tons. Of this quantity, 75 tons was rock and 165 tons combustible suitable for fueling purposes in the steam plant.

The original tipple was erected in 1920. It incorporated a rescreening plant and all other facilities considered necessary in that day for proper preparation, mixing, and sizing of the coal, including picking tables for lump, egg, and nut sizes.

In the reconstruction of the tipple all but one of the picking tables were enlarged and one new table was added: A table handling 6-in. lump, 5 ft. wide, was increased from 30 ft. to a length of 70 ft.; a 3x6-in. egg picking table, 6 ft. wide, was increased in length from 30 ft. to 70 ft.; two 2x3-in. nut picking tables each 3 ft. wide were lengthened from 12 ft. to 28 ft. Additional picking surface was added to the facilities for picking 1¼x2-in. nut, which is accomplished on two tables, each 3 ft. wide and 28 ft. long. Combined picking-table areas were increased 114 per cent over the original installation.

No discrimination is made by the pickers between pure rock and lumps of coal to which is attached refuse in the lump and egg sizes. Convenience in disposing of the rejects is not lacking, and the pickers need not hesitate or lose time in this operation. The picker stands on a low platform on each side of which is a refuse-disposal portal of generous proportions and flush with the floor. Under the portals are flared plates which con-

verge to a refuse conveyor directly beneath the picking table. On leaving the picking table the lump and egg are discharged to rescreen shakers, where the product of degradation is removed before the sizes are loaded into cars via conveyor loading booms. Nut sizes go from the picking tables to bins and thence to shaker screens for removal of undersize coal.

Lump, egg, and nut, individually or together, can be crushed to screenings if and when the demand for stoker coal exceeds the demand for domestic lump, as in the summer months. Loading booms handling the picked sizes are so arranged that they can be raised to discharge into a 36x 48-in. two-roll crusher when screenings are desired. The company contemplates putting in a crushed-coal rescreening plant to yield resultant sizes from crushed lump, egg, and nut. These sizes would be No. 3 ($1\frac{1}{4}$x$\frac{3}{4}$ in.), No. 4 ($\frac{3}{4}$x$\frac{3}{8}$ in.), and No. 5 (minus $\frac{3}{8}$ in.).

Broad facilities have been added to this tipple for separating the raw coal into a wide range of sizes, incidentally for effective picking, but chiefly for uninterrupted remixing, after picking, into combinations unattainable before the tipple was altered. The cost of this reconstruction project, which is detailed in Table I, was $90,000.

As the contract for machinery was placed in a lump sum, Items A to E inclusive are estimates which include erection supervision by the Link-Belt Co., supplier of equipment for the reconstruction job and also original erector. Items G and H, however, are actual. Labor and engineering were performed by employees of the coal company.

Three-inch screenings from the primary separation are elevated to the rescreener plant and these separated into No. 1 and No. 2 nut and $1\frac{1}{4}$-in. screenings. After being cleaned on picking tables the two nut sizes are stored separately in steel bins each holding three carloads. When loaded separately, these sizes are discharged from the bins into degradation screens of the shaker type before final disposition in railroad cars. The $1\frac{1}{4}$-in. screenings are carried directly to a bin adjacent to the nut bins and, in direct loading, are dropped into a railroad car.

Frequently demands are made for mixes of two or more of the five primary sizes. Reuniting of sizes is accomplished without stopping or hindering the flow of coal, by a wide, fast-moving belt conveyor which lies alongside and near the bottom of the bins. A draw gate and chute in each bin provides easy regulation of flow of one or all three sizes to the belt. From thence the coal is discharged onto a steel conveyor which extends across the loading ends of the booms over the lump and egg tracks. The egg boom can be elevated to empty into this same cross or recombining conveyor, which, through bottom gates and chutes, can discharge its burden on either the egg or the lump track.

Arrangements are such that any demanded combination may be made, and prepared minus 3-in. sizes are joined with picked egg and lump. For picked run-of-mine the gates on all bins are opened wide. If a 2-in. lump is demanded the No. 1 nut is allowed to reunite with egg and lump. When a car of 2x6-in. egg is specified the No. 1 nut is transported to and combined with the normal 3x6-in. egg. Similarly, a 3-in. lump is made by combining egg and lump through the cross conveyor.

A supplementary combining system is installed on the side of the storage bins opposite to the bin discharge belt. It comprises a steel bucket conveyor and elevator designed to receive No. 1 and No. 2 nut from their respective bins. These products are taken either singly or in combination and discharge to the upper run of a cross conveyor, whence by chutes and gates they are delivered for mixing with either the lump or egg flow at the inner end of the loading booms.

At the No. 7 mine, located at Staunton, $3\frac{1}{2}$ miles from the No. 15 mine, the company operates a washery. Coal of a size less than 3 in. may be shipped by railroad from Mine No. 15 to the washery for mechanical cleaning to fill special orders. These latter command premium prices. The cleaning plant is equipped with three Shannon jigs having a capacity of 150 tons an hour, which handle sizes Nos. 1, 2, 3, 4, and 5; it also is equipped with two Faust jigs for rewashing No. 5 size.

Although the No. 15 tipple was greatly enlarged, no change was made in its capacity, which remains 5,000 tons in eight hours. However, the tipple crew was more than tripled. The number of pickers was increased from 8 to 42 and three picking-table bosses were added to the supervisory force; but otherwise the tipple force remained practically unchanged. Before and after the tipple was reconstructed the normal crews numbered 16 and 60 men, respectively. In Table II is listed the present normal attendance on the tipple.

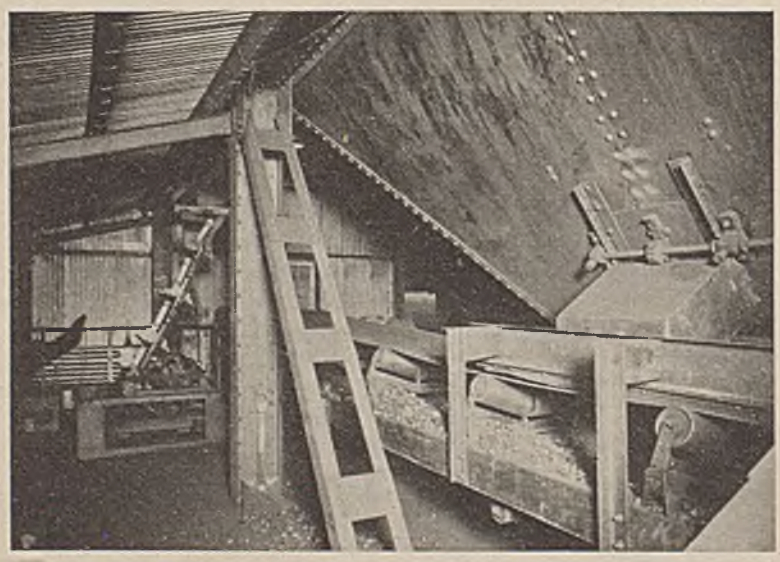
Table I—Cost of Tipple Changes

A—Picking tables	$18,000	
B—Screens	1,200	
C—Conveyors	15,000	
D—Crushers	5,000	
E—Structural and housing	34,000	
Total cost of material		$73,200
G—Labor	$13,600	
H—Engineering and miscellaneous	3,200	$16,800
Total		$90,000

Table II—Men Employed in Operation of Tipple

1	General tipple boss
3	Picking-table bosses
38	Pickers on clean coal
4	Pickers on boiler fuel
1	Greaser and clean-up man
2	Car trimmers and boom operatives
2	Car pinchers and spotters
1	Bin and chute attendant
2	Car riders
2	Car pullers
1	Weighman
1 to 5	Car cleaners
58 to 62	Men, total

Nut and Screenings Are Delivered to a Cross-Flight Conveyor for Mixing With Lump or Egg



FUNCTIONAL DISTURBANCES

+ As a Cause of Accident

By M. E. FULK, M.D.

Muskingum Coal Co., Zanesville, Ohio.

IN ITS essence accident prevention in mines has two aspects: First, the mine must be safe and provided with all the protective devices and safeguards necessary; and second, the men in it themselves must work safely.

Dismissing for the moment the purely mechanical devices that assist in safety and in which frankly I am only distantly interested, let us consider the question: what makes some miners work safely and others unsafely? The answer is that all men have underlying physiological conditions to which their temporary aberrations are responses. Because these aberrations have causes, one does not have invariably to yield to them, but while they are operating, certain normal organic functions are held in abeyance. Consequently, there is a physiological aspect of safety, and by discussing it one gets just a little nearer the great objective: safe operation of mines.

Broadly speaking, all men are natural hazards—that is, naturally predisposed at times to invite accident by their actions. Perhaps that statement should be qualified to read that all men *may* be hazards, and of these hazards there are different degrees. The conception that men in general have such tendency toward the acceptance of hazards stirs up in one's mind a demand for a system of measurement that will grade these hazardous impulses.

The miner's life is a hard one, and he is subject to prolonged nervous and physical strain. Hence he is prone to functional disorders. On some workmen in the exercise of their duties depends the safety of their fellow workers. It is necessary that these keymen should be observed carefully at intervals for any sign of incipient malfunction. Focal infection may render a mind that is usually calm and sane, flighty and unbalanced, and a hand that is normally strong and steady, weak and tremulous. Workers with a low standard of health as well as those who are stupid, inefficient, and thoughtless, are all marks for the hazards of mining.

Hazards are physical, psychological and physiological, some depending on the working place, some on the mind of the worker and some on his health. Dr. Fulk deals with the last two. Who should be admitted to the mine if safety for themselves and others is to be attained? Some men are repeaters in accident lists. Is bad health with functional disturbances the cause for their multiplied misadventure?

Any modern occupation, especially a hazardous one, departs appreciably from the more primitive forms of labor. The more such occupations deviate from natural working conditions the greater the chances that negligence will take its toll. But the dangers which naturally result from the facing of the unaccustomed and even the unknown will be reduced by the employment of men who have a well-rounded development, mental and physical. Safety depends not only upon health and vigor but on good judgment, common sense, self-control, and the ability of the individual to work well with other men.

Like other industries, coal mining is rapidly becoming a mechanical operation, with a constant pressure for production economies, especially in the use of labor. What we are seeking today is not more brawn but more brain. That being so, any system for the purchase of labor should be selective and based on the most modern principles.

When an accident happens, the public lays the entire blame on the mine, but the active or passive participation of the individual is not an

insignificant factor. Many illustrations might be given, but perhaps one will suffice. A year ago last May I was called to a near-by mine where 42 men were gassed out of 150 working under identical conditions. The clinical history revealed the fact that they were suffering from carbon-monoxide poisoning. In the course of an investigation I physically examined all the men exposed, in order to determine, if possible, why the survival rate was so high.

My findings were that certain physical conditions predispose to carbon-monoxide poisoning. The cleavage between the two groups—those who were gassed and those who escaped—was so marked that an impartial physician could have made a selection of victims from non-victims simply by reading the examination chart. Among those who suffered from gas twenty had not only bad teeth but weak heart, abnormal blood pressure (high or low), and abnormal weight (under or over); six had weak lungs, abnormal blood pressure, and weak heart; ten had alcoholism, bad teeth, and gastro-intestinal diseases; one had piles and constipation; three had diseased tonsils and a bad heart; and two syphilis, abnormal blood pressure, and a weak heart.

THESE figures revealed to the operators what an important asset a strong and healthy miner is, if kept in good and efficient condition. The employees now undergo a thorough physical examination, which is proving a paying investment not only from a safety but from an economic standpoint.

A distant relationship exists between a lack of safety and functional disturbance, though it is extremely difficult to prove that relation statistically. A few minutes' examination of these figures will convince any employer that the relation does exist.

A physically ailing man is mentally ailing and unable to concentrate. The man who cannot keep his mind on his work is a hazard to himself and to his fellow employee, and an encumbrance and an expense to his employers. A short time ago a brain worker asked me to operate for hydrocele. It was a small affliction but it annoyed him and he could not concentrate his mind on his work. How much worse are these distractions for the men doing hard physical work; not only are they inefficient but they become careless of their own and their co-workers' welfare.

Industrial physicians are in a rather difficult position. Confident as they are that they can greatly reduce the number of accidents, they are not prepared with the statistics that will prove their case. Their success in preventing disease from entering the mine is indeed a step forward in the march of industrial sanitation, and it will be something of which to be proud if equal attention is devoted to forestalling the functional disturbances that are so largely responsible for dangerous or hazardous acts on the part of the miner.

It may sound trite even to the point of banality to say that if doctors wish to set up a just claim to be considered "industrial physicians" they must deal more sanely and soundly with the vital issue of accident prevention and should not wait till fresh disasters due to human negligence arouse them. The mine doctor should not only examine all the men who enter his mines but should interpret the fact that the human body must struggle to adjust itself to the environment of modern mining.

Fortunately, the physical qualities which along with common sense are most desirable in a coal mine, appear to have the maximum safety value. This does not mean that careful measures of safety should not be instituted but that along with such measures pre-employment physical examination should be introduced.

Its increasing use has been a factor in improving the physical condition of coal miners.

The mine doctor needs more and more comprehensive and accurate information about the physical types that are basically best fitted, under modern conditions, to mine coal. This information must be gathered, interpreted, and used in a far more scientific way than at present. Agreement will have to be reached upon a standard form of physical examination for coal miners which will embody a method of labeling and classifying the different physical types which have to be measured.

Human formulas of whatever sort—social, medical, or commercial—are likely to be as imperfect as the human nature by which they are contrived. But in these modern days medicine has devised many precision instruments with their accompanying array of standards to supplement the judgment of the practitioner.

One thing, however, that physicians know definitely is that functional control is reduced by fatigue, nervous disorders, and other functional factors of which pathology tells us so little, and that the arrangement for concentrating the discharge of energy is perfected as adjustment proceeds.

THE basis of all physical examination must, of course, necessarily be fact, the substantial reality of the human body as a whole. But when medicine comes to deal with mining and the men who engage in it the great fundamental problem in addition to recording the clear-cut cases of physical disturbance due to occupation is to evaluate the functional capacity of the men that come under examination. The mine doctor must forecast the effects of functional incapacity. The future must not be left to take care of itself. He must set himself to the task of testing each man in the mine for the hazardous impulses which physiologic disturbances may cause.

There is a need for a standard form of physical examination. Mine must join mine to establish this standard, which will include not only precise methods of labeling and grading physical condition but will furnish comparable statistics about the physical condition of miners.

COSTS CUT 25 PER CENT + By Modernization At Small Ohio Mine

By JOHN WYNN, Jr.

General Manager
Edgefield Coal Co.
Canton, Ohio

MODERNIZATION and mechanization are by no means applicable solely to large plants. When intelligently used, these measures will cut operating costs at mines of relatively low capacity, as has been demonstrated by results at the plant of the Edgefield Coal Co., located on the outskirts of Canton, Ohio. Coal is mined by a long-face panel system and carried by conveyors to the cars. Economies have been derived from the substitution of large modern cars for small cars, and savings have accrued from remote control of trip movements past the loading ends of conveyors underground, and through the tipple on the outside. No less important are the steps taken to simplify coal handling and minimize degradation in the surface plant.

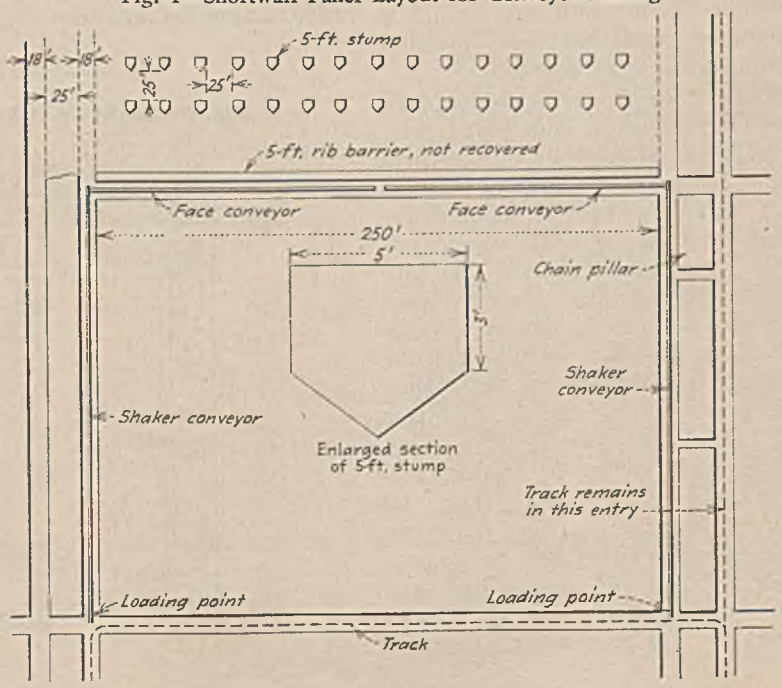
At the outset it should be explained that the plant is somewhat unusual, for it combines working a mine with dealing in shipped-in coal of several grades. As the property is situated within two miles of the city of Canton, an open market is available. The local coal, however, does not meet all the requirements of this market. Furthermore, it would be practically impossible, under ordinary conditions, to keep production on a uniform basis. Demand would overtax the plant's production during the winter. Since the shipped-in coal can be handled without any appreciable increase in the overhead, the foreign fuel relieves the peak demand on the mine, puts operation generally on a more uniform basis, and provides an additional source of income. As far as physical aspects are concerned, the two operations are entirely separate, each having an individual handling and storage system. In each case coal is transported to market by trucks

The Edgefield mine takes coal from the No. 4 seam, lying about 80 ft. under the surface. Overlying strata consist chiefly of hard slate, which makes a good roof. The mine is free from gas. Average headroom is 4½ ft., and the mine is without heavy grades. Daily production runs about 400 tons.

A retreating shortwall panel system is used, the panels averaging about 250 ft. wide. At present only one panel face is being mined, one cut being taken each day, which yields about 210 tons. With the exception of entry driving, all the work is done mechanically. The mine is subject to considerable bottom water, which delays the operation of conveyors in the entries. It has been found that the panels under these circumstances can be developed much more rapidly if loading in the entries is done by hand. The general scheme of operation, as it applies to one panel, is shown in Fig. 1. A pair of 18-ft. entries is driven down each side of the panel, and in one entry of each pair is installed a shaker conveyor which runs from face conveyors to the loading point.

To start a new panel, the track is lifted in the upper cross-entry of the

Fig. 1—Shortwall Panel Layout for Conveyor Mining



A Standard Trip Consists of Nine 3½-Ton Cars Hauled by a 10-Ton Locomotive

panel and the face conveyors are set in place preparatory to cutting. Shaker conveyors are set up in the side entries and the loading points prepared at the lower cross-entry junction. Meanwhile, tracks have been laid in the lower cross-entry and coupled to tracks in the section entry. Cutting, drilling, and shooting are performed at night. Shaker conveyors are shortened every two cuts.

As the cutting proceeds, 5-ft. pillar stumps are left every 25 ft. to hold the roof temporarily behind the face. These stumps, shaped as indicated in Fig. 1, are cut out by machine. The pointed end allows widening out and picking up of the long face in advance of the stumps with a minimum of pick work. Thus cross-cutting is practically eliminated. After a row of stumps is formed and an additional cut has been taken to open the face avenue, the face conveyors are broken and reset in advance of the stumps. The panel is worked until only a 5-ft. rib of coal remains. This rib is left the full width of the panel and serves to delay cover movements until the face of the succeeding panel has been mined a safe distance from that rib.

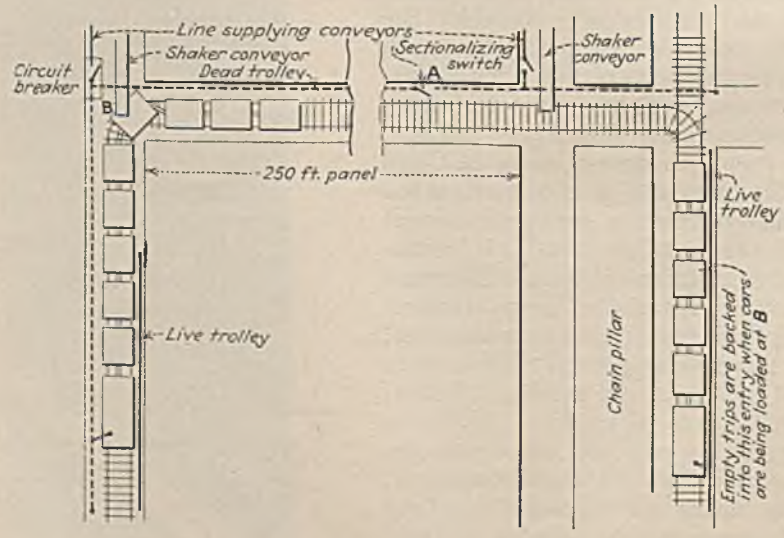
A newly developed sectional, drag type face conveyor, built particularly for this sort of work by the Fairfield Engineering Co., of Marion, Ohio, is used. This conveyor is designed for speedy and easy moving around pillars. It consists of a number of separate units, including a power frame, a take-up section, the desired number of 6-ft. intermediate sections, and the drag chain which carries the flights. The power frame carries the drive unit, which is powered by a 3-hp. motor, with automatic starter, and a worm-gear reduction unit, all mounted together. This frame can be installed on either side of the conveyor proper, and drives the head shaft through a roller chain and sprocket. The head shaft is mounted in Timken bearings, and has an extension on each end for mounting the drive sprocket.

Intermediate sections each consist of a carrying pan on top and a pair of return guide angles underneath, the two being connected by a framework that makes them a solid unit. The bottom of the pan is flat, and the sides vertical to act as guides for the drag chain and flights, above which the sides are flared at an angle of 45 deg. Leakage of coal dust at the joints is prevented by interlocking lips on the bottom of the pans. The take-up section carries a shaft and sprocket for the drag chain, the former being mounted between two tension screws, one at each end, and turned through a swivel handle. The various sections are assembled through dowels and bolts, so that it is a simple matter to break and reassemble the conveyor when pillars are encountered. This conveyor drags back little slack, because uniform tension can be maintained in the take-up.

A simple but effective method has been devised for handling trips at the car loading point, as shown in Fig. 2. The live trolleys are dead-ended at the cross-entries on the sides of the panel, and a supplementary circuit is installed, which gets its power from the lines that supply the face and shaker conveyor drives. The "dead" trolley is connected to these lines through a hand-operated circuit breaker. A sectionalizing switch (see *A* in Fig. 1) connects the two ends of the dead trolleys on the cross-entry. Except during clean-up periods, loading is in progress on only one-half of the face at a time. Empty trips are backed into the adjacent entry, and far enough into the cross-entry to permit their being picked up and hauled to the loading position by a motor operating from the dead trolley. The sectionalizing switch is closed only for this movement of trips.

After the first car is spotted, the motorman leaves the locomotive, with the brakes lightly set and the controller on, and through the circuit breaker controls the movement of the cars. As each car is loaded the trip is moved forward to bring the next car into position. While he is wait-

Fig. 2—Movement of Cars Under Conveyor Is Remote Controlled



ing, the motorman trims the loads on the cars already loaded. The board carrying the control breaker for the dead trolley also is supplied with a switch controlling both the face and shaker conveyor circuits. So, in case of necessity, both conveyors can be stopped from this point.

Cars can be loaded at the rate of about a ton a minute, by one man, the motorman. When the trip is completely loaded, the motorman throws the locomotive trolley over to the live trolley circuit, and hauls the cars to the point where they are picked up by the main haulage locomotive. He then picks up an empty trip and spots it in the adjacent entry preparatory to loading. Besides resulting in a decided increase in the speed of loading, this remote control has given a 30 per cent reduction in the labor cost of loading.

The company has adopted the policy, which is rapidly becoming good practice, of using fewer mine cars, of larger individual capacity. Recently 80 2-ton cars were replaced by 26 Sanford-Day Timken-equipped cars of 3½-ton capacity. These new cars have a 40-in. wheelbase, a 12½-ft. body, an over-all height of 30 in. from the rail, and a tare weight of 3,100 lb. The body is mounted on a framework made of heavy channel sections, and the overhang is braced on each side by three strong gusset plates, riveted in place. Especially heavy axles are used, the safe axle load being 7 tons. In the construction of this car, body weight has been kept down. The body is made of ¼-in. plate and the bottom is composed of three scoop-section doors, which are opened simultaneously.

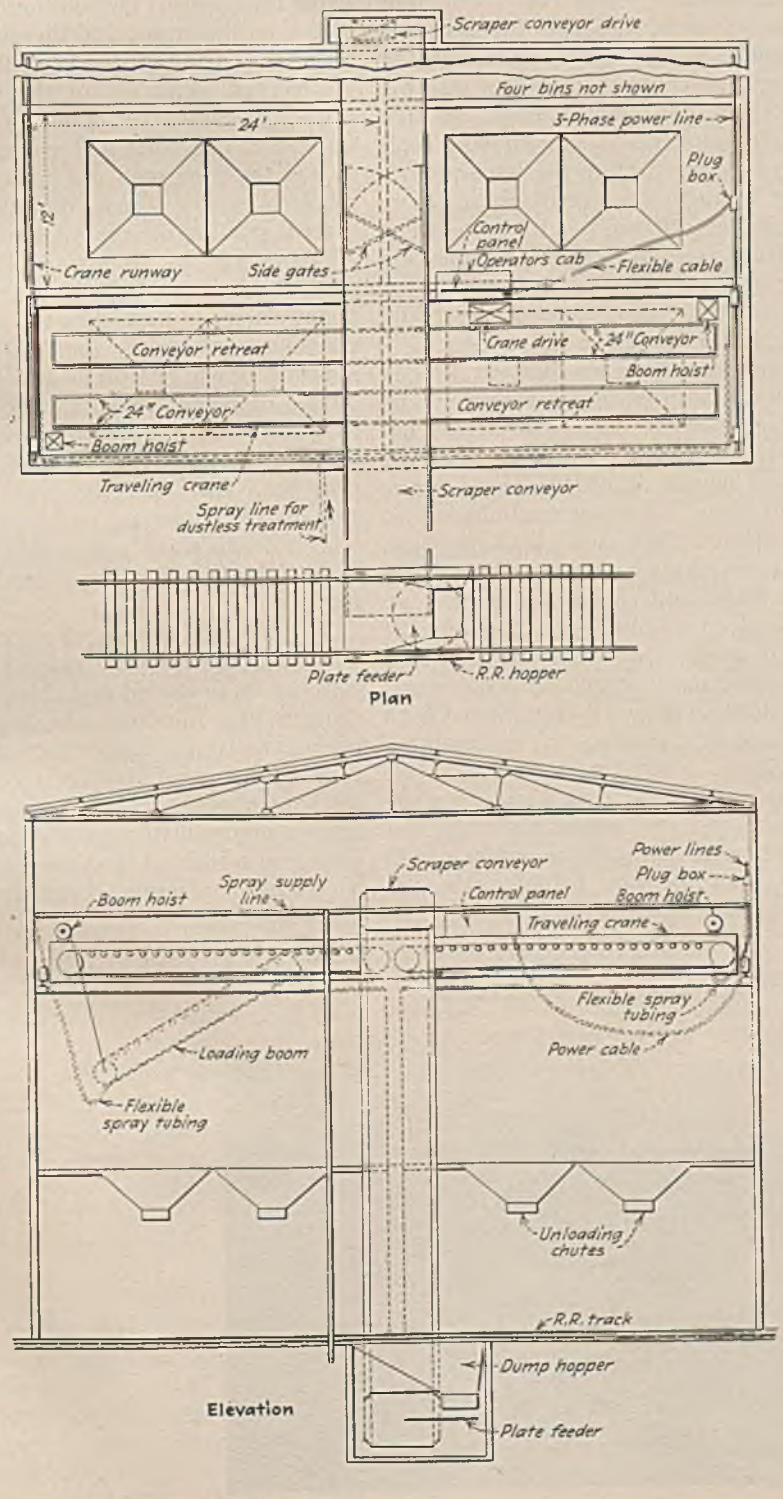
Despite their long wheelbase, these cars are easy to handle in the mine; in fact, it has been found that hand loaders in entries where grades are not steep can place their own cars. The cars also have reduced the time element in both hauling and dumping, as will be explained later. They have had a decidedly beneficial effect on car maintenance expense, partly because there are fewer of them and partly because of their construction.

A simple and effective system has been applied to the lubrication of the cars. Each car is numbered, and the numbers are kept on a chart at the tipple. When the chart shows that certain cars are due for lubrication they are cut out of the trip and greased. When lubricated they are marked with paint in a conspicuous place, and the date recorded on the chart. This work is done by a tipple man between runs, so that no extra labor or lost time is involved. Cars are lubricated every three months, because of the water conditions in the mine, which compel the use of a lime-base grease.

A normal trip consists of nine cars hauled by a 10-ton Jeffrey locomotive. Before a trip is moved into the tipple, the motor is shifted to the rear end and put on a dead trolley wire, which is controlled by a circuit breaker in the dump house. As in the mine, the brakes on the motor are lightly set, to keep the trip from drifting when the power is off. The trip is pushed over the weighing scales, a car at a time, through the agency of the aforementioned circuit breaker. When the power is off, the cars are held stationary by the brakes on the motor, so that weights can be accurately recorded.

After the last car is weighed, the whole trip is run past the bin and stopped. The tripping lever is then set and the cars are pulled over the hopper and dumped, movement of

Fig. 3—Plant for Handling and Storing Shipped-in Coal



the cars again being controlled by the circuit breaker. All dumping operations are performed by the motorman. Utilization of the drop-bottom type of car in conjunction with the circuit-breaker control has eliminated the labor of two men and cut the cost of unloading two-thirds. In addition, the arrangement has increased the speed of dumping and assured a steady flow of coal through the subsequent processes.

Mechanization has had a gratifying effect on the operating cost of this mine. In one item alone, that of labor, the reduction has been material, as can be seen from the table following:

Present Force for Average Daily Output of 400 Tons

	Men
Above ground	
Tipple (including picking and car greasing)	2
Smithing	1
Electrical upkeep and extension	1
Main-line hauling and dumping	1
Below ground	
Pumping	1
Track work, inspection, etc.	1
Mine-car loading and gathering	2
Cutting, drilling, and shooting	1
Supervision of conveyor work	15
Loading of face conveyor	12
Development (hand loading in entries, etc., one shift)	

Force Eliminated by Mechanization

Above ground	
Tipple operation	2
Below ground	
Haulage	5
Pumping	1
Cutting	2
Loading coal	15

Responsibility for the saving may be ascribed to several factors in addition to the item of mechanization, chief of which are the substitution of a few cars of large capacity for a number of smaller cars and the liberal use of anti-friction bearings in the cars and in mechanical equipment. Maintenance cost has been lowered and a reduction in the power bill has been effected. Whatever else the cause, the fact remains that over-all operating expenses per ton have been reduced 25 per cent.

While the system used for handling shipped-in coal may be considered as incidental to the foregoing, it nevertheless may offer suggestions of value in the solution of coal handling and preparation problems at typical mine plants. It may give the answer to questions involved in getting several different grades of coal out of mine cars and into appropriate bins with a minimum of rehandling, manual labor, and breakage.

Storage facilities consist of eight concrete-lined bins of 100 tons capacity each, designed for overhead loading and gravity unloading by means of chutes. Facilities also are provided for open storage, so that small quantities of slow-moving coals can be cleared from the bins, providing storage for varieties in more immediate demand. In spite of a surface appearance of complexity, the system developed for handling and distributing the material is really simple and effective.

Incoming cars are dumped directly into a hopper equipped with a motor-driven plate feeder. This feeder delivers the coal to a scraper conveyor which carries it up to a level above the bins. The latter are built in two groups of four each, back to back, and the scraper conveyor runs down the center and above the common bin wall. Extending over the bins at right angles to the conveyor, is a traveling crane which does the actual loading. The crane is equipped with two loading booms, one for each set of bins. Each boom carries a belt conveyor driven from a motor on the boom, and the whole assembly can be lowered through an angle of 30 deg. into the bin, bringing the delivery end close to the bottom of the bin and preventing breakage of coal. The scraper conveyor delivers its load to the appropriate loading boom by means of a series of side gates and chutes, as shown in Fig. 3.

While being unloaded, the coal is rendered dustless by spraying. The spraying mechanism is located under the end of the boom, the trajectory of the spray being such that, while it thoroughly drenches the coal, none of it wets the metal of the boom to cause corrosion. The spray is supplied from a Bean spraying unit located in an outhouse near the bins. From the sprayer, the solution goes to a tank on the crane, and thence to the boom ends through flexible tubing.

Electrical controls for the various conveyors and the crane are centralized at one point and are so interlocked that one man can operate the whole system. Once the crane is placed, starting the rest of the system is done by an automatically controlled sequence which starts the boom conveyor first, then the scraper conveyor, and finally the feeder. In shutting down, the order is reversed. This provision prevents backing up of material at any point in the chain when there is trouble along the line. One man can load the bins at the rate of 100 tons of coal per hour. This storage plant was designed and erected by the Morrow Manufacturing Co.

The storage system eliminates rehandling, increases the rate at which cars can be unloaded and cleared, and reduces to a minimum the labor expense involved. Experience at this plant offers proof that the intelligent mechanization of coal-handling processes is as productive of practical and economic results as are those obtained by the mechanization of underground operations.

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COAL MINING INSTITUTE

+ Holds 44th Annual Meeting

SAFETY, ventilation, mechanical loading, and disposal of acid mine water, together with institute policies, were topics at the 44th annual meeting of the Coal Mining Institute of America, held at Pittsburgh, Pa., Dec. 10-12, 1930. The institute, which decided not to disband, elected the following officers for 1931: J. W. Paul, mining engineer, U. S. Bureau of Mines, Pittsburgh, Pa., for president; F. B. Dunbar, general manager, Mather Collieries Co., Mather, Pa.; J. J. Forbes, chief engineer, Safety Extension Service, U. S. Bureau of Mines, Pittsburgh, Pa., and E. A. Holbrook, dean, School of Engineering and Mines, University of Pittsburgh, Pittsburgh, Pa., for vice-presidents; G. W. Grove, assistant mining engineer, U. S. Bureau of Mines, Pittsburgh, Pa., for secretary-treasurer; and F. E. Bedale, safety engineer, Consolidation Coal Co., Fairmont, W. Va.; Matthew Blair, mine superintendent, Vesta Coal Co., California, Pa.; C. W. Gibbs, general manager, Harwick Coal & Coke Co., Harwick, Pa.; S. S. Hall, state mine inspector, Connellsville, Pa.; Richard Maize, state mine inspector, Uniontown, Pa.; C. W. Pollock, superintendent of mines, Ford Collieries Co., Curtisville, Pa.; G. S. MaCaa, state mine inspector, Pittsburgh, Pa.; W. N. Rigg, chief mine inspector, Pennsylvania Mine Rating Bureau, Harrisburg, Pa.; L. E. Young, vice-president, Pittsburgh Coal Co., Pittsburgh, Pa., and J. O. Thomas for managing directors.

In his annual address, R. M. Lambie, chief, Department of Mines, Charleston, W. Va., retiring president, declared that the coal industry is showing an upward trend and that gradual improvement with steady production, but without peaks, was best for the industry.

J. T. Ryan, vice-president, Mine Safety Appliances Co., Pittsburgh, Pa., read a paper on "Safety in Mining" at the Wednesday morning session. In Pennsylvania, during 1929, companies having well-organized safety departments had an average fatality rate per million tons only half of that shown by companies with no safety organizations. Direct cost of compensation in the bituminous industry of the United States in the first seven months of 1930 was 4c. per ton. Indirect losses, including loss in wages, cost of treatment, interrupted production, damaged property, and the like are actually two to three times the direct cost.

Discussing "Placing Responsibility for Accidents," Silas S. Hall, state mine inspector, Connellsville, Pa., stated that each man in the organization, from the operator and his officials down through the ranks to the miner, had his share of responsibility in accident prevention: the operator and his engineering department in proper planning and opening of mines; the superintendent, mine foremen, assistants, and firebosses, in knowing and performing their duties in accordance with the law and best safety and operating practices; the worker, in obedience to orders, company rules, and safety precautions necessary in his job.

On the afternoon of Dec. 10 the first question-box session, with J. J. Forbes, Bureau of Mines, as chairman, discussed these questions:

1. Do regular safety meetings of employees help to reduce accidents?
2. Can safety be advanced by increased mechanization of mining?
3. What instruction should a newly employed miner receive?

Regular safety meetings greatly reduce accidents, in the opinion of all participants in the discussion. In some cases, regular safety meetings are given credit for reducing the number of accidents to 15 or 20 per cent of former figures. For greatest success, meetings should be entertaining, held regularly but not too frequently, and the wives and families of the men allowed to attend at intervals "to get the idea across."

Discussing Question 2, John A. Bell, state mine inspector, Dravosburg, Pa., said that mechanization had increased hazards and instanced the fine coal dust produced, dangers accruing from power lines and from machinery in restricted space, increased danger of explosions, a lowering of safety standards, insufficient and unsystematic posting, machine noise as interfering with detection of roof movement, untidiness and scattering of equipment making travel hazardous. Defending mechanization, W. D. Northover stated that production of the same tonnage mechanically, with one man as against two to four men needed in hand loading, was in itself a safety measure, as exposing less men to the hazard of the industry.

C. E. Lutton, safety engineer, H. C. Frick Coke Co., Scottdale, Pa., discussing the third question, emphasized the importance of making the man newly employed feel at home and a part of the organization. The instructions given him should include those necessary to develop a sense of self-preservation, good workmanship, and use of safe practices. He should receive training in the mining law as it affects his job, on the use of the safety lamp; on the meaning and purpose of safety boards; on the characteristics of local roof. He should be taught how to timber his place and what tools and clothing are necessary for safe operation, and why. To these should be added instructions to report injuries promptly; how to handle explosives; how to ride man-trips; what company rules have been established; and what safety meetings he should attend. The assistant should take the

new man to his place and show him his duties and how to work his place safely and efficiently.

In the third paper, "Economic Losses in the Industry Resulting From Injury," Rush Hosler, superintendent, Pennsylvania Mine Rating Bureau, Harrisburg, Pa., stressed the fact that while compensation and medical costs in the Pennsylvania bituminous industry for the period 1925 - 1929 inclusive approximated $25,000,000, the time lost, aggregating over twenty-one million man-days, was a source of much greater loss. During this period 192,090 injuries occurred, or 1 per 3.36 employees or 3,600 tons mined.

LOSS by accident in Pennsylvania bituminous mining per year approximates $5,000,000 direct cost, a like amount for indirect costs, a wage loss of $10,000,000, and a time loss of over 17,000 man-years. In general, the total loss is from two to five times the direct loss. Since compensation went into effect, employers realize that a saving in accident cost is as important as any other cost reduction.

Wednesday afternoon's program closed with motion pictures showing complete underground and surface operations at the Wildwood mine of the Butler Consolidated Coal Co. At the institute dinner on Wednesday evening, Mr. Lambie spoke on the value of the institute and its future, and introduced the newly elected officers. J. T. Battle, traffic manager, National Coal Association, discussed the work of his organization in promoting safety and increasing the use of coal.

Thursday morning, Dennis L. Boyle, general superintendent, Penelec Coal Corporation, Johnstown, Pa., stated that improvements made in Penelec Mine No. 5 had increased the fan capacity from 85,000 cu.ft. per minute at 2.19 in. of water gage to 153,000 cu.ft. per minute at 2.20 in. within four years. The changes made included: elimination of sharp turns in airways, increase in areas of passage by cleaning entries, increase in number of main intakes and returns near the shaft, and in working sections, elimination of useless air travel, recoursing of air to eliminate necessity for return-air travel over caved areas and through choked airways, an increase in the number of splits, an equalization of resistance to cut regulator losses, and elimination of the local restrictions in airways disclosed by detailed examination and study of the mine. Savings in power cost will pay for the changes and improvements many times over.

Asserting that good ventilation is the greatest safety factor in the production of coal, George Stanheiser, inspector, Rochester & Pittsburgh Coal Co., Indiana, Pa., discussing "Practical Mine Ventilation," stressed the point that the condition of the mine determines the volume of air which will flow at a given pressure difference produced by the fan. He urged the importance of ventilation studies by trained men, and said that special attention should be given to the entries at and near the shaft, and in the longest split, for these were the source of the largest losses in pressure. Mr. Stanheiser advocated the use of the altimeter for ventilation studies. Regarding stopping losses, an instance was given of a mine needing 91,000 cu.ft. per minute at the face; with a 50 per cent stopping loss the fan required 115 hp. to deliver 182,000 cu.ft. per minute at 3 in. of water gage; with 30 per cent stopping loss only 41 hp. was required to deliver 130,000 cu.ft. per minute at 1.5 in. water gage. The result was a power saving of $13.20 per day.

The question-box session then discussed:

4. What are the qualifications of a fireboss other than those required by law?

5. What characteristics are needed in mine officials?

6. What benefits have you observed from first-aid training?

As Questions 4 and 5 are closely allied, the chairman, F. R. Vinton, Indiana, Pa., general superintendent of mines, Rochester & Pittsburgh Coal Co., decided to discuss them together. Various participants in the discussion advanced progressiveness and ability, desire for self-improvement and larger responsibility, the old-fashioned virtues (loyalty, honor, sobriety, diligence), courage, good health, receptiveness, ability to plan, foresight, good disposition, and firmness as the desirable qualities in firebosses and other mine officials, aside from knowledge of their duties, which they are assumed to have.

Attention was drawn to the fact that the benefits of first-aid training were difficult to express quantitatively. One speaker stated that in mines where first-aid training was effectually and continuously maintained, the accident curve was dropping; he hoped and believed that the training was helpful, and spoke of three cases in which lives were saved which otherwise would have been lost. The consensus of opinion was that first-aid training makes for safer workmen.

A complete history of mechanical loading devices from the earliest crude machines to the ones in use today was given in the paper, "Development of Mechanical Loading Devices," by Dr. Young. Industry was forced into mechanized loading by various causes such as labor and housing conditions, the need for greater safety, the necessity for using machinery for the mining of thin seams, market conditions, pressure of related industries, and the enterprise of machinery manufacturers. The first mechanical loader, a Stanley heading machine, was introduced in 1888; various other machines were introduced from time to time. Finally, in 1924, the first local wage agreement covering mechanical loading wage scales was made, and in 1928, in Illinois, the first state agreement. There are enough machines on the market to make it possible to find one to suit any individual condition. The belief was expressed that in most operations mechanical loading can increase production per man and decrease costs.

"Progress in Handling Acid Mine Water," said R. D. Leitch, associate chemical engineer, U. S. Bureau of Mines, Health Laboratory Section, Pittsburgh, Pa., depends first of all on the gathering of reliable data, both as to cause and size of the problem. The Bureau of Mines has been collecting such data since 1925. It is generally agreed that in the mines, for sulphuric acid to be formed, pyrite must contact with air and water.

DISCUSSION of future policies of the institute in regard to finances, publication of proceedings, growth, and election procedure occupied the remainder of the afternoon. After a vote of confidence in the officers and directors, and expressions of faith in the future, it was agreed that the executive committee should decide on the means to be taken to improve the financial condition of the organization.

On Friday the members were conducted on a sightseeing trip to the top of the Cathedral of Learning of the University of Pittsburgh. Following this the Bureau of Mines held open house; the work of the Bureau was explained, and testing of electrical and mechanical equipment for safety was demonstrated.

SELECTING A CABLE

+ For a Button Conveyor

By H. F. GEIST

Engineer, Webster Mfg. Co., Chicago

CABLE-AND-BUTTON conveyors were discussed in pages 719-21 of the preceding issue of *Coal Age*, but the mathematical calculations by which the size of the cables to be used in any given instance is determined remain to be shown. Fig. 1 shows the stresses in the upper and lower sections of the cable due to gravity and friction, both for the coal and for the cable, and buttons with their direction of action.

Fig. 2 illustrates by line thicknesses the stresses on the rope, with the varying angles of inclination that constitute four decisive slope conditions. The conveyor is regarded as running at the moment to which these diagrams apply.

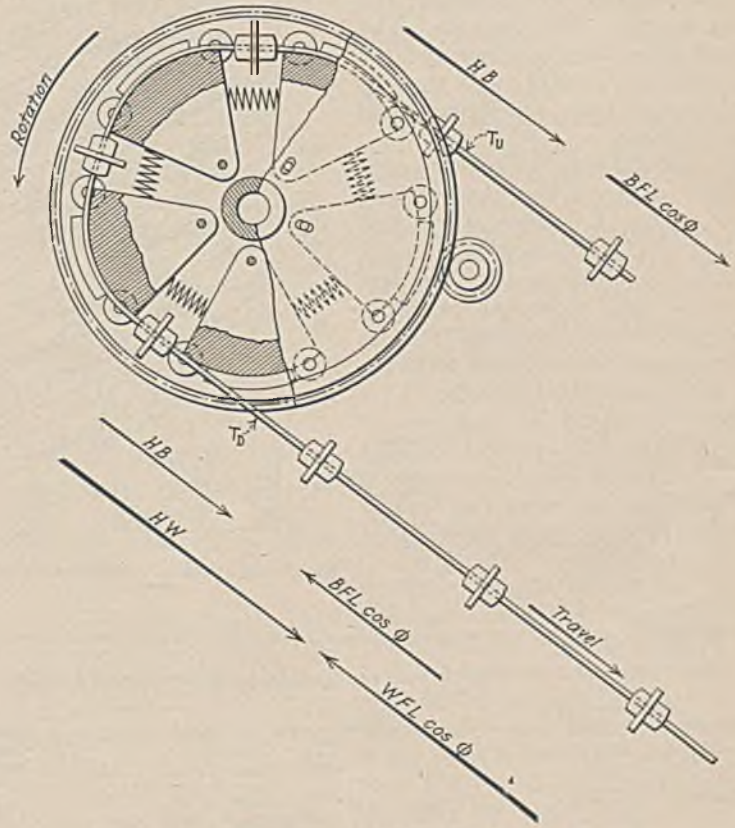
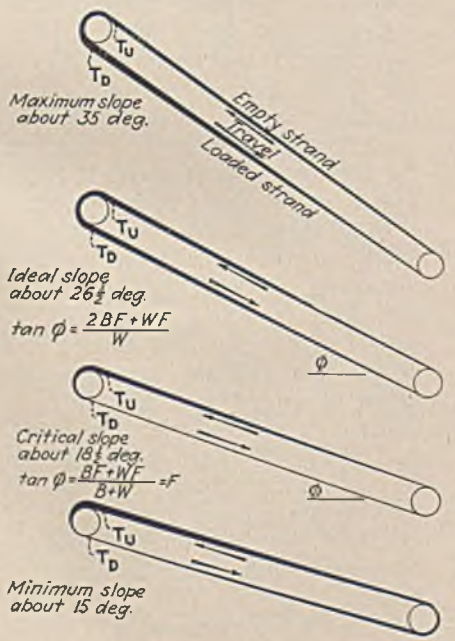


Fig. 1—Rope Stresses on Cable and Button Conveyor

Fig. 2—Distribution of Cable Stress



The symbols used in the diagrams and table and their meanings follow:

- W, weight of coal per foot of conveyor trough, pounds
- B, weight of cable and buttons per foot of cable, pounds
- H, difference in elevation, feet
- L, length of conveyor, feet
- ϕ, angle of inclination degrees
- F, friction
- S, speed of travel, feet per minute
- T_U, cable tension in upper strand at head sheave
- T_D, cable tension in lower strand at head sheave

In formulating the following tabulated equations for cable tension and horsepower, mathematical signs are taken, as plus or minus, to give a positive result. To simplify the theory, friction is designated throughout as F, whether for starting or running coal or buttons. Finer distinctions may be made by expanding the equations to suit special cases. A further simplification is made in regarding the unit cable and button weight equal to one-fourth the unit weight of coal moving; i. e., $B = W/4$. This is entirely a practical assumption.

The formulas found in the table on page 16 are self-explanatory.

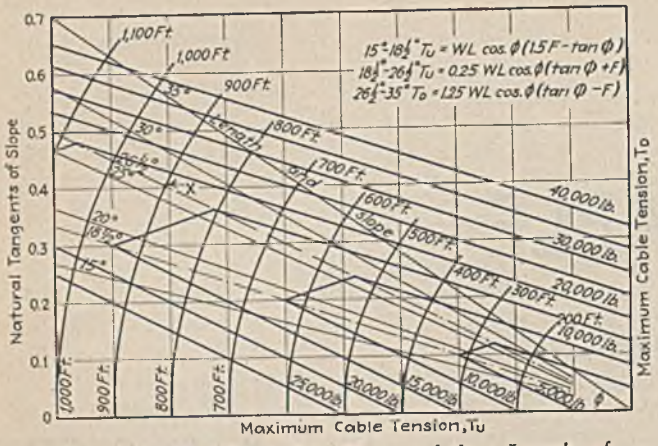


Fig. 3—Typical Operating Characteristics; Length of Conveyor, 1,000 Ft.

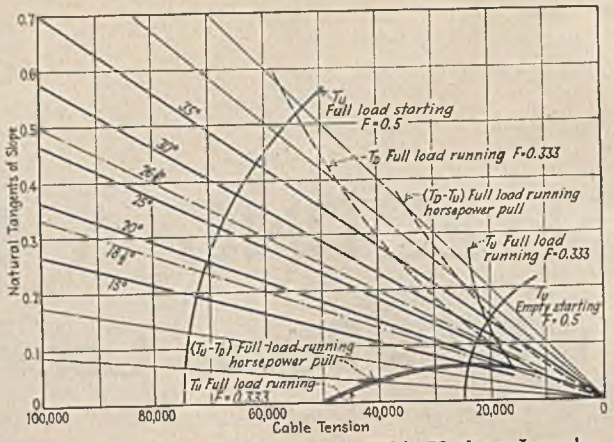


Fig. 4—Theoretical Cable Stress With Various Lengths and Slopes

For starting conditions, horsepower formulas are not given, because the starting speed is indeterminate. The motor should, therefore, be rated for full-load running and have a starting torque four or more times its normal running torque.

Figs. 4 and 5 refer to running conditions. Lines on the charts show definite values for cable stress and horsepower (based upon 100 lb. of coal per foot of trough) superimposed on lines indicating conveyor lengths and slopes, making it comparatively simple to find maximum cable stress and size of motor.

Allowance should be made in selecting a cable. Its diameter should not be determined solely by the stress. One must bear in mind that cables in general practice range from about $\frac{3}{4}$ to $1\frac{3}{4}$ in. diameter. Fig. 5 is intended as an operating motor chart, no allowances being necessary. The solid curves are partly based upon calculations and partly upon field observations. It will be noticed they call for 10-hp. increments for each 200 ft. along the ideal slope lines. Thus conditions at *X* in Figs. 4 and 5 call for a cable stress of about 16,800 lb. ($1\frac{1}{4}$-in. cable) and a 50-hp. motor.

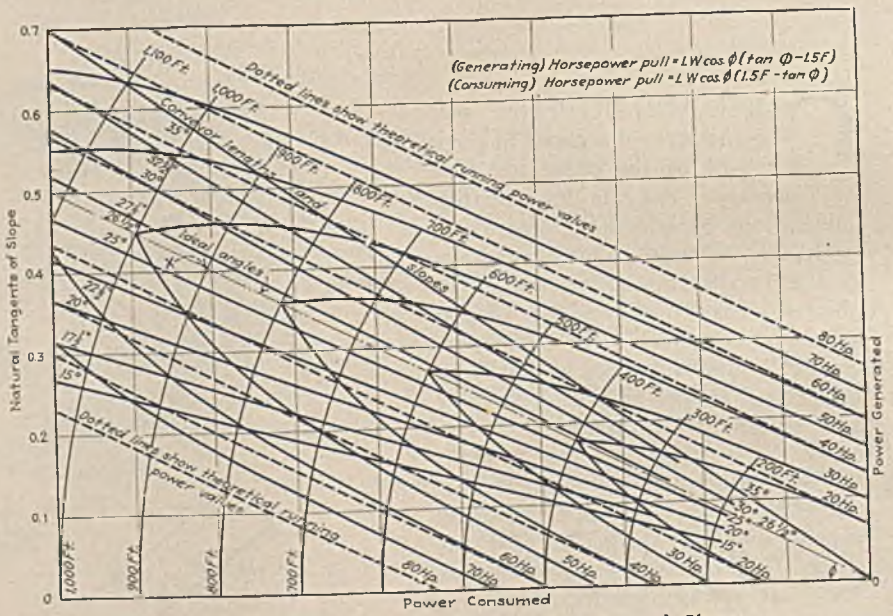


Fig. 5—Power Required for Various Lengths and Slopes

In all three charts—Figs. 3, 4, and 5—the capacity is 300 tons per hour, the speed is 100 ft. per minute, the coal load is 100 lb. per foot, the weight of the cable and buttons is 25 lb. per foot, and the running friction factor is assumed as 0.333. Fig. 3 is based on a conveyor length of 1,000 ft. In Figs. 4 and 5 the length may be read on the respective charts. As the charts are based upon a coal load of 100 lb. per foot, interpolation may be made for other loads by direct percentage provided that the relation $W : B = 4$ is maintained with reasonable closeness.

Cable Tensions and Horepowers for Certain Inclinations and Loading

No.	Operation	Condition as to Loading	F.	Slope Angle, Deg.	Cable Tensions	Horsepower
1	Starting	Empty	0.5	15–35	$T_U = 2BFL\cos\varphi$ T_D = Zero	Consuming, indeterminate value
2	Running	Empty	0.333	15–18½	$T_U = 2BFL\cos\phi$ T_D = Zero	Consuming, $\frac{T_U S}{33000}$
3	Running	Empty	0.333	18½–35	$T_U = HB + BFL\cos\phi$ $T_D = HB - BFL\cos\phi$	Consuming, $\frac{(T_U - T_D)S}{33000}$
4	Starting	Loaded (cable taut)	0.5	15–35	$T_U = 2BFL\cos\phi + WFL\cos\phi$ $= 1.5\,WFL\cos\phi$ T_D = Zero	Consuming, Indeterminate value
5	Running	Loaded	0.333	15–18½	$T_U = 2BFL\cos\phi + WFL\cos\phi - HW$ $= WL\cos\phi\,(1.5F - \tan\phi)$ T_D = Zero	Consuming, $\frac{T_U S}{33000}$
6	Running	Loaded	0.333	18½–26½	$T_U = HB + FBL\cos\phi$ $= 0.25WL\cos\phi\,(\tan\phi + F)$ $T_D = HB + HW - BFL\cos\phi - WFL\cos\phi$ $= 1.25WL\cos\phi\,(\tan\phi - F)$	Consuming $\frac{(T_U - T_D)S}{33000}$
7	Running	Loaded (Balanced)	0.333	26½	Same as No. 6 except $T_U = T_D$	Zero
8	Running	Loaded	0.333	26½–35	Same as No. 6 except T_D is greater than T_U	Generating $\frac{(T_D - T_U)S}{33000}$

Note that in equation No. 4 the cable is regarded as being taut. True starting tension may be only 67 to 75 per cent of this value.

WHY ROCK-DRILL STEEL FAILS

+ What Can Be Done About It

By O. A. KNIGHT

Associate Professor of Metallurgy
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GREAT indeed is the need for metallurgists and mining men to co-operate closely to promote improvement in rock-drill-steel performance. Many mining men regard their rock-drill-steel problems as of so much less importance than others as to be unworthy of consideration. Others believe that no saving which might be brought about by scientific treatment of their steels would be worth the trouble or annoyance of putting their practice on a scientific basis. This is particularly true where the number of steels in constant use is relatively small.

This opinion would not be so prevalent if it were realized that proper scientific methods can be used as easily as any others and that a worth-while saving can be effected by good practice even where only a limited number of steels are in use. For example, when a drill steel breaks and cannot be drawn from the hole the cost of the steel lost is quite often a small item compared to the loss of the hole. Again, a piece of broken drill steel may find its way into crushing and other machinery and do serious damage.

In one such instance the cost for repairs ran well over $1,000, and doubtless the damage done has, at times, been even more serious. Because of the constant breakage or spalling of bits, sharpeners' wages frequently run into several hundred dollars per year. Proper practice sometimes decreases this trouble so greatly that the sharpener can dispense with a helper or the latter can devote his time to some other work.

On heating steel from ordinary room temperatures up to a good heat for forging, it passes through a range of temperature called, by metallurgists, the "critical range." On our temperature scales this runs from about 700 to 900 deg. C. or from about 1,300 to 1,650 deg. F., or by color, from medium cherry red to yellow.

This critical range is important to the tool hardener, because if steel is not heated well into, or above, this range it will not harden appreciably even though it be cooled rapidly by plunging it into cold water. Rapid cooling, as in water or oil, is called by the steel treater "quenching."

Drill steels are, or should be, forged at temperatures above the critical range, and the finishing temperature—that is, the temperature of the steel when forging is completed—should be as close to that range as possible. As the steel loses temperature in forging, it has to be heated above the upper edge of the critical range, but care should be taken to exceed the limit of that range as little as possible. Many blacksmiths and drill sharpeners heat their steel to too high a temperature because at the higher temperature it is softer and takes the shape of the dies more readily.

Thus large crystalline grains may form as the metal cools from the finishing to the critical temperature. Such a grain structure will make the steel brittle and may cause it to break or the bit to spall. Even more important is it to avoid too high temperatures when the steel is heated for quenching, because in this case between the heating and the hardening quench no mechanical work is done on the steel to prevent crystallization. For hardening, the steel should be heated to just above the critical range, but no higher.

Only the so-called plain carbon rock-drill steel will be considered here. It usually has approximately the composition shown in Table I.

Steel of this composition has the narrowest and the lowest critical range of any of the plain carbon steels. In fact, its range is so narrow that it is frequently designated as a critical "point" rather than as a "critical range" of temperature. The critical range on heating is approximately 740 deg. C., or 1370 deg. F., so that when a temperature of 775 deg. to 800 deg. C. (1430 deg. F. to 1472 deg. F.) is reached one is quite certain the temperature of the steel exceeds its critical range. For forging, the steel may be safely heated to 950 or 1000 deg. C. (1742 to 1832 deg. F.), whereas for hardening, it should not be heated above 800 deg. C. (1472 deg. F.)

Table I—Approximate Composition of Carbon Rock-Drill Steel

Constituent	Average Per Cent	Range Per Cent
Carbon	0.85	0.80–0.90
Silicon	0.20	0.15–0.30
Manganese	0.25	0.15–0.30
Sulphur	0.03	0.02–0.04
Phosphorus	0.03	0.02–0.04

When steel is heated for forging, not only should its temperature be controlled but also the rate of heating, the furnace atmosphere, the time in the furnace or forge, and the length of steel heated. As previously mentioned, 1000 deg. C. (1832 deg. F.) is about the maximum temperature to which the steel should be heated prior to forging. It should be allowed to remain at this temperature no longer than will assure the uniform heating of the steel. Long soaking at this temperature develops coarse crystals which forging may not break down into finer sizes and which may cause brittleness.

Steel should not be heated in an oxidizing atmosphere lest the carbon be oxidized or burned out of the surface of the steel to such a degree that the steel will not harden satisfactorily when heat-treated. Bits made in an oxidizing atmosphere are too soft for drilling rock. Sometimes this reduces the cutting life of bits materially. Therefore, excess

air is to be avoided in the atmosphere in which the steel is heated. Nor should the steel be heated too rapidly, because when cold steel is plunged into a region of high temperature, cracks are likely to develop, which may cause the tool to fail prematurely in service.

NO greater length of steel should be heated than will insure that the portion to be forged is high enough above the critical range that it will be sufficiently plastic to form into the desired shape. Heating needlessly long lengths of steel is harmful, because the portion which is heated to a high temperature and which is not forged, develops a coarse crystalline structure which is not subsequently refined by forging.

Automatic drill-sharpening machines usually forge the steel very rapidly. If the steel is at a temperature of 1000 deg. C. (1832 deg. F.) at the beginning, it may be, and often is, entirely too high above the critical range when the forging operation is completed. This is not satisfactory, for reasons already stated. It can be corrected in either one of two ways: either the temperature to which the steel is heated before forging can be decreased, or in the event that the steel must be heated to such a high temperature as to render it sufficiently plastic to conform readily with the desired shape, the forging operation can be purposely slowed by performing it in stages. By doing this and observing the steel closely stage by stage it can be finished nicely just above the critical range.

Before it is shipped to the consumer rock-drill steel in the form of bar stock usually is treated in such manner as to make it as tough as possible. The drill-steel sharpener in the shop cuts the steel to the required lengths and forms on one end of each length the bit and on the other end the shank. After forging the bit and shank, as already described, the steel is ready for heat-treatment.

Bearing in mind that the steel as received in the form of bar stock is in the toughened (sorbitic) condition and that this condition is the result of air-cooling from a little above the critical range, we are now ready to discuss the heat-treatment of the two ends, bit and shank, which have been forged. Assuming the bit end was heated above the critical range for a distance of 3 in. from the end prior to forging, it is wise to heat it above the critical range for a distance of about 4 in. from the end before quenching to harden it. The temperature to which it is heated for hardening should be around 775 to 800 deg. C. (1430 to 1472 deg. F.) and certainly never above 800 deg. C. (1472 deg. F.)

All of the precautions outlined previously, with regard to rate of heating, furnace atmosphere, time of holding at maximum temperature, etc., should also be exercised during heating for hardening. After proper heating to about 775 deg. C. (1430 deg. F.), only the teeth of the bit should be quenched in cold water. The water should be agitated by some suitable means during the quench in order to prevent the occurrence of a sharp line of demarcation between the portion quenched in water and the portion above, which is cooled in air.

After the teeth have cooled to the temperature of the cooling water, or nearly so, but while the remainder of the heated portion is still quite hot, the steel can be removed from the quenching water and stood up in a pan containing enough water to cover the quenched teeth. It may be left in the pan of water until it has cooled to room temperature. This allows the portion back of the teeth to air-cool completely and at the same time prevents the heat that still remains in the portion back of the teeth from raising the temperature of the teeth sufficiently to soften them.

BITS thus treated will possess maximum hardness and minimum tendency to spalling, because the finishing temperature of forging is just above the critical range and the hardening quench begins at the same point. Back of the region affected by the quench the hardness will decrease somewhat gradually to the air-cooled portion, which possesses maximum toughness, the same as the original bar stock. Allowing the hardening heat slightly to overlap the forging heat tends to iron out any change in structure and properties which may have resulted from the latter.

The shank end should be heated to about the same temperature as the bit end and here again the portion heated for quenching should overlap the portion heated for forging, and for the same reasons. After properly heating, the shank end should be cooled in a good grade of quenching oil to a depth of about 1 inch.

This imparts a Brinell hardness of about 400 to the shank end, which will withstand the upsetting action of the hammer, whereas back of the region affected by the quenching, the steel has been air-cooled; hence it is tough, as is the remainder of its length.

As an aid in determining temperature by eye, when temperature measuring instruments are not available, the following table (Taylor and Whites) is reproduced. This shows the relation of color to temperature in both the Centigrade and Fahrenheit scales.

Table II—Temperature and Color Relations
(After Taylor and Whites)

Color	Degrees Fahrenheit	Degrees Centigrade
Black red	990	533
Dark blood red	1050	565
Dark cherry red	1175	634
Medium cherry red	1250	676
Full cherry red	1375	745
Light cherry red	1550	843
Salmon	1650	899
Light salmon	1725	940
Yellow	1825	995
Light yellow	1975	1078
White	2220	1203

It should be kept in mind, however, that lighting conditions at the time of observation greatly affect the judgment. On a bright day the blacksmith will heat the steel to a higher temperature than on a dark, cloudy day. This source of error can be overcome to some extent by thrusting the hot end of the steel into a small inclosure, built preferably of brick, with one end open. In this its true color can be observed.

It should be borne in mind that if a steel has been overheated before the quenching operation, the damage cannot be repaired by simply holding it in air until it has cooled to near the critical range and then quenching it. It should be allowed to cool completely to room temperature or at least till black, when it may be again heated to just above the critical range and quenched.

Drill-steel failures can never be entirely eliminated, no matter how excellent the steel, how well it is forged and heat-treated, or how carefully it is used. One end of the steel is against a wall of solid rock and an air hammer is pounding on the other end. No material can endure such punishment indefinitely. However, by exercising care in the selection of the steel, in its forging and in its heat-treatment, many times more feet of holing per dollar can be obtained than when little or no thought is devoted to this phase of the mining operation.

WANTED: A BILL OF RIGHTS

+ To Free Bituminous Industry of Burdens of Anti-Trust Statutes

By LANDON C. BELL

Counsel, Red Jacket Consolidated Coal & Coke Co., Inc.
Columbus, Ohio

EVER since the close of the World War, overproduction has been the curse of the bituminous coal industry. The general public may not fully appreciate the situation, or the cause of it, but President Hoover, in his address in Boston, on Oct. 6, 1930, made it clear that he is aware of its unhappy state at the present time. Overproduction and the consequent suicidal competition have brought the industry to the verge of ruin.

A process of readjustment has been going on ever since the termination of the World War. This the president mentions as follows:

> It is this process of readjustment that partly causes our present difficulties in the bituminous coal industry. In that industry, the encroachments of electrical power, of natural gas, of improvements in consumption, have operated to slow down the annual demand from the high peak, leaving a most excessive production capacity. At the same time, the introduction of labor-saving devices has decreased the demand for mine labor. In addition to its other difficulties must be counted the effect of the multitude of 6,000 independent mine owners among 7,000 mines, which has resulted in destructive competition and final breakdown of wages.
>
> All these conditions have culminated in a demoralization of the industry and a depth of human misery in some sections which is wholly out of place in our American system. The situation has been under investigation of our government departments, by Congress, together with commissions and committees of one sort or another for the past ten years. The facts are known.
>
> One key to solution seems to me to lie in reduction of this destructive competition. It certainly is not the purpose of our competitive system that it should produce a competition which destroys stability in an industry and reduces to poverty all those within it. Its purpose is rather to maintain that degree of competition which induces progress and protects the consumer. If our regulatory laws be at fault, they should be revised.

Again in his message to Congress, Mr. Hoover referred to the "prohibitive interpretation of the anti-trust laws," "the well-known condition in the bituminous coal industry," and recommended to Congress an inquiry into "the effect of the workings" of these laws (as interpreted), and very clearly indicated, as is believed, his view that they need revision.

This declaration and this recommendation of the President are the most heartening words heard on the subject for years. They indicate an understanding of where the trouble lies. These developments indicate, too, that the President is seeking a way to remove that trouble.

What business needs, says Mr. Bell, is a Bill of Rights which will legalize honest co-operative effort in conservation, production and price control. Today those industries not susceptible to quasi-monopolistic merger are doomed by the Sherman law to unending destructive competition. No plan, however sound economically, can now be made effective, declares the author who has been intimately associated with the coal and lumber industries and with trade association activities for many years, without risking conflict with existing anti-trust statutes; therefore, the necessity for a new declaration of fundamental economic principles and their legal application.

There are some who in their discussions of the problems of the industry disclose a disposition to complain of those who manage the affairs of the coal industry. In fact, sometimes the charge is made that the management of the industry has proved itself a failure, and predicated upon such a charge of managerial bankruptcy, some very radical measures have been urged as the remedy.

Responsibility for the deplorable status of the industry does not lie at the door of private management. The condition is one which came about through no fault of the industry or of anyone in particular; it is in the main a legacy of the World War period. It is primarily the result of an expansion to which the industry was urged to the uttermost effort by the government and the allies of this country in the World War. At that time expansion was patriotism.

When the war ended, the industry was in a state of overexpansion—for the peace-time period which ensued. It is easy to appreciate the fact that, under these circumstances, the industry confronted the gravest problems of retrenchment, curtailment and readjustment. What is not so generally appreciated is that the industry found itself confronted by a legislative and judicial situation for which it was in no sense responsible, but which, nevertheless, made it impossible for the industry to do anything effective in remedy of its distressing state. And that legislative and judicial situation has, so far, not been changed.

The industry was confronted by the Sherman anti-trust law, its amendments and supplements. The American Bar Association has ex-

pressed surprise at the judicial construction given these laws; the average business man may therefore be excused for believing that Congress never intended by any law to forbid the adoption by those engaged in industry of plain, simple, and reasonable measures designed to prevent overproduction, to secure fair wages, to provide a reasonable return to capital invested and for managerial ability, and to assure the public ample supplies of commodities at not exceeding reasonable prices, all economic factors being adequately taken into account.

The management of the bituminous coal industry knows, as everyone else knows, that it is not in the public interest for sales prices of commodities, as a result of such destructive competition as the President described, to be so low that fair wages cannot be paid, that investments yield no profits, and that valuable natural resources be wasted.

But, despite that realization, the industry has been powerless to remedy the condition. This does not result because those engaged in the industry are bankrupt of ideas, nor from a lack of interest in the problems. Hundreds of the best minds of the industry, managers, bankers, lawyers, industrial and economic engineers, professional students of such problems have studied the subject intensively.

ALL these efforts have come to naught; not because these men were unable to devise ways and means which they believe would ameliorate conditions, and within a reasonable time solve the problems and place the industry upon a stable economic basis, but, because from whatever angle the subject was approached and whatever the varying methods or plans which they believed likely to be effective, the conclusion was always the same. Were their plans practical? Yes. Sound in economics? Yes. Moral and equitable in fact and in truth? Yes. Good for the industry? Yes. Including its employees? Yes. Desirable for the public at large? Yes.

Legal? No!—or so doubtful in the illogical and confused state of the law that none, or but a very few, would be willing to take the chance of criminal prosecution in order to carry out a program, however sound and constructive it might be. The unanimous answer of the legal advisers of the industry to the question of what the industry as a whole by co-operation and concert of action can do for itself is: "Nothing that is, or that promises to be, effective in the present state of the law."

If there is one proposition upon which a great majority of business men are agreed it is that the Sherman act, at this day and time, instead of promoting and maintaining competition of the character and kind which "induces progress and protects the consumer," has in most cases the diametrically opposite effect. It has resulted that business is separated into two general classes: The groups which have consolidated and merged, and which do not compete because of the practical monopolies which have come into being; and the other groups which, for such reasons as wide geographical distribution of operations and the enormous number of independent owners and operators, cannot merge.

These unfortunates who cannot consolidate and merge are engaged, and have been engaged for the past decade, in the fiercest, most suicidal competition. Enormous tonnages of bituminous coal—very probably most of it—is being sold at less than the cost of production.

THERE ought to be less coal produced, and that produced ought to sell, on an average at least, a little above the cost of production. But no such condition can be brought about in the industry except by the voluntary concert of action of all, or a substantial majority, of the industry.

And they cannot take that action, because to do so would be to commit a crime and subject those who did so to fines and imprisonments under the Sherman law. It would be to become a party to a technical "combination" or constructive "conspiracy" made criminal by the law as written, construed and administered. The "crime" under the law is "complete" when the parties agree to co-operative action.

The court does not consider the economics of the question or the reasonableness of the result. It is true that mergers or consolidations are not illegal (such is the construction) unless they unreasonably restrain trade and commerce; and absolute control of more than 50 per cent of the commodity of an industry by one great corporation (the result of a merger) is not "unreasonable." But as to co-operative activities, for example, of the 6,000 independent mine owners mentioned by Mr. Hoover, any two or more of them become criminals when by concert of action they seek to prevent overproduction or to get prices above the cost of production, regardless of the reasonableness or unreasonableness of what they do, and even though they produce and control less than 1 per cent of the output of the industry!

No wonder the Committee on Commerce of the American Bar Association, at the annual meeting last year said:

> The criminal features of the Sherman law as they are written and as they are enforced by the government are indefensible. They violate the most fundamental safeguards which from earliest times have protected men against the tyranny of government. The amazing thing is that our courts ever sustained these provisions as constitutional.

There are those who would help the bituminous coal industry by better government regulation. By better regulation, as the doctrinaires use the term, is meant more regulation. It always has been the idea of this class that the remedy for the evils of regulation is more regulation. It is significant that the proposals for more regulation arise from the regulations now in effect. Attempted relief by more regulation, however, would but disclose the need of still more regulation, more laws, and more supervision by governmental tribunals.

Private industry under such a policy would suffer the consequences of irresponsible control, a control which, while assuming no responsibility, can impose burdens but which has no true incentive to see that the industry succeeds. That path would lead to a state of affairs so intolerable that the final step of nationalization, accompanied by partial or complete confiscation, would inevitably follow. The need of the industry is not more, but less, regulation.

IF the absurd and impossible restrictions pointed out be removed, the bituminous operators believe they can put the industry upon a sound industrial and economic basis; they can create a condition wherein they can maintain their properties, pay their taxes, pay reasonable wages, and earn a fair return upon their investments.

But the repeal of a law, once enacted, especially if it deals with a controversial subject, usually is difficult. The committee of the American Bar Association whose report has already been referred to expresses the opinion that the Congress should so amend the anti-trust law "as to provide . . . that what constitutes an unreasonable restraint is a question of fact and not of law

. . ." This would seem to assume also such change as to remove from the category of criminal conduct anything which did not in fact constitute unreasonable restraint.

The legal situation in which the bituminous coal industry finds itself has become so befogged by ineptly drawn statutes, their application by construction to situations never intended to be covered and by interpretations so emphatically condemned by the American Bar Association, and business has suffered so outrageously as a result, that the time has come for recurring to fundamentals and making a fresh start.

We need something in the nature of a Bill of Rights of Business, which will brush aside theories and refinements and define the rights of those engaged in trade and commerce in terms of practical business economics and make clear the right to follow sound business practice.

This Bill of Rights might run about as follows:

That all persons have the right, individually and collectively, to pursue such methods in business, trade, and commerce as they think proper, unless the same be against the public interest;

That any and all methods of competition or of co-operation are legal unless they are against public interest;

That no method of competition or of co-operation is or shall be deemed against public interest unless it unreasonably restrain trade or commerce or unreasonably restrain competition;

That all methods and acts of competition, trade, and commerce which cause, or materially help to cause, overproduction or sales at less than a fair margin above cost, or which cause, or materially help to cause, economic waste in industry, trade or commerce, unreasonably restrain trade and commerce, and unreasonably restrain competition are against public interest;

That it is not the intent or purpose of the anti-trust acts, or the Federal Trade Commission act, or any other law, to denounce as illegal and to prohibit any means, methods, plans, programs, or activities which are sound economically, whether the same may have been heretofore held or deemed forbidden under the law as unlawful combinations or conspiracies against trade, commerce, or competition, or not;

That acts of co-operation, through trade or commercial association, or otherwise (whether the same may have been heretofore deemed illegal or not) by those engaged in trade and commerce:

(1) Which better or reasonably fit the volume and rate of production to market and consumption requirements, or

(2) Which tend to eliminate uninformed, and, therefore, uneconomic or destructive competition, for that which results when sufficient facts are known, and adequate statistics available, or

(3) Which tend to assure that raw material will not be wasted, but which promote maximum practicable utilization, or

(4) Which tend to assure a fair margin of profit upon all business done;

so long as said acts do not result in prices or costs to the public higher than they should be, economically considered, they are lawful and desirable, and should be encouraged.

Under some such plan, instead of wasting time in trying to find a way to do the obvious and proper things legally, when there is no legal way under present laws, business men would cease to do business *in terrorem* and could devote their full energies to worth-while pursuits without the fear that, despite the best of motives and the soundest of practices, they might nevertheless violate the law, which itself violates "the most fundamental safeguards which from earliest times have protected men against the tyranny of government."

◂◂◂ LETTER to the Editor

Designation "Obsolete" Is Misleading, Says Builder

I read with much pleasure in the December, 1930, issue of *Coal Age*, the splendidly prepared article of H. C. Faust, of the United Pocahontas Coal Co., describing the combination coal cleaning plant recently installed at Crumpler, W. Va. This article very clearly and precisely describes the new plant in such manner as to enable one skilled in the art of cleaning coal to understand thoroughly the various operations through which the coal passes in this particular type of plant.

However, the caption used with one of the photographs might lead one not schooled in the art of coal cleaning to an erroneous conception of certain kinds of coal-washing jigs. I refer to the photograph on page 710, lower left-hand corner, which is a picture of the washing and sizing plant at the Indian Ridge mine designed and built by our company a great many years ago. The caption for this photograph says that the Indian Ridge plant was rendered "obsolete" by the new plant. The word obsolete means "gone out of date."

Therefore, in order to be fair to the manufacturers of other types of coal washing equipment, and to our company in particular, you should have used the word "abandoned" instead of "obsolete." Mr. Faust clearly sets forth in his article why both the Indian Ridge and Zenith plants were abandoned.

The "Pittsburgh Basket-Type Jig" used in the Indian Ridge Plant is by no means an obsolete method of washing coal. Naturally, we think it is about one of the best. Just recently we completed a modern washery equipped with these jigs for The New River Co., the largest shipper of coal from the New River field. This plant was purchased after a thorough investigation of all known types of washers. This washer has been in operation for some time, and our customer is highly pleased with the results.

And again, in the Pocahontas field, where the new Crumpler plant is located, are to be found many fine plants in which our coal-washing jigs are used with decided success. In other words, the owners of these plants do not as yet consider their equipment obsolete by any means. In fact, if results were to be checked up properly, I venture to say that those being obtained at the new Crumpler plant, which seems to be an excellently designed one, would be but little better, if any, than the results being obtained at the many plants in the Pocahontas field equipped with "Pittsburgh Jigs." I feel quite sure our jigs could readily fulfill the contractor's guarantee for the Crumpler washer, as outlined in Mr. Faust's article. I am sure the old Indian Ridge washer, now captioned as obsolete, produced results equal to those mentioned in this guarantee for the Crumpler plant.

In writing you I am in no way attempting to discredit the new Crumpler plant. I have no doubt in my mind whatever but that it is a first-class one, and producing first-class results. What I have attempted to bring out is, the caption for the photograph illustrating the old Indian Ridge plant is very misleading, and might do our concern considerable harm.

THE PITTSBURGH COAL WASHER CO.
[Signed] Lee Llewellyn,
Vice-President.

COAL AGE

SYDNEY A. HALE, *Editor*

NEW YORK, JANUARY, 1931

Steel-prop recovery

BRITISH records show that the recovery of steel posts is much lower than in the United States. Some mines lose 40 to 50 per cent of their posts yearly. In the few mines of the United States where jacks are used—possibly in practically all of them—only a few posts, if any, are lost, and the manager will tell the inquirer that if the conditions had been better understood and the men had pulled their jacks into a safe place as soon as they were disassembled not a post would have been lost.

Apparently, in Great Britain conditions are not so good for recovery, because the steel posts are used in thicker and deeper coal with a more fragile roof. Perhaps also the jacks may not be as readily recoverable as those in the American market. But even with losses as high as 40 to 50 per cent the British operators remain "fully sold" on the value of steel posts, for with a loss of 52 per cent per annum the depletion is only 1 per cent per week and possibly 0.5 per cent per prop-line advance, assuming a six-day run, a progress of one foot per day, and props at 3-ft. centers.

It is better to lose one steel prop in every two hundred along a longwall face than to lose the greater part of all the wood posts and to use so many of these as has been necessary.

Tons per linear foot

NO MEASURE of efficiency is likely to be developed that will cover all operating conditions. Not even such simple indices as dollars of profit per ton of product or per dollar of investment are all sufficing, though they have a quite convincing quality. In all such calculations may be found conditions which make them inadequate on the determination of efficiency. The number of trips per car per day, the number of tons per employee are within limits fair indications of certain types of economy, but though fair they are by no means conclusive.

So also tons per linear foot of developed face has its disadvantages as an index, but it would be well if it were more frequently calculated, for every mile of development costs many thousands of dollars for posting, cribbing, drainage, ventilation, superintendence, wiring, tracking, transportation, supervision, rock-dusting, loss of coal, timber waste, and what not. Like a big home a big mine takes lots of servants to maintain it. A little home can be cared for by few.

One should calculate, then, not how big a mine can be made but how small. Activity should be intensified everywhere. The area opened should be mechanized to the limit, and plans should always be made to make the utmost use of facilities. Where the facilities provided are used continuously and moved forward as fast as the coal is removed, the utmost is almost certainly being attained. If an area in the development line is idle or is worked by only a single conveyor or by only one loader to a panel, there will be found inefficiency and waste of both capital and labor.

Water on the cutter bar

WHEN the need for spraying the bits of mining machines falls under discussion, emphasis is laid on the suppression of coal dust thus accomplished, on the saving effected in rock-dusting, and on the increased safety of return airways. Although the suppression of combustible dust is a sufficient end to animate any bituminous coal operator to put water on the cutter bar, all the virtue in that act does not lie in this freedom from explosive dust, as a little reflection will show.

Wherever there is pyrite or rock to be cut or wherever either are unexpectedly encountered in cutting they get quite hot. Indeed, because they do not conduct heat readily, they may get hot enough to ignite methane. When face and bits are kept cool by water, it is unlikely that either will become hot enough to set fire to gas, and it is certain that the bits will not become softened by heat, and so will give better service.

In a machine shop, oil is allowed to flow on the cutters in a continuous stream. It must be acknowledged that the material being cut is tougher than rock or pyrite and that the cutter sometimes, though not always, operates steadily till its entire cut is completed, whereas the coal bit is cutting only half the time and any element in the face is cut only during an extremely small part of a cycle. On the other hand, the metal being cut is a good conductor and so cools the points of contact, whereas the earthy substances being cut by the teeth on the cutter bar retain their heat.

Many mines, especially those which are alkaline, are quite dry. However, now that the roadways have no longer to be sprinkled with water, because of the use of rock dust, more water should be available for use at the face, and wherever it is so alkaline that it does not corrode pipe, conditions, it would seem, are today not too unfavorable for spraying the cutter bar, even where water is at a premium. The only exception is where moisture causes the mine floor to swell.

When to the other advantages is added the improvement of the miner's health and comfort, the increase of his self-esteem, the prolongation of his

life, the greater safety of underground rotary dumping, and the action of water in removing cuttings, thus lightening the work of the cutter, it appears that water on the cutter bar has much to commend it. To find enough water to wet the cutter bar is worthy of some sacrifice of money and effort.

Big cars for thin coal

IN NEARLY every large thin-coal mine, ventilation forms a most difficult problem, because, with present arrangements, the roadways are made only high enough to accommodate the lowest kind of car and locomotive. But times are changing. With conveyors, the coal can be brought to the entry, and the entry should be made high, not only to accord room for cars and locomotives but to give the requisite ventilation volume.

A thin-seam coal mine with a large daily tonnage grows amain. The roadways accordingly are long and haulage is expensive. Large-capacity cars, as the medicos would say, are indicated in such cases. It is true, high headings driven quite largely in rock have in the past progressed too slowly to permit of adequate mine development, but the modern low-coal mine, if it is to succeed, should have underground rock-loading machinery, and on the outside of the mine the most effective of rock-dumping equipment.

Where, however, the coal lies so high in the hills that the mines will never be large and ventilation and haulage never problems of great difficulty, the squat, wide car, set low on its axles, has its appropriateness. In the past most low-coal mines have been perched high on the hills and their cars have been small, but the future unquestionably will tell a different story.

Plain speaking

IF PRESENT DISCUSSION of the wisdom of modifying existing anti-trust statutes does nothing more than make clear to the public at large the wide gap between the strict language of the law and generally accepted ideas of economic business practices, the inquiry will not have been in vain. Conceived in a laudable desire to protect the weak from the strong, changing economic conditions have made the law an instrument to still further weaken the weak.

Short of physical and financial merger, which may be impossible of execution legally and economically, a strict reading of the Sherman act denies to independent business units engaged in the same industry any right to co-operative action to eliminate competitive conditions which under another statute have been held to constitute unfair competition. Under the fair-trade-practice conference program, associated industry may make a common declaration of disapproval of certain unethical practices, but others rooted in uncontrolled production and profitless prices may not be touched.

Selling coal below cost for the purpose of injuring a competitor and with the effect of lessening competition has been denounced as a practice outside the legal pale. Fine! But an agreement between two competitors on specific prices, regardless of the reasonableness of such prices, will make the jail doors creak in anticipatory welcome to new lodgers. It is legal to embrace the shadow, but criminal to traffic with the substance. That such a situation is healthy, that it promotes respect for the law is beyond thinking. This, if nothing else, the present inquiry is bound to develop.

How many could pass a test?

AT GLEN COVE, Long Island, the New York Automobile Club ascertained, with the aid of the local police, that 76 per cent of the cars inspected were out of order in their brakes, headlights, horn, mirror, windshield wipe, wheel alignment, or steering-wheel play. In 1,103 cars tested, only 261 passed the tests satisfactorily. Of all the cars examined, 45⅓ per cent had brakes that did not function with a desirable degree of safety, 40 per cent had improper headlights, 15½ per cent had wheels out of alignment, and 17½ per cent had too much play in the steering wheel.

Most of these machines were in the hands of their owners. In all cases their defects endangered the lives of those who possessed or who drove them. Yet they had been suffered to get out of condition and were allowed to continue in that state. What, then, is likely to be the plight of uninspected mine equipment operated by men who are not mechanics and have no ownership interest in the machines they operate?

An inspection with a careful record would show how distressingly frequent are badly functioning and unsafe loading and cutting machines. Many are merely able to get by. A machine that does the work required of it occasionally or even generally is hardly better than none at all. A machine which "lies down on the job" breaks in on quantity production, upsets schedules, makes men all over the mine work with decreased efficiency, and thus does in a day or so more harm than it can correct in a week of reasonably standard operation.

But this is not recognized. The failure in general output is not traced back to the badly functioning machine. The lowered tonnage of the locomotive, dump, hoist, tipple, cleaning tables, is distressing, but often not a finger points to the machine that was the cause of these lowered tonnages. Certainly, no one has actually charged the machine on the books with the delays its irregular operation caused. The expression "all along the line" seems expressly coined to designate the extent of the failure when from lack of inspection one unit fails to do its "daily dozen."

NOTES

. . . from Across the Sea

SOME time back, the late Prof. H. B. Dixon, of Manchester, England, discovered that gases could ignite at a low temperature—that is, become more sensitive to flame—if nitrogen peroxide were present. When he presented his conclusions to the research committee, of the Safety in Mines Research Board of Great Britain, the members of that committee told him the results were interesting but not nearly as valuable as the discovery of a gas that would raise the ignition temperature. Prof. R. V. Wheeler informed Dr. Dixon that a mixture of air with ethane that had been prepared from ethyl iodide and which therefore possibly contained a little iodine did not ignite when passed through a red-hot tube, though a mixture of pure ethane and air would be ignited when thus heated.

Dr. Dixon discovered, as he stated in the discussion of a paper by W. Payman on "Researches on Coal Mining Explosives" (Transactions, Institution of Mining Engineers, London, England), that it was a matter of indifference whether ethane iodide is used or free iodine vapor or a compound containing iodine which Dr. Dixon said presumably, almost certainly, was decomposed at the temperature to which these gases are raised. And the sensitivity of methane could be greatly increased by passing it over iodine packed in ice. With a bromide an even greater

Fig. 1—Steel Caps and Timbers With Yielding Angle Joints Support Entry

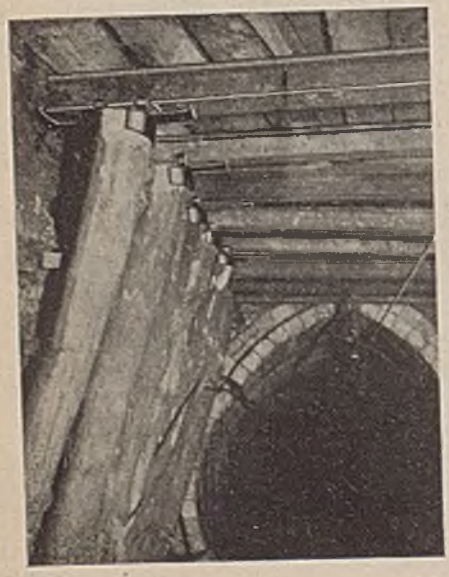

Fig. 2—With Yielding Angle Joints, Peg Legs, and Curved Members, Lining Gives Without Collapse

effect was obtained. The presence of one part in 1,000, or 0.1 per cent, of bromine made a remarkable increase in the temperature of ignition.

Mr. Payman suggests that some such iodide or bromide might be used in the mine to raise the temperature at which explosives will burn or the gas surrounding the explosives will explode. Similar inhibitors of burning are used, as Mr. Payman points out, to give antiknock gasoline its desired quality. Much has been said as to catalysts that speed up actions, but sometimes retarding catalysts have their value.

Though in coal mining the principal stresses are vertical and do not come from the sides of the opening, the cap and post shoes (*Kapp- und Stelzschuh*) to which the name Diplomat has been given, manufactured by the Queens Soehne company, of Gladbeck, Germany, near the mining town of Recklinghausen, have an applicability to certain of our mining conditions, especially in the anthracite region. The principle is somewhat similar to that used in providing for resisted vertical movement, the movement permitted being opposed by a wedge laid within a clamp which in resisting further opening acts as a spring. Lateral pressure, instead of deforming the leg of the steel set, causes the top of the leg to move toward the roadway against resistance, still supporting the cap and continuing to hold back any loose material in the walls of the roadway. The lateral movement at the top of the post lowers the cap a little, but sometimes the post itself is made with a stilt, or peg-leg, as shown in Fig. 2, so that it can shorten vertically and give opportunity for adjustment in that direction. The weakness of a concrete or metal arch is that side pressure turns a circular vault to a Gothic arch by forcing the top of the arch upward. When the arch does not have the compressibility it has with the Shaefer design it endeavors to free itself of side pressure by lifting the rock above it. Thus the weight above is augmented by the side pressure and if there is no leeway the arch must be broken to pieces at the top. Its flexibility can be increased as in that figure

Fig. 3—Hook Embraces End of Girder; Curved Band Engages Post; Wedge and Clamp Hold Two Together

by the use of curved cap members that will straighten out under weight.

In Fig. 1 may be seen an arch that has been deformed. Apparently it was not backfilled tightly above and it has become egg-shaped, the vertical diameter being greatly in excess of the horizontal. In the foreground are steel cap pieces with wood posts connected by Diplomat joints which give under great pressure like the councillors after whom the joints are perhaps named. The play of the shoe is 15¾ in., but only 7⅞ in. of this movement has been used. The timber sets, particularly the uprights, are undamaged; whereas neighboring timber sets with rigidly connected members have had in part to be replaced.

Fig. 2 shows curved beams, curved posts, peg-leg footings, and angle joints

Fig. 4—Angle Joints Used With Curved Members in Fig. 2

of Diplomat type. This installation is in a lower level of the mine from that shown in Fig. 1. Fig. 3 shows a detail of the joint in Fig. 1, and Fig. 4 a detail of that in Fig. 2. Experiments show that the shoes offer a rapidly increasing resistance, and then a constant one. As the sets give way gradually they do not break; thus entire failure is avoided. Credit must be given to *Glückauf* and other sources for this information.

R Dawson Hall

On the ENGINEER'S BOOK SHELF

The Menace of Overproduction—Its Cause, Extent, and Cure. Edited by Scoville Hamlin. John Wiley & Sons, Inc. 202 pp., 5½x8½ in. Price, $2.75.

First in the list of collaborators in this book is C. E. Bockus, president, National Coal Association, who declares that the coal industry is and, for the safety of the public, must be overdeveloped, and suggests that the overdevelopment such as exists is not excessive.

"Influenced by the cost of storing a bulky commodity like bituminous coal," says Mr. Bockus, "it is difficult to induce a consumer to increase his summer purchases appreciably by any reasonable concession in the cost of his fuel. Neither seasonal changes in prices nor seasonal changes in freight rates—both of which devices have been suggested—hold out promise of material relief." Mr. Bockus concludes by advocating some lightening of the Sherman and Clayton acts.

Oil, textiles, wool, silk, rayon, agriculture, and radio are all represented in the symposium, and these specific industrial problems are followed by more general economic discussions, in which Henry Chalmers, P. H. Fassnacht, Sir Henry Deterding, Paul T. Cherrington, F. H. Sisson, Virgil Jordan, H. S. Person, and the editor take part. Mr. Hamlin's suggested cure is a restriction of income to 7 per cent or less. He does not make quite clear how it will produce the millennium.

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Oil Conservation and Fuel Oil Supply, by the National Industrial Conference Board, Inc. 165 pp., 6x9¼ in. Price, $2.50.

This authoritative little volume discusses with great deliberation the competition between modern sources of energy, the world's supply and consumption of fuel oils, the distribution of the product, the United States oil situation, the relation of crude-oil conservation to fuel-oil supply, and the effects of a possible decline in fuel oil.

The Conference Board concludes that there are grounds for believing that during the period covered by the present survey fuel oil almost reached its peak of production. This conclusion is based on these facts: (1) That the consumption of fuel oil has increased but slowly since 1927, despite the rapid decline of prices; (2) that the supply of natural gas has increased in areas where fuel oil hitherto has been consumed; (3) that in the future, more of the present fuel-oil supply will be converted into gasoline; (4) that the practice of "cracking" will be extended, because thereby the quality of the motor fuel obtained will be improved.

The Board declares that cracking is a profitable way of producing gasoline as well as a graceful gesture to conservation. It also calls attention to the fact that the introduction of hydrogenation, if general, would completely eliminate the production of fuel oil. Here it might be interjected that by the process of hydrogenation, which is, in part, an additive action, 102 per cent of gasoline can be secured from the oil thus treated. Consequently the gasoline now needed could be obtained from only 38.2 per cent of the present crude-oil production. All of which suggests that industrial sickness of a severer kind than is now being suffered by the oil industry may plague it in the future. Some would say that its wastefulness in production has had a counterpart in its wastefulness in refining methods, but that would be a shallow judgment, for the petroleum producing and refining industries have been perhaps even more active than the coal industry and the coal consumer in correcting their wastes.

Everybody concerned in the future of coal should read this book. Its perusal will be both interesting and pleasing. So much that interests the coal man today is rather discomforting than satisfying. Yet withal there is such a judicial flavor about all the judgments in this book that the reader in perusing it assents readily to its conclusions. R. Dawson Hall.

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Coke for Blast Furnaces. First Report of the Midland Coke Research Committee, by R. A. Mott and R. V. Wheeler. The Colliery Guardian Co., Ltd., 30-31 Furnival Street, London, E.C. 4, England. 267 pp., 6⅛x10 in.; cloth.

This book, also known as Technical Report No. 1 of the Iron and Steel Research Council, contains a large volume of original material and some information regarding older researches and observation in the British Isles and in other countries, with the conclusions based on such studies. It contains, in addition to the pages listed, 46 inset plates illustrating for the most part the cokes under discussion as made under certain specified conditions. Perhaps never before has such a large mass of data on this subject been collected.

Among interesting conclusions scattered through the book may be quoted: "Evidence has been obtained that oxidation reduces the activity of coal surfaces, the 'wettability' being reduced, and binding, during coke formation, hindered or altogether prevented." This fact is well known though generally not so expressed, but the authors add: "Sometimes an oxidized coal, or one normally of high oxygen content, may be admixed to advantage with a high-volatile coal to act as a 'bubble burster,' so as to make the resulting coal denser."

Other kindly references to poorly coking materials follow: "Although a coal of low coking power may produce a fingery (prismatic) coke, the admixture of a suitable proportion of another coal of equally low, or even lower, coking power, may improve the size of the coke. The blending with a coking coal of a small proportion of a non-coking material, such as anthracite duff, or the breeze from low-temperature coke, improves the size of the coke whatever the quality of the coking coal used for the blend. The use of a non-coking material for blending with the coke charge is indeed the most effective method of improving the size of coke, but regard must be paid to its effect on the hardness of the coke.

"Perhaps the most interesting, because unexpectedly valuable, material to use is clean slurry. No doubt the slurry, because of the concentration of fusain in it, can itself be regarded as a blend of coking and non-coking materials. Full-scale tests on the coking alone of cleaned slurry from coking coals, whether good or poor, produced blocky cokes but little fractured, provided that the slurry did not contain too much fusain."

Chapters are devoted to the specification of coke—its size, structure, analysis, density, abradability, hardness, reactivity—the influence of the character of the coal from which it is made, of the blending of the charge, of the size of the coal, of the method of charging the oven, of moisture, of rate of heating, and of quenching, screening, and handling; followed by a chapter on research methods, with several pages of tabular records on coke tests of the Midland Research Committee. The book is a credit to the authors and to the sponsors of the research work. R. Dawson Hall.

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Techno-Diktionar, Hubert Hermans, Berlin-Lichterfelde, Germany. 411 pp., 4¼x6¼ in., paper cover. Price $3.75.

This little book comprises three dictionaries, one Deutsch-Englisch-Italiensch, one English-German-Italian, and one Italiano-Tedesco-Inglese. It contains words in general use by engineers with a tendency toward mechanical engineering. Some few mistakes can be discovered, but the book will prove of ready assistance to those needing to use German or Italian, as its pocket form is greatly in its favor.

THE BOSSES TALK IT OVER

Payroll Overdrafts—

How Do You Control Them?

"NOT so good," muttered Mac to himself, after pondering over an order which came to him from the superintendent's office. It reads: "Effective at once, work all men living in company houses who are overdrafted on the payroll." Finding the super in his office and alone, Mac went in. "This order of yours," Mac began, "appears ill-advised to me, Boss."

"Why?" asked Jim. "We can't carry the credit of these men indefinitely. Another thing: they must need the money."

"No matter how you look at it, the order is wrong," persisted Mac. "You're being partial to the man who has already been helped most. At the same time you're penalizing the man who pays his way."

"We have to get our money back some way, Mac."

"In the long run, the plan will not accomplish your direct purpose," quietly retorted Jim. "Besides, it will cause other troubles."

WHAT DO YOU THINK?

1. How do you control payroll overdrafts?

2. Do you ever extend credit to men who do not live in company houses? If not, why?

3. How do you equalize pay to your men without jeopardizing production efficiency?

4. What do you do about needy cases?

All superintendents, foremen, electrical and mechanical men are urged to discuss the questions on page 26. Acceptable letters will be paid for ▶▶▶▶

What should be the relation of the safety inspector to the mine foreman? Jim and Mac fussed over this question in December. How the readers of *Coal Age* would settle the matter is told in the letters following.

Employment of Inspectors Admits Faulty Supervision

SAFETY inspectors do not earn their salaries in results produced. Employment of a safety inspector is quite obviously an admission that the mine wherein he functions is faultily supervised and that the mine foreman and superintendent are ignorant as to ways and means of efficient mining, which, of course, is safe mining.

A foreman who allows his men to do their work in such a manner that they are liable to injury, or who permits them to work under an unsafe condition is not an efficient foreman and should be dispensed with. Production efficiency must include the provision that an inefficient person is one who allows his subordinates to be hurt through unsafe practices or conditions. Efficient production in a coal mine consists of producing coal at the lowest possible cost per ton, and this low cost cannot be obtained if injuries occur.

Loss of time removing the injured man, compensation paid him during nonproductive periods, medical fees incurred and perhaps a lawsuit are the results of an injury. These expenses, whether directly or indirectly added to the cost of production, finally come into the red side of the ledger.

The question of dividing authority between the safety inspector and foreman is another argument against the use of a safety inspector for any other purpose than testing for gas. If the safety inspector notices an unsafe practice he reprimands the worker. If the foreman sees the same thing he too administers a corrective potion. If the safety inspector sees an unsafe condition in the working places he takes immediate steps to have it corrected so as to not injure a man. Your real honest-to-goodness efficient foreman will do the same thing, so that he can keep down his costs and keep up his production.

Why, in the name of common sense, should your safety inspector have to report to anyone? If a condition arises that will take a session of the officials to correct, the mine foreman will have already brought it to their attention. Why not have the foreman himself, in his report, state that certain men were removed from a certain area because of gassy conditions or bad roof? Why not have the foreman insist on having conditions remedied because they are detrimental to the operation of the mine. You can get more results by telling the "men higher up" that an explosion will cost them fifty thousand dollars or that a fall here or there will cost them two days' production than you can by telling them that if the ventilation isn't changed or the roof timbered better, "it might, if there is a man there maybe, probably hurt him perhaps."

How should a safety inspector function? Well, if you just must have someone on your payroll designated as a safety inspector, he should be allowed to traipse around the mine testing the air for methane and perhaps have an anemometer to register the air flow. When he has made one round and logged the data in a book, he should be sent right back again and do the same thing as many times as it is possible for him to get around. When he finally gets fed up on this job he should be given a chance to learn something about mining and an opportunity to earn some real money, and his former job may be given to anyone who is mentally capable of reading dials and going through the routine of gas testing.

Mine foremen (of the run-of-mine type) do let their personal beliefs run away with their better judgment. But a man whose knowledge of a mine and mine operation is sufficient to promote him to the position of mine foreman is supposed to have personal beliefs that are good judgment. In a word, if it is his personal belief that a trip permitted to run over a certain switch will wreck, isn't that his best judgment? And if his best judgment is that a cutter bar is about ready for the junk yard, isn't that his personal belief?

DONALD DAVID LONG.
Woodward, Ala.

Do Not Merely Advocate Safety; Teach It at Every Opportunity

IF the mine foreman is of the right type, a safety inspector in his mine would be a dead expense to the company. An A1 foreman gives safety the first consideration and sees that the state mining laws are strictly observed, thus accomplishing exactly the purpose for which an inspector would be employed. If the foreman could spend the money on safety that goes to pay the inspector and to keep up his department, necessity for the kind of reports written by the inspector would be unnecessary.

This is not true of all inspectors, for there are some who are worth their pay. Under no circumstances should the inspector have authority over the foreman. The inspector's findings should be cleared through the manager.

I know of a small mine in which conditions are really bad that has been working for several years without an accident. At this plant no consideration is given to safety at all. At another mine which employs a safety inspector and gives first-aid training, where conditions are good and an attempt made to enforce all safety measures, many accidents, including several fatals, have occurred. Safety measures, seemingly, were of no avail in the last instance. There is too much safety advocation and not enough safety education.

Meyersdale, Pa. M. E. REICK.

Larger Scale Maps Help in Posting of Extraction Progress

IMPLICIT trust for the complete removal of pillars and for the marking up of stumps on the mine map should not be placed in the pillar bosses. This matter of checking up on the unpulled pillars and those abandoned should be placed in the hands of the mine engineer, who should co-operate with the foreman and superintendent. These three men should visit the pillar workings together at least twice a month.

On a 100- or 200-ft. scale map a stump, say, 10 ft. square, is difficult to show and consequently is frequently passed over by the engineer. Yet this block of coal, if abandoned, may cause or contribute to much damage in the mine. The difficulty of completely showing every little stump is enhanced by the fact that if the roof is soft and has a tendency to cave at the least provocation, the engineer may be confronted in certain places with a wall of rock where once a pillar stood. He then has no other choice than to take the foreman's word as to whether the pillar had been mined.

A map of the pillar section of the mine prepared on a scale of 50 ft. to the inch is useful for the purpose, and prints of this size should be furnished regularly to the mine bosses. These should show the break lines as they really are and as they should be. All small abandoned stumps can easily be shown on a map of this kind. Coal extracted each month might be indicated in different colors. The very fact that these maps are posted regularly does more to promote clean pillar extraction than any other one regulation around the mine.

As a creep is caused by the weight of

the overburden or the pressure from the bottom not being able to adjust itself properly, the obvious thing to do is to give these forces an opportunity to reach equilibrium as quickly as possible. Most mines of the West which are worked on the room-and-pillar system leave barrier pillars, generally about 100 ft. wide, between headings. These thick pillars sometimes act as a "stop signal" to indicate the approach of a creep, but unless they themselves are properly extracted they will aggravate the ride. Here in the Rocky Mountain region we often have as much as 2,000 ft. of cover, which means that extra precautions must be taken in the preliminary planning of the workings and in the actual operation of the mine. In pillar workings we try to establish good breaks or caves by clean mining. When, for any reason, it is apparent that too many stumps have been abandoned we have no recourse except to go back into the gob after them, generally by the use of wooden or concrete cribs and much expensive timbering.

Latuda, Utah. ROBERT SCHULTZ.

Advises How to Avoid Trouble In the Recovery of Pillars

"AS A MINE is planned, so will it crush," whispers the honest cut boss in a quiet place underground. To keep his job, he has to be a diplomat and take the consequences of a mode of planning which is not his own, and not even that of the engineer who had gained experience with him on the spot.

Had their advice been requested, the forecast would have been based on the average behavior of the roof in the district, and their task would have been a picnic. Although a few years of operation proves that a wholesale criss-crossing by rooms and crosscuts is not bad, a few years more shows a tendency to riding; later on, pillars are crushed and the roof becomes dangerous—roof subsidence had been overlooked.

Whereas the cut boss should be a man of trust, capable of carrying out instructions, the engineer should not only post extraction on a map, but should also produce from time to time an advance plan of operations, aiming at equal subsidence of the roof and at a pillar extraction following quickly upon the tight work. The cut boss would appreciate the advance plan. He has studied the causes and effects of a ride and has predicted the trouble when too many pillars have been formed ahead of recovery.

When a ride starts, the engineer should outline the affected area on the map for the benefit of an official whose task is to lessen danger caused by crushing, heating, gas bells, and gob fires. It may be necessary to seal off workings and even to cut new airways in the rock. Lack of planning allowed by the owner is responsible for such troubles and expenses. M. PIARD.

Bellevue, Alberta, Canada.

Relief Measures

In their discussion concerning the handling of payroll overdrafts, both Mac and Jim tried to be fair, yet they agreed in no single respect. Their arguments show how difficult it is to temper judgment in taking care of all employees alike when business is dull. No single problem looms bigger today in industry. You can help to formulate an equitable plan. Send in your letter today.

Whether Mac Is Right Must Depend on Circumstances

MAC, worrying about costs, decides to save the wages of a couple of men, so he puts them to loading and lets the aircourse become blocked; decides he can get along without one brattice man and his brattices are neglected; that one timber man can do the work two are now doing; that one main-line tracklayer is enough. He pats himself on the back and shows Jim where he is saving the wages of five men. Jim is tickled, and tells the Old Man. If the Old Man is like some executives he feels fine about the saving.

In a few months the men are kicking about bad air and some are going home early every day, because of "damps" in their working places. Mac tells Jim the fan needs speeding up. This is done, and up goes the power bill to the tune of the wages of five or six men. A bad piece of rock is neglected because the timber man could not get to it that day. It falls. The motor coming along the haulageway hits it; the trip is wrecked, injuring the trip rider and motorman, damaging the motor to the extent of $40 or $50 and stopping the hoist for an hour or two. It may have been a broken rail unnoticed by the tracklayer, who had too much territory to cover that caused the wreck on the haulageway.

If the mine had had a real safety inspector these troubles would not have been encountered and true savings might have been effected. The savings in wages of the five men for more than a year are lost.

There should be no division of authority between the foreman and inspector. The inspector should make written recommendations, which Mac should consider as orders and carry out. At the same time the inspector should send a copy to the Old Man. If on his next visit the inspector finds the orders have not been carried out, he should put them down in his succeeding recommendations to Mac, and send the duplicate to the Old Man. Then it is up to the Old Man to find out the why and wherefore of the case. In the event the inspector finds an imminently dangerous condition, he should have the right to do whatever he decides with absolute authority.

Sometimes a good foreman has a poor safety inspector. Then, again, there is a problem. Too frequently, the job of safety inspector is handed to an individual for no other reason than that the Old Man wants him to have what is considered by them a soft job. As there are no law requirements for this job that I know of, any nincompoop can be thus employed. If this is the case, then Mac is absolutely right in feeling peeved over a boob trying to tell him where to get off. Mac at least had to know enough to make his papers. On the other hand, the inspector may be a younger man than Mac and thoroughly competent. If Mac is set in his ideas, all that can be done is to tell him to line up or else—

I do not think that Mac should have to swallow whole all the pet schemes that an inspector thinks up. If in his judgment the scheme is wrong, he should be allowed to state his views to the Old Man. A safety feature in itself may be all right and yet in final cost be disproportionate to the advantage gained. THOMAS JAMES.

Vincennes, Ind.

Analysis of Accident Costs Shows Need for Inspectors

IN answering the question "Does organized safety work pay in dollars and cents?" we may profitably inspect a few figures having their source in the accident report compiled by the Pennsylvania Department of Mines for the year 1929, covering accidents in mines of Pennsylvania. For the sake of brevity I have extracted a few pointed figures dealing, on the one hand, with companies having well-organized safety departments, which I shall designate "First Class," and, on the other hand, companies having no safety departments, which I shall term "Second Class."

The group of the first class produced 594,381 tons per fatality and 73,562 tons per disability of 60 days or over, and the group of the second class produced 297,875 tons per fatality and 55,021 tons per disability of 60 days or over.

It has been found that over a five-year period the average compensation cost in Pennsylvania is $3,801 per fatality, and $703 per accident of over 60-day disability. Also that for each fatal accident there were 30.66 accidents under 60-day disability, costing an average of $67, and besides this 60.6 noncompensable accidents with an average cost of $21 for medical attention.

Compiling cost figures upon this basis, we find the per ton costs of compensation for the same classes as are named above, as follows:

Compiling the first group, the per ton cost of compensation itemized was: for fatalities, 0.64c.; for 60-day disabilities, 0.95c.; for disabilities of less than 60

days, 0.56c., or a total of 2.15c. A similar compilation in the second group on the per ton basis indicates: for fatalities, 1.28c.; for 60-day disabilities, 1.28c.; for disabilities of less than 60 days, 1.12c., or a total of 3.68c.

This indicates that the companies in Pennsylvania having well-organized safety departments produced coal at a compensation cost amounting to about 1½c. per ton less than those companies having no safety departments. In addition to these costs, the operator has the intangible costs of interrupted operation due to accidents, costs of training new men, the resulting loss of efficiency during such training period, and the cost of property damage. There is also the item of lessened morale.

To the worker, there is the further loss of wages he could have earned while receiving only meager compensation, and, in many cases, a permanent handicap in earning capacity which the compensation award meagerly compensates.

Pennsylvania compensation costs are less than Indiana's. A certain reciprocal insurance company in the latter state charges 5½ per cent of the payroll for compensation insurance. If the labor cost per ton equals $1.25, this amounts to 6.875c. per ton. What a field for organized safety! So much for the reason for the existence of safety inspectors. But there are safety inspectors and safety inspectors. By that I mean to say that the qualifications possessed by such gentlemen are of exceedingly varying degree and, similarly, the scope and authority with which they are endowed is also of widely varying range.

After all, a safety inspector, whether he be good, bad, or indifferent, reflects in exact measure the qualifications and safety attitude of his superior. The latter should be high enough in executive authority to view the business of producing coal from a long range instead of a day-to-day production standpoint. Such an executive will recognize and encourage the ability of the safety inspector. He will give sympathy and support to his efforts and will demand no rubber-stamp acquiescence to lukewarm safety policies which are mostly of the lip-worship variety. I have known coal operators whose principal voluntary contribution to the cause of accident prevention took shape in the form of a sign inscribed with the trite admonition "Safety First."

There should be no conflict with the edict of the safety inspector. The friendly logic and the sincerity of effort evidenced by the right kind of man should quickly impress each mine boss or superintendent whose relations come into conjunction with his. Any company far enough advanced in operating methods to feel the need of a safety inspector is very likely supplied with a personnel of superintendents and mine bosses who really appreciate safety measures. Show the mine boss that you are sincere in your zeal to check accidents, and watch him respond. Let him know that, as important as you consider production costs, human lives are regarded by you as even more important, and watch his respect for you grow. It is true that he may have some notionable and erroneous ideas concerning some of the safety measures advocated, but he can be set right with patient logic and figures. It is the function of the safety inspector to sell the idea of safety to everyone concerned. He should not assume the office of critic but of helpmate. His is a missionary function and he should strive with patience and kindliness to win followers to his cause. At the same time, should he meet with willfully stubborn and dangerous opposition to his doctrine, he should exert the full force of his authority to check it.

W. E. Buss.

Vincennes, Ind.

Superintendent Is Boss

BECAUSE Mac thinks the safety inspector is meddling into his affairs should be no reason for abolishing the job. The writer has known of men who took Mac's attitude in matters of this sort. That their attitude is wrong is proved by the statistics of insurance companies, which show that the accident rate has been diminished and more careful work done when men are made to realize that their work is being watched.

The inspector should visit the various sections of the mine at regular, short intervals and report his findings to the mine superintendent. The superintendent should give the recommendations to the foreman, who, in turn, should report back to the superintendent when such recommendations are carried out.

Feno Castellani.

Manhattan, Kan.

The Foreman's Mail

Mrs. Nelson told Mrs. Lucus that they had never done well until they came to Coalville. She said: "The children and I like it fine, but John often complains that they are too strict. He says he's going to quit, but we talk him out of it and remind him of how fine he is doing. John always says: 'I've no complaint only that they are too strict. They get my goat sometimes'."

This was John's first experience at a mine where he had to work every day where he had to clean up his place every day, and had to adjust himself to the company's and not his own way of working.

There was no compromise in matters pertaining to recognized mining practices.

John Nelson found his first real boss at Coalville. He was doing well because he had to do as directed.

George Edwards.

Even the Smaller Mines Require a Safety Inspector

MINE management shows wisdom when it appoints a safety inspector for its operations. If a company is too small to bear alone the expense of carrying this additional official, it should get together with several other companies of the same size and hire an inspector jointly. A good inspector will not only look after the safety features of a mine but will be of great assistance to the management otherwise. He is in a position to get first-hand information on specific problems.

It cannot be the privilege of the inspector to exercise authority over the mine foreman, for the mine law distinctly states that "the mine foreman shall be in full charge inside." If he is broad minded, the foreman will welcome the suggestions of an efficient inspector and be glad to have his co-operation in the prevention of accidents. Altogether too common is the situation where mine officials resent the suggestions offered by men outside the immediate fold. The inspector should write an accurate report of his findings, sending it to his higher boss with a copy to the foreman.

Smithfield, Pa. F. O. Nichols.

Casual Inspections Are Best

ANY work so important as pillar mining should be checked by some independent responsible person. Inspection should be made casually with as little fuss as possible, for then the cut boss will not be conscious that he is being closely watched. All men resent interference with their work, and like to be trusted. But trusting a man too far is not a good policy. I do not think this work should be in the hands of the engineering department, as the job is more of an operating nature than of engineering. The problem boils itself down to the employment of the right man for the job of cut boss.

Herts, England. W. E. Warner.

How Mac Gets That Way

A GOOD safety inspector can earn several times his salary if he receives the right kind of co-operation from the company, the mine foreman, and other officials. Mac is putting out the age-old cry that is heard from the lips of many well-meaning foremen who can't keep from being jealous when other men are strutting their stuff in their mines. This was my big failing when starting out, and my boast was that I was the boss in my mine and ran it to suit myself.

The manager, to whom the inspector should report, must see that safety recommendations are carried out and back the inspector in his demands. When a safety inspector sees a dangerous condition or practice, he should not wait for action from an outside source

but should remedy the situation at once. It is his duty to stay on the job until a remedy has been effected, and it is the duty of the mine foreman to render him every aid. Many accidents occur in the period between the observation of hazards and their removal. Much of Mac's frame of mind is the outcome of attempts to hold down the ideas proposed by the foreman. Perhaps that is why Mac feels like saying he would like to take the salary of the safety inspector and spend it himself for safety.

Glo, Ky. WALTER HORNSBY.

It's a Human Characteristic To Be Contrary Sometimes

IN WORKING around a number of different coal mines it has been my privilege to meet a few Macs who could see no further than a car of coal. Of course, they worked in safety as long as it did not interfere with the day's run, and did not increase costs. But just let someone try to tell them how a thing might be done in a different way, and they would come back with the remark that they knew what they were doing and could get along without the advice.

This applies equally as well to the management of some mines and also to workers, especially if they happen to be a few years older than the man who suggests the improvement. The worker is likely to tell you that he was digging coal before you were born and that you cannot tell him anything he does not know. If you do not have sufficient authority to control him otherwise, he will go ahead and do the job his way. He is likely so to act even if he knows you were right in the method you advised him to try.

That attitude would not persist for long if the worker understood that the word of the safety inspector and other officials was final. All people are inclined to have their own way in the performance of their job, especially if the steps have become routine and habit; it is not surprising, therefore, that they balk when asked to do the job in another way. J.A.R.

Sullivan, Ind.

Inspectors Are Indispensable

EVERY mine, large or small, should have a safety inspector. The Old Man made a good move when he employed a safety inspector, for, as the problem stated, the foreman cannot be in two or three different places at the same time. Sooner or later Mac will find out that the inspector will be a great help to him in driving home safety in the minds of the workers.

Mac should not have jumped to conclusions the way he did. The inspector is not after Mac's job. Mac should have welcomed the inspector and made up his mind that he would get along with him. JOHN J. CHIRE.

Hazleton, Pa.

Dangers Develop Slowly

THE safety man has a very definite and useful place in modern industry. He can be of much help to the foreman, especially in mining, where every man is on his own more than any place else. So much of the foreman's time is taken in watching his organization and keeping the coal coming that details will escape him no matter how efficient he may be.

From experience, I know that danger creeps up on a man. For example, a piece of slate may show a small crack which when examined is not considered immediately dangerous. That crack is seen every day and yet the change is so small that the difference is not noted until the slate falls and results in injury or death. The same applies to decaying timbers. Inasmuch as the safety man doesn't see these things often, he notes them as they really are and not as they have been.

It sometimes takes a little give and take to bring the safety inspector and the mine foreman together. The safety inspector should in no way be dependent upon the foreman nor should he be subject to discharge by the foreman; they should rank equal in authority. The inspector should make up a daily report to the manager and send copies to the superintendent and foreman. There is no place for a fanatic in this job, and the inspector must make out his reports to cover conditions as they really are without fear or favor.

C. E. MONTGOMERY.

Edwight, W. Va.

An Inspector Must Know, And Know That He Knows

IF a company is sincere in establishing a safety inspectorship, it should be careful in picking a man for the place, for he must be a good man in more ways than one. The safety inspector, to begin with, should be a man with a good background of intelligence, study, and experience in the mines, who knows his business, and knows that he knows it. With this background he has confidence in himself, and is able to inspire confidence in others. At the same time he should not be of the old hardshell, know-it-all type quite prevalent in the mines and eager for an inspector's job. He should know the details of what constitutes good, progressive, and safe practices in all phases of mining. When he has this knowledge he is not backward in his opinion of anything which he thinks is being done wrong or being left undone. If he does not have this background, he will be afraid to stack his opinions against the opinions of the men responsible for the conditions he considers wrong.

The safety inspector should report to the head of the operation; if his duties cover all the mines of a company, he should report to the general superintendent; if a local inspector at one mine, to the superintendent.

Duties of the safety inspector and of the mine foreman should not mix or overlap. The inspector should have no direct jurisdiction over the mine foreman, except in an advisory capacity. On his visits to the mines, he should talk to the men in the mine and to the foreman in regard to conditions, calling their attention verbally to the things he desires. If the safety inspector is a competent man and can impress his competency on the men and the foreman, he will obtain ready compliance with the recommendations that he may express.

The feeling should be created that the safety inspector is not making his reports in criticism of the mine foreman but as a co-worker in the interests of the company. Men can criticise a job after it is done who would not have the slightest idea of how to start the job. This is not the safety inspector's field. His province is to allow the foreman to go ahead with his work of producing coal, and to keep the foreman balanced between what is right and wrong in mining practice. A. L. VOIGHT.

Danville, Ill.

Negligence on the Job

I MUST say that Mac is some mine foreman to admit to the super that he has a ride in his mine and hasn't checked up on it lately. It appears to me that Jim needs a new foreman more than Mac needs a new track boss, for any mine that has a ride advertises the fact that someone has neglected his work. HOWARD LONG.

Heber, Calif.

Publications Received

Cost of Accidents to Industry, by F. S. Crawford. Bureau of Mines, Washington, D. C. I. C. 6,333; 10 pp.; includes a summary of indirect costs of accidents.

Effectiveness of Different Size Rock Dusts in Preventing Coal-Dust Explosions in Mines, by G. S. Rice, H. P. Greenwald, and H. C. Howarth. Bureau of Mines, Washington, D. C. R. I. 3,034.

Support of Underground Workings in the Coal Fields of the North of England (Durham, Northumberland, and Cumberland). Safety in Mines Research Board. Paper No. 61; 140 pp., illustrated; price, 2d. net. The last of six reports made by the Support of Workings in Mines Committee appointed by the British Secretary of Mines.

Safety at Mines of Ford Collieries Co., Curtisville, Pa., by C. W. Jeffers. Bureau of Mines, Washington, D. C. I. C. 6,339; 8 pp.

Fuel Problem of Canada, by Martin Nordegg. Macmillan Co. of Canada, Ltd., Toronto, Canada. Pp. 155.

Survey of Fuel Consumption at Refineries in 1929, by G. R. Hopkins. Bureau of Mines, Washington, D. C. R. I. 3,038; 11 pp.

OPERATING IDEAS

From PRODUCTION, ELECTRICAL And MECHANICAL MEN

Timber Yard Inside the Mine Insures Intelligent Supervision

TIMBER-HANDLING practices differ widely, even at mines in the same field. Local conditions are responsible for most of the variations, but there is a tendency to bow too readily to a local condition and put off the adoption of a practice of reputed advantage. Take the practice of delivering posts cut to correct length. At the Auxier (Ky.) mine of the North East Coal Co., a slope operation with a long outside haul, a timber yard was established inside the mine in order to insure more intelligent distribution.

The yard extends for several hundred feet beside the empty track at the foot of the slope, from which point the gathering locomotives work. The posts are piled in a single row with one post standing vertical between piles of different lengths. There are six sizes, graduated by steps of 2 in., including a 3-ft. 6-in. size, which is the shortest, and a 4-ft. 4-in., which is the longest.

Not more than one carload, consisting of ten posts and twenty caps is delivered to a working place at a time. As he leaves the mine the loader tells a supply clerk on the outside the number of posts and exact length required for the next shift, and this clerk writes the requirement on a shipping tag which is printed for the purpose.

The next morning the motor boss takes the tags with him to the slope bottom and proceeds to dispatch the timbers on the first trips going to the respective sections. He attaches the tag to the car to insure correct delivery.

A Pile of Each Length Beside the Empty-Hole Track

G. E. Minns, mine foreman, has observed no disadvantages in the system and credits it with the following advantages: (1) No waste of timber by cutting off pieces; (2) square ends result in a better timbering job; (3) less of the loader's time required in timbering; (4) ease of setting timbers encourages safer operation; (5) locomotives are not delayed; cars are loaded as they stand idle in the empty hole; (6) any size of post is quickly available in case of emergency; (7) other supplies are dispatched in the same car as the timbers, and in that way the mine operates without a night supply crew.

Serves as Requisition and Shipping Tag

Deliver to _____

At _____

Posts _____ Inches Long

_____

(This line for other supplies)

Date _____ _____

Foreman

Opening One Side of V-Door Opens Other Half

V-doors for controlling ventilation are used extensively in the mines in the Elkhorn division of the Consolidation Coal Co. These are opened and closed by hand. To avoid the trouble and time loss incidental to opening both halves

Opening One Side of the V-Door Automatically Opens the Other

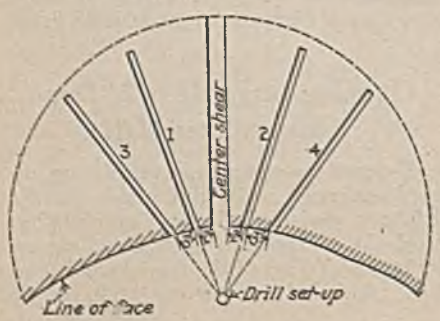
and holding them in the open position to allow the passage of equipment, a lever arrangement has been perfected. The mechanism and its arrangement are shown in the accompanying illustration.

The members attached to the doors are made of pipe, and are fastened to the frame above the door by heavy staples or U-shaped fasteners threaded on both legs for nuts. From the pipe members attached to the doors, rods are extended to each end of a flat member fastened in the roof by means of a bolt driven into a block of wood. The wood block is wedged tightly into a drillhole of the proper depth in the roof. As the flat member is so fastened that it pivots about its central point, opening one half of the door automatically opens the other half. Ordinarily, the lever mechanism is placed over the door, but in a few instances is placed under the door, the members running between the ties and under the rails of the mine track.

Drilling for Best Results From Arcwall Cuts

When an arcwall machine is used either for undercutting or topcutting a sheared face, shotholes should be drilled level, according to James Towal in a recent Dupont Explosives Service Bulletin. A satisfactory arrangement of the holes is shown in the accompanying sketch. Holes 1 and 2 should stop 8 to 12 in. from the back of the cut, while Holes 3 and 4 should extend to the back. Holes drilled in accordance with the suggested plan, when properly loaded, have been found to dislodge the coal from top to bottom and to give an excellent grade of lump. The drilling of horizontal holes, incidentally, saves time where electric drills are used, as all four holes can be drilled from one set-up.

All Four Holes Are Fanned Out From One Central Drill Set-up

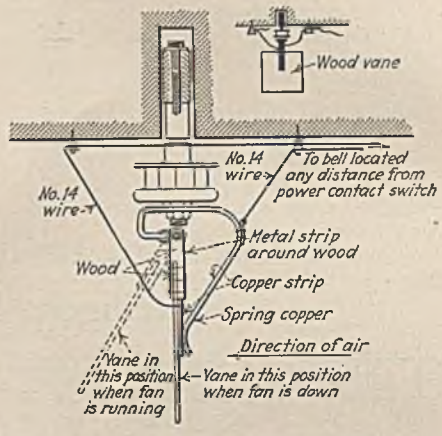


Why Not?

"That's a good idea," concluded the superintendent after listening to the electrician's explanation as to how he eliminated a cause of electrical breakdowns. The super advised him to put the idea in writing and send it in to *Coal Age*, but the electrician was indifferent, arguing that the idea was not of much account, anyway. "Why adopt it then?" asked the boss, and the electrician was stumped. *Coal Age* received the idea, a good one, and later heard the story from the lips of the superintendent. The ideas you develop may have more value than you think. By all means send them in. Published ideas are paid for at the rate of $5 or more each.

Fan Signal Functions Through Air Pressure Vane

Most of the signal systems to indicate stopping of the fan are electrical devices installed on and operated by the fan drive. C. T. Grimm, general superintendent, Buckhannon River Coal Co., Adrian, W. Va., suggests a fan-operation signaling circuit which depends on ventilation pressure for functioning.



Details of Contact Switch in Fan Signal Circuit

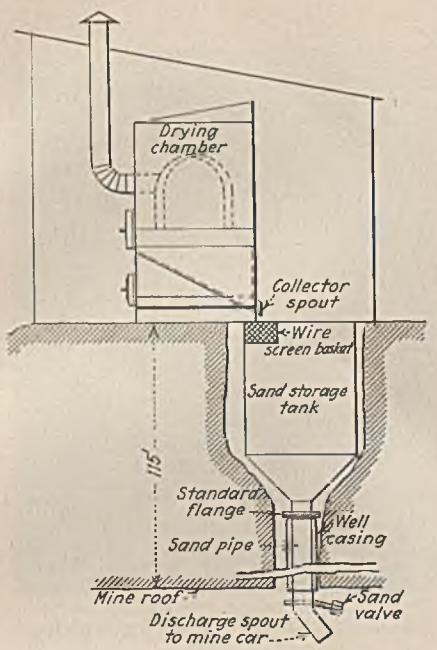
A vane integral with a contact switch is installed in front of the fan on the intake side of the air circuit. While the fan is running, ventilation pressure holds the vane at an angle to the vertical, in which position the electrical switch is open, as shown in the sketch. If the fan should cease operation, the vane would drop and close the circuit, in which may be installed either a light or a bell. The signal can be placed either near or remote from the fan at any convenient point.

Drying of Sand Processed In Straight Line

After merely getting along for several years with the old methods of drying sand for use in mine haulage, the Green River Fuel Co., Mogg, Ky., recently changed to an improved system. Details of this new system are provided by C. H. Farmer, mining engineer of the company.

Sand is unloaded from the railroad car to a sand bin immediately adjacent to the sand house. This bin is close enough to permit shoveling directly to the dryer. The sand stove is housed in a fireproof corrugated-iron building with a floor space of 10x10 ft. and a height of 7 ft.

The sketch shows the arrangement. When dry, the sand falls through the interstices of the stove grating into collector spouts and thence through screen baskets into a storage tank. From the storage tank the sand is dropped into the mine through a borehole. The sand pipe is placed inside a regular well



From Bin to Stove to Mine in One Fell Swoop

casing so that it may be replaced if necessary. The tank and sand pipe have a combined capacity in excess of that necessary to fill a sand car. When a car of dry sand is needed for distribution, it is readily drawn from the tank by placing the car beneath the discharge spout and opening the sand valve as indicated.

This installation is saving an appreciable amount of money. It requires only occasional attention such as can be given by the night watchman, and involves no labor for delivery of sand into the mine.

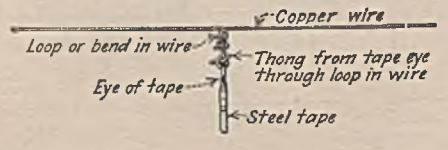
Aid to Survey Chaining In Hilly Country

In mountainous regions the engineers on survey work have their difficulties in handling the steel tapes. The loose section of the tape behind the rodman tends to slide downhill and pile up or kink, with the result that the tape is likely to be broken when a forward pull is given.

Robert Smith, field engineer of the New River Co., Macdonald, W. Va., suggests a solution of this problem. His method is to tie crosswise a 6-ft. length of flexible copper wire to the end of the tape, as indicated in the accompanying sketch.

It will be seen that the copper wire tied crosswise will drag through the underbrush, weeds, and leaves of any wooded hillside, and resist the tendency of the smooth steel to slide. The flexibility of the wire and vegetation on the other hand allows them to yield readily to a firm pull on the tape so that there is no interference with the forward movement.

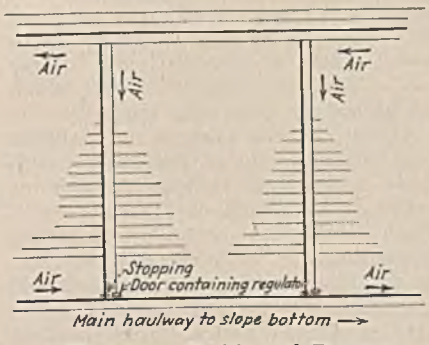
Wire at End of Tape Prevents Slipping Downhill



Regulator Located in Door at Return End of Split

Where the air divides from the main current is the usual location for a regulator to control the flow into a split for ventilating a small territory. In some instances, however, it may be advantageous to locate the regulator at the point where the split joins the return air.

This is the case in Auxier (Ky.) mine of the North East Coal Co., on several butt headings each about 1,100 ft. long and serving panels between the intake air headings and the main haulway, which is on return air.



Illustrating Position of Doors and Regulators

It was essential to have some means of compelling the motormen to stop before entering the main-line track when bringing trips off these headings. These gathering locomotives haul to the slope bottom. A door which has to be opened by hand is effective for this purpose; therefore doors with regulator openings were installed at the outby ends of each of the four pairs of parallel headings serving the territory.

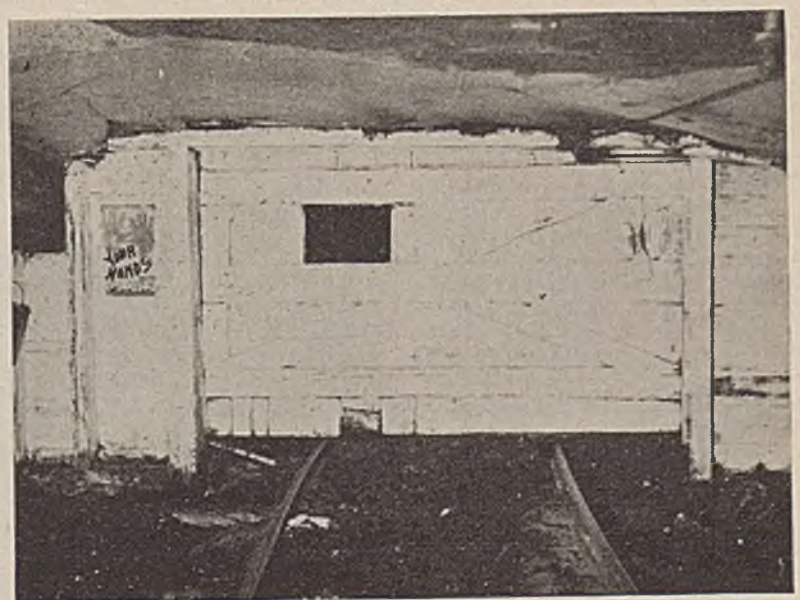
The arrangement places the regulators where they are observed frequently and provides the stop requirement for the gathering locomotives entering the main line. The disadvantage lies in the increased number of mine doors in use in the mine.

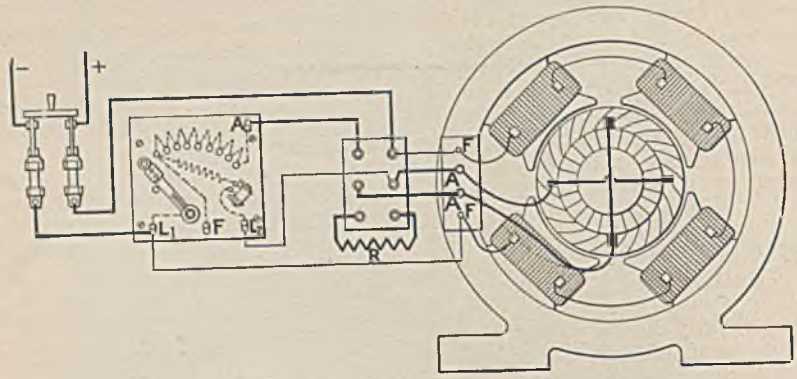
Wiring of Manual Starter For Dynamic Braking

Sometimes it is found desirable to apply dynamic braking to a direct-current motor driving a machine which cannot be stopped quickly enough by other systems of braking. To achieve this retarding force, the motor, during the braking cycle, must naturally be converted into a generator, which system requires special connections in the controller. In a recent issue of *Power*, Marin Phillips, of Niagara Falls, N. Y., describes the wiring which will allow a manual starter to be used temporarily in this service. His idea is suggested for use only where dynamic braking must be immediately applied and until the permanent braking system, through an automatic controller with special connections, can be installed.

In the case mentioned, a 10-hp. motor started by an ordinary manual-type control was driving a machine which could not be stopped during the short cycle required. A mechanical or a magnetic brake was first considered, but these were expensive and did not seem to be satisfactory for the job. The only alternative was to apply dynamic braking to the motor, which,

A Door With Regulator





Wiring Diagram for Dynamic Braking in Emergency Service

however, was not provided with a starter designed for this service. It was decided, therefore, to change the manual type starter so that it would function in the dynamic braking circuit until the proper controller could be installed permanently.

In the diagram are shown the connections used for dynamic braking. The shunt field coils were connected for excitation as long as the line switch was closed. A two-pole double-throw switch was mounted on the machine within reach of the operative and connected into the motor circuit. To the bottom of the switch was connected a resistance with several taps, one of which could be selected that would produce the desired dynamic braking effect by giving proper resistance when connected across the armature terminals.

With the double-throw switch closed to the up position the motor can be started in the normal way. With the switch in the down position the armature is disconnected from the line and connected to the resistance *R*. Simultaneously, the field coils are being excited from the line. So long as the armature continues to rotate it will generate a current and produce a braking effect, the intensity of which can be controlled by adjusting the resistance. Naturally, the lower the resistance connected across the armature terminal, the more severe will be the braking effect, the limit of which is determined by the amount of current that can flow through the motor without causing severe sparking at the brushes, and upon the mechanical forces the machine will stand without injury.

In this system of wiring the no-voltage release coil is connected to the double-pole switch, making the coil live when the switch is in the upper position and opening the coil when in the dynamic braking position. The arm on the starter will be returned to the starting position before the double-throw switch is close to the running side. This method of stopping the motor was utilized satisfactorily for more than two months until a new automatic control was obtained. Mr. Phillips believes there are many places where a similar arrangement could be used satisfactorily in an emergency.

Derailing Switch on Rock Bank Thrown From Larry

Many and varied are the designs of derailing switches used in mine track on heavy grades. Some are full automatic, others are manual; but regardless of the type, each has merits which are backed by those who built it.

At the Helvetia mine of the Helvetia Coal Mining Co., in central Pennsylvania, a derailing switch has been installed in the track of the slate bank, which functions semi-automatically. When the rock larry ascends the bank the derailing switch, naturally, is closed. After passing through the switch the larry engages a switch throw standing in a vertical position, turns it down, and through a connecting rod extending along the center line of the track opens the derailing switch through a fulcrum arm, as shown in Fig. 2. Thus, the derailing switch is in open position for the descending trip of the larry.

Before passing the derailing switch on the return trip, the larry must stop between points *A* and *B* shown in Fig. 1, until the switch is closed. At the bottom of the switch throw is a

Fig. 1—High End of Switch Control

Fig. 2—Switch and Actuating Fulcrum

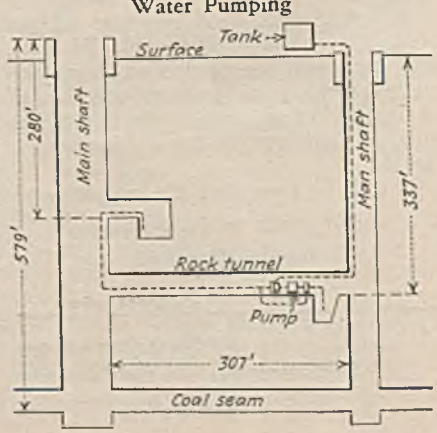
shaft which rotates when the switch is opened or closed. At the right-hand end of this shaft in Fig. 1 is a lever arm which is actuated by a wire that is horizontally disposed between two pulleys—one, at *C*, abreast of *A*, and the second on a post abreast of *B*. To open the derailing switch, the larry standing between the last two mentioned points, the operative merely tugs the horizontal portion of this wire, which lies at a level easily reached from the control platform of the larry.

One Unit Pumps Town Water From Two Elevations

Domestic water supply for the town of Coalwood, W. Va., of the Consolidation Coal Co., comes from water rings in the shafts of Mine 251 and is pumped by one unit, even though the rings are at different elevations.

The water ring in the main shaft is 57 ft. higher than that in the other, and there is a rock tunnel connecting the shafts at the lower elevation. The pumping unit, located at the lower water ring, consists of a motor with a single-

Schematic Diagram of Domestic Water Pumping



stage centrifugal pump connected to one end of the motor shaft and a multi-stage pump connected to the other end. Water from the lower or main shaft ring is raised by the single-stage pump to the head on the suction pipe of the multi-stage pump. The latter pumps from the elevation of the main shaft ring directly to a tank on the outside.

This unusual arrangement of water rings and rock tunnel between was "inherited" by the company when it bought the mine. Soon after acquisition it replaced steam pumps by the electric pumps now in use.

Arc Welding in Reconstruction Of Storage Bins

Like many of the larger coal mining properties of Illinois, Mine No. 1 of the Bell & Zoller Coal & Mining Co. is equipped with a rescreening plant for grading small coal. The storage bin of this plant was originally built of structural steel and lined with wood planking. This bin is about 43 ft. long, 18 ft. wide, and 30 ft. high, the bottom being about 22 ft. above the track. Later, an

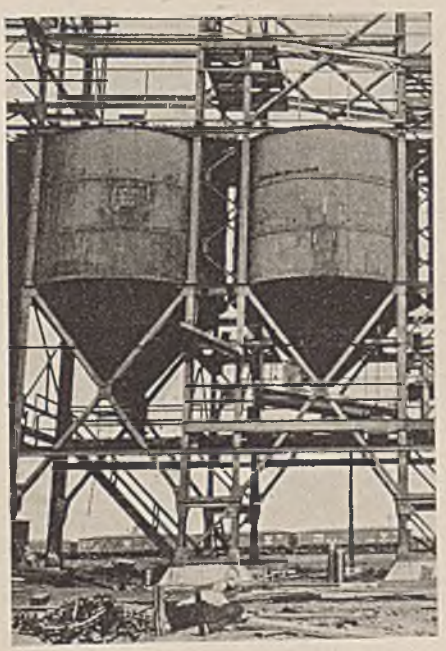


Fig. 1—Curved Sheets Were Welded Over Worn Spots in Bin

addition of four circular steel bins set in tandem on a structural steel frame was made to the original plant.

After years of service the wood lining in the rectangular bin needed to be replaced and the circular bins, which in spots had been rusted and worn through by the abrasive action of the coal, were in need of repair. In addition to repairing the bins it was desired to raise the circular bins about 6 ft.

Arc welding was chosen for this job. Two 300-amp. arc welders had been in service for over a year and applied successfully to a variety of jobs at the

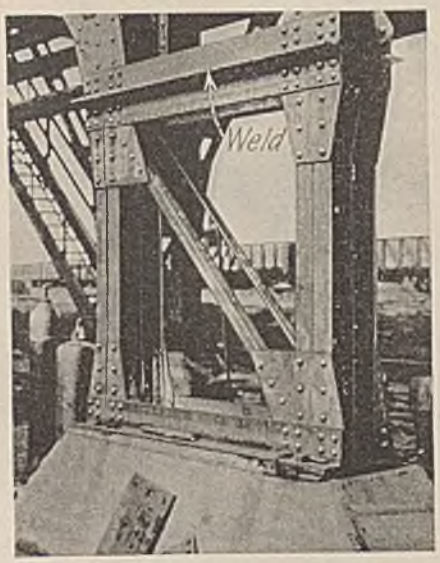


Fig. 2—Substructure Was Welded to Original Legs to Elevate Bins

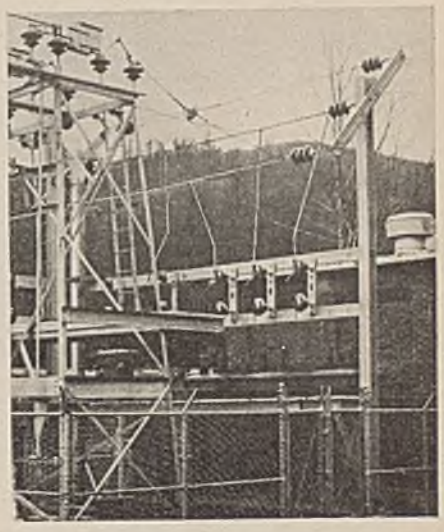
mines of this company. Both sets were utilized night and day to speed up the work. The welders were mechanics with previous experience on other arc-welding jobs at the mines.

In making repairs to the circular bins over worn spots, writes F. W. Richard, St. Louis representative of the General Electric Co., steel sheets were curved into place on the inside of the bin and welded to the original walls, as indicated in Fig. 1. It will be noted that the sill of the original base (see Fig. 2) is arc-welded to the substructure, which adds 6 ft. to the height of the bins.

For relining the rectangular bin 30-ft. sheets were suspended vertically in place by the crane seen in Fig. 3, while the welder, seated on a swinging stage, spot-welded them in place. The night crew finished the welding job both inside and out. Eighteen hundred pounds of ⅛-in. diameter welding rod was used on this job.

Angle Mounting for Buses Simplifies Equipment

In 1929 the Consolidation Coal Co. rebuilt the 22,000-volt equipment at all substations in the West Virginia division. Assemblies with "Railway Industrial" high-pressure contact air-brake switches, choke coils, and "S&C" carbon-

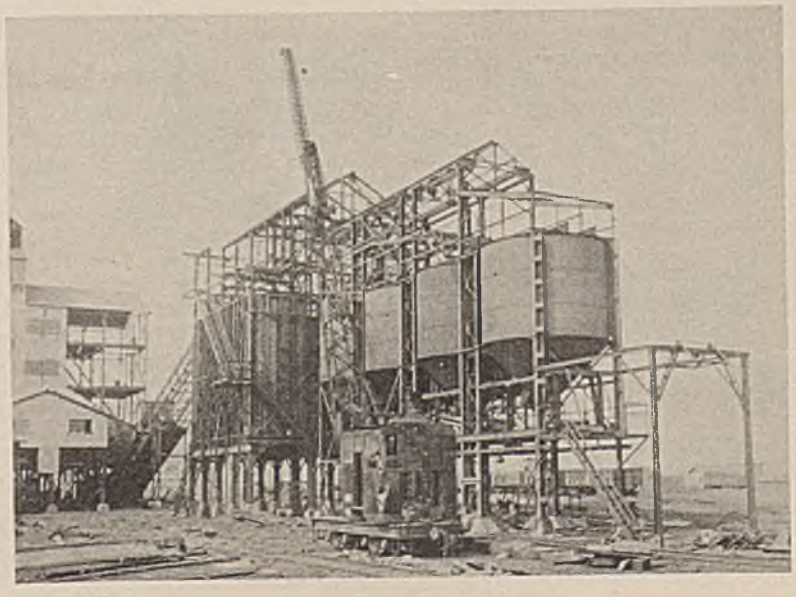


Sloping Crossarm Provides Connection Spacing

tetrachloride fuses, oxide-film arresters, and larger insulators were installed. Bus spacings were made more liberal.

The illustration of equipment at a new substation at Mine 63, Monongah, shows the novel idea of mounting the buses in a plane 45 deg. to the horizontal instead of horizontal. A bus arm and insulators are to be seen at the upper right of the picture. This provides a simple method of making the connection from the top of the tower to the bus and then down to the transformer disconnects without using extra supports and insulators to obtain the required clearance.

Fig. 3—In Relining the Rectangular Bin Steel Sheets Were Placed by a Crane



WORD from the FIELD

New Plant Construction

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

American Coal Co. of Allegany County, McComas, W. Va.; contract closed with the American Coal Cleaning Corporation for tube-type dust-collecting system to serve eight pneumatic separators; to be completed Feb. 15.

American Coal Co. of Allegany County, McComas, W. Va.; contract closed with Roberts & Schaefer Co. for Menzies hydroseparator coal-washing equipment for cleaning egg and nut; capacity, 50 tons per hour.

Berwind-White Coal Mining Co., Windber, Pa.; contract closed with Roberts & Schaefer Co. for Marcus picking table screen and Menzies tandem hydroseparator coal-washing equipment. Lump over 4 in. will be hand-picked, and the 4x$\frac{1}{2}$-in. coal will be washed. Capacity of the plant, to be erected at No. 37 mine, is 400 tons per hour.

Big Vein Coal Co., Buckskin, Ind.; contract closed with the Roberts & Schaefer Co. for plant embodying Menzies hydroseparators for primary washing and rewashing of 3x0-in. coal; capacity, 125 tons per hour.

Crystal Block Coal Mining Co., Lobata, W. Va.; contract closed with American Coal Cleaning Corporation for one Type R pneumatic separator to treat 1$\frac{1}{4}$x0-in. coal; capacity, 70 tons per hour; to be completed Feb. 1.

Leccony Smokeless Coal Co., Besoco, W. Va.; contract closed with Roberts & Schaefer Co. for Menzies hydroseparator coal-washing equipment for cleaning egg coal; capacity, 50 tons per hour.

Mead Smokeless Coal Co., Mead, W. Va.; contract closed with the American Coal Cleaning Corporation for one Type R pneumatic separator for cleaning $\frac{3}{4}$x0-in. coal and tube-type dust-collecting system; capacity, 100 tons per hour; to be completed April 1.

West Kentucky Coal Co., Sturgis, Ky.; contract closed with the American Coal Cleaning Corporation for coal-cleaning plant, consisting of three Type R separators and tube-type dust-collecting system. Cleaning capacity will be 200 tons per hour as follows: 2x0-in. coal, 100 tons per hour; $\frac{3}{4}$x0-in. re-treatment, 70 tons per hour; and $\frac{1}{4}$x0-in. re-treatment, 30 tons per hour; to be completed June 1.

Coal Age was founded in 1911 by the Hill Publishing Co. In 1915 *Colliery Engineer,* with which *Mines and Minerals* previously had been consolidated, was absorbed by Coal Age.

When, in 1917, the Hill Publishing Co. and the McGraw Publishing Co. were consolidated to form the present McGraw-Hill Publishing Co., Coal Age became a member of this larger publishing enterprise. On July 1, 1927, the journal was changed from a weekly to a monthly.

During nineteen years the editorship has been held successively by Floyd W. Parsons, R. Dawson Hall, C. E. Lesher, John M. Carmody and Sydney A. Hale. The editorial staff of Coal Age consists of: Sydney A. Hale, R. Dawson Hall, J. H. Edwards, Louis C. McCarthy, Ivan A. Given, and A. F. Brosky.

Ord Heads Smokeless Operators

Colonel W. D. Ord, Landgraff, W. Va., president, Empire Coal & Coke Co., and a director of the National Coal Association, was elected president of the Smokeless Coal Operators' Association of West Virginia at the annual meeting held in New York City, Dec. 11. Other officers chosen at the meeting were: first vice-president, Ralph Knode, Philadelphia, Pa., president, Stonega Coke & Coal Co.; second vice-president, W. A. Richards, Bluefield, W. Va., president, Pemberton Coal & Coke Co.; secretary, Holly Stover, Washington, D. C.; and treasurer, H. R. Hawthorne, New York City, treasurer and general counsel, Pocahontas Fuel Co. Among other questions discussed at the business meeting was that of standardization of sizes.

New River Operators Elect

At the annual meeting of the New River Coal Operators' Association, held Dec. 3 at Mt. Hope, W. Va., M. L. Garvey, president, Fire Creek New River Coal Co., Charleston, W. Va., was re-elected president for the coming year. Other officers chosen at the meeting were: vice-president, R. H. Morris, general manager, Gauley Mountain Coal Co., Ansted, W. Va.; treasurer, P. M. Snyder, president, C. C. B. Smokeless Coal Co., Mt. Hope; and secretary, S. C. Higgins, Mt. Hope (re-elected).

At the business meeting, Harry Kurtz, Iron Fireman Mfg. Co., Chicago, portrayed the possibilities of an increase in the production of coal through the development and sale of stokers. Addresses also were given by R. H. Gross, president, The New River Co., and C. B. Huntress, executive secretary, National Coal Association.

Utah Complaint Dismissed

The Federal Trade Commission has entered an order of dismissal in Docket No. 1840, a complaint against the Utah Coal Producers' Association, Idaho Coal Dealers' Association, and Retail Fuel Dealers' Association of Utah. In this complaint, the Commission alleged "classification of customers" to unduly and illegally enhance the price of coal. General denial of the charges was filed by the producers' association and others involved in the case.

Asks for Trade Conference

The New River Coal Operators' Association, Mt. Hope, W. Va., has applied to the Federal Trade Commission for a trade-practice conference, to include its own members and certain coal operators and their sales agents and representatives located in central and northern West Virginia. Wrongful use of the words "New River" is alleged, and the New River association seeks to eliminate any unauthorized use by the trade-practice conference method, rather than by formal legal complaint to the Federal Trade Commission.

Washington Plans for Sherman Law Inquiry; Coal Men Divided on Modification

WASHINGTON, D. C.—For the past several years Congress, in dealing with measures to relieve certain industrial conditions, has been confronted with inhibitions imposed by the Sherman anti-trust act. Designed originally to prevent abuse of monopolies, the Sherman act has now been found to prevent particular legislation permitting restrictions that are in the public interest. In the case of the Capper-Kelly bill, for instance, which seeks to fortify independent merchants against excessive competition by chain stores, the Sherman act has been brought forth as an objection. This is because the bill proposes to permit manufacturers of trademarked articles to fix the retail price, and it is argued that such price fixing by individual manufacturers brings about restrictions in retailing which may very well come under the anti-trust act.

The matter of studying the Sherman act with a view of making modifications has now been brought to a head by statements made by the President in his recent message to Congress. After reciting commodities that are now produced wastefully and that are not properly controlled, the President suggested that an inquiry be directed especially to the effect of the workings of the anti-trust law in the particular field of natural resources, in order to determine if some of the present evils of chaotic production can be remedied without sacrifice of the fundamental purposes of the law.

One survey which, among other things, will determine the practicability of modifying the Sherman act, already has been launched by the President. This is in connection with the studies of a commission which he has appointed on timber conservation. It is realized by all who are interested in timber that an effective means of permitting the industry to exercise some control of its production is the basic question that must be solved. Other industries dealing with natural resources, therefore, are awaiting with interest the report of the timber conservation commission.

As a result of the President's recommendation, the Judiciary committees of both the House and the Senate have taken steps to appoint subcommittees to examine into the workings of the Sherman act under present conditions. The Senate Judiciary Committee has appointed a subcommittee consisting of Senators King, of Utah; Robinson, of Indiana; and Hastings, of Delaware; for the purpose of determining whether or not the Sherman Act should be modified. Senator King, chairman of the subcommittee, intends to start hearings in the near future. Representatives of the Department of Justice, delegates from labor organizations, and business and industrial leaders will be invited to testify at these hearings.

Two bills have been introduced on the Senate side dealing with the advisability of modifying the Sherman act. One of these measures was introduced by Senator McKellar, of Tennessee. After calling attention to the President's recommendations for an examination into the workings of the act, this measure proposes that the subcommittee shall determine whether or not the act should be strengthened rather than liberalized. The other resolution, which is sponsored by Senator King, merely calls for an investigation to ascertain whether the act should be strengthened or modified.

On the House side, a bill has been proposed by Representative Graham, of Pennsylvania, chairman of the Judiciary Committee, calling for a study of the

(*Turn to page* 38)

Business Sentiment Improves

"Though the death rattle of 1930 is sufficiently sweet music in everybody's ears, the finale of the rather sour symphony of the past year adds some reassuring notes," says *The Business Week* of Jan. 7. "The records of the last week of the year are much less feeble than was expected, and are in some respects more encouraging than those of 1929. Our index rose again, from 76.9 per cent of normal to 77.8 per cent. Building contracts, merchandise car loadings, steel production, and check payments have held out surprisingly well against seasonal declines that might have been much more severe at the end of a bad year.

"Basic commodity prices seem to have exhausted the possibilities of further decline. Though the tangible effects of lowered Federal Reserve rediscount rates on the bond market are still to be tested, increasing support may be expected if the usual contraction of outstanding Reserve credit is not insisted upon when the large volume of currency in circulation returns to the banks in January. Business sentiment is steadier and more alert, and the railroad consolidation news strikes a constructive note to start the new year. It is still hard to see very far into 1931, but the atmosphere is slowly clearing, and we can give 1930 a good swift kick into oblivion with more confidence that it won't return."

SENTIMENT in the bituminous coal industry is by no means unanimous for modification of the Sherman act and related statutes. While a majority of the producers indorse such a proposal, inquiry by *Coal Age* discloses the fact that there are a number of important interests in the industry that are opposed to such a move at this time. For the most part, this opposition, which has not been made public, is born of the fear that modification would mean further governmental regulation.

In the opinion of C. E. Bockus, president of the Clinchfield Coal Corporation and head of the National Coal Association, "producers should be allowed to co-operate to stabilize both production and price to the extent that such action does not result in unreasonable enhancement of profit or work an unreasonable hardship on the consumer." Reasonableness of the results attained should be the real test of the legality of the action. Where such action has been taken openly, no criminal action should be permitted "until the unreasonableness of their action had been proved and the acts continued by the producers after such a determination.

"My test of reasonableness," adds Mr. Bockus, who emphasizes that his statements are merely his own personal opinions, "would be a fair return on the capital actually invested in a business, operated at a cost, with a fair wage scale, in line with the general cost of production in that particular business in the district in which it is located."

The law should be so modified, is the way R. H. Knode, president, General Coal Co., summarizes the situation, "that the producers of any commodity could intelligently co-operate and agree, from time to time, upon a minimum price for their product, provided that such price does not exceed the average cost of production of such product, plus a reasonable profit to the producer." Existing anti-trust laws foster ruinous competition, bankrupting all "but the fittest," developing a shortage, excessive prices, and re-entry into the field of too many producers—and then another repetition of the vicious cycle.

The effect of legalizing price agreements such as suggested, states E. B. Leisenring, president, Westmoreland Coal Co., would be "the eventual elimination of high-cost companies that should really not be in business: who are today waiting for some act of God, such as war, strikes, and so forth, to bring about high prices in order to recover losses during average business years. For those companies who have an average cost, it would give more steady employment, would eliminate competitive wage reductions and would give a fair return to investors and some sort of staple future for the industry."

Legalized production and price agreements, declares H. N. Eavenson, president, Clover Splint Coal Co., would mean genuine conservation, best mining practices, safer mines; would mean that "the wage scale can be such that proper living conditions for the employees can be maintained, and that a reasonable profit be allowed for the stockholders. The reasonableness of such changes should be subject to review by the courts."

W. A. Brewerton, president, Brewerton Coal Corporation, is among those who fear "political expediencies would be opposed to complete modification of the present act." He believes, however, that a workable modification "would delegate to the Department of Justice or the Federal Trade Commission the right to license co-operative arrangements upon a showing of propriety in the plans with relation thereto—all with due regard to the right of the producers to have for their products the cost thereof, plus a fair return, and no more."

Any administrative functions necessary under modification could be discharged by the Federal Trade Commission, in the opinion of R. C. Tway, president, R. C. Tway Coal Co., who would have the law so changed that trade bureaus could act as stabilizing agents in production costs and selling prices, "so as to permit a reasonable profit to the producers, with a fair wage scale paid to the laborer." That modification should be made which would permit each district "in the interest of labor and economy, to effect an organization which would control the output and insure the miner regular employment at profitable wages," is the view taken by C. F. Richardson, president, West Kentucky Coal Co.

"I believe the repeal of the Sherman law," declares W. E. Widmer, president, Elmira Coal Co., "would remove the fetters from business as it is being conducted in this age and open the field more freely for industrial development and efficient production as demanded by modern conditions. I would suggest, if necessary to prevent the growth of monopoly, that a new law be enacted with that end in view, that will not throttle legitimate growth of trade or instill fear of law violation in men who are trying to transact legitimate business."

Coal producers ought at least to be allowed the same freedom of action accorded agricultural organizations and labor unions under the law, maintains Edward L. Stone, president, Borderland Coal Corporation. Perhaps, he suggests, co-operative organization of district producing units and consolidation of separate district selling agencies might be a way out—if the law permits.

Speaking on behalf of the Coal Trade Association of Indiana, R. H. Sherwood, chairman of the board, declares that "the bogey of the Sherman law, with its criminal penalties for violation, has rendered practically all efforts" to control cutthroat competition through co-operative marketing fruitless. "Since the Sherman law was enacted, an unquestionable change has taken place in the attitude of men in charge of industry toward the matter of price for their commodity and living standards for their employees. The soundness of the policy of high wages, steady volume of business, and moderate and regular profits is now realized by business men as never before.

"Public opinion still believes in competition as an incentive to economically conducted business, reasonable prices, and good service, but it sees the fallacy of cutthroat competition surrounding every business transaction." Congress ought to amend the law to enable natural-resource industries "to combine in a way to stabilize prices, maintain wage schedules and extract their minerals in a proper manner, just so long as no monopoly is created and the public interest is served." High wage standards and comfortable working conditions with maximum safety precautions "are difficult and often impossible when an employer is engaged in a continual race with the sheriff."

A. L. Allais, president, Columbus Mining Co., is another of the large group that believes the law should be so modified that men engaged in business may regulate their actions to secure sales prices in keeping with costs of production and a fair margin of profit. Charles A. Owen, president, Imperial Coal Corporation, indorses a resolution passed by the Smokeless Coal Operators' Association of West Virginia "suggesting that the act be amended so as to eliminate provisions for criminal prosecution for violation of those sections prohibiting contracts, agreements, and combinations in restraint of trade and that a provision be added to leave such questions to the civil courts where violations of the act may be prohibited."

"Because of the great excess of productive capacity of all business over demand, with its proportionate competitive effort in selling," remarks G. Dawson Coleman, president, Coleman & Co., Inc., "the buyer has a very harmful advantage over the seller—and uses it. The seller should be given a means of defense through understandings as to selling price with individual competitors or groups of competitors."

Changed conditions since the enactment of the Sherman law and related statutes make modification necessary, says James Bonnyman, president, Blue Diamond Coal Co. What form modification should take, however, is something which, in his opinion, can be safely decided only after careful expert study. Correction of the situation which has come about as the result of the interpretation and application of section 1 of the Sherman law, declares Landon C. Bell, counsel and member of the board of directors of the Red Jacket Consolidated Coal & Coke Co., makes the time ripe for a fresh start and a new Bill of Rights for business. Mr. Bell's outline of what such a Bill of Rights should embody appears on page 19 of this issue.

Permissible Plates Issued

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

(1) Mine Safety Appliances Co.; Type 65 rock-dusting machine; 5-hp. motor, 220 volts, a.c.; Approval 206; Nov. 12.

(2) Goodman Mfg. Co.; Types 124CJ and 324CJ slabbing machines; 50-hp. motors, 210-500 volts, d.c.; Approvals 207 and 207A; Nov. 14.

(3) Boyts, Porter & Co.; No. 6501 mine pump; 5-hp. motor, 230 volts, d.c.; Approval 208 issued to the Westinghouse Electric & Mfg. Co.; Nov. 29.

Washington Prepares for Sherman Law Inquiry

(*Continued from page* 37)

application of the Sherman act to the field of natural resources. A subcommittee of the House Judiciary Committee had not been appointed for the purpose of making the study, at the time of this writing. In addressing the House on the subject, Mr. Graham cited six points that would be covered in the investigation he proposes:

1. Consideration of legislation to aid in administration of the anti-trust act by providing a means through which the business world may be officially advised as to whether or not proposed commercial agreements are held by official authority to threaten a violation of the act.

2. Consideration of means of facilitating the administration—without change in the substantive law—for the benefit of honest business and a contribution to the prevention of violations of the law without recourse to tedious and expensive litigation by the government or private individuals.

3. By presenting the proposal in a legislative form, what lies in the mind of the country may be reduced from vague discussions and suggestions to a definite examination of the character of the Congressional authority involved and the practicability of the suggestions outlined. If Congress has the power to do a thing suggested, the question of whether or not a new administration tribunal should be established or whether the experiment should be made through the Trade Commission is a question of policy for discussion.

4. The question of whether proposals submitted should be confined to contracts and agreements or also to combinations affecting interstate commerce is a question for discussion.

5. It should, furthermore, be noted that no suggestion is made involving the existing authority of commissions dealing with special subjects, such as the Interstate Commerce Commission and the Federal Reserve Board.

6. The question of whether or not the

primary purpose of the agreement or contract is to conserve a natural resource of the United States, is a special and serious question to be presented as a part of any submitted proposal.

Two general trends of thought on the subject already are in evidence at the Capitol. A small but energetic group of Senators and Representatives, classed as independents, of both of the regular parties in all probability will take advantage of the situation by demanding that the anti-trust laws be made more severe. The second general trend that has been observed is in connection with the need for curtailed production of industries not included in the field of natural resources. Some Senators and Representatives who have only a slight interest in coal and lumber are beginning to perceive that the proposal to modify the Sherman act may redound to the benefit of industries in their own states. Particularly in the case of the textile industry is this true. The Sherman act has long constituted a bar to the working out of an effective means of preventing overproduction in the textile industry.

On the whole, it seems that sentiment in Congress is agreeable to a study of the situation. No drastic position is taken one way or the other by the majority of the members. Many of the Senators and Representatives from states having important industries dealing with natural resources are inclined to believe that the regulation of production would be a great aid to conservation. Some, however, take the view that by permitting producers to restrict output, the government would aid in squeezing out the small producers.

A few representatives from coal-producing states are apprehensive lest the proposed modifications of the Sherman act for the purpose of permitting regulation of production may in the end pave the way for restrictive regulation of the industry. Another objection that has been raised is that the regulation of production may benefit the soft-coal producers at the expense of the anthracite operators. This objection apparently is based on the reasoning that the anthracite producers already have achieved more orderly methods of production than is the case with the soft-coal mines and would lose their relatively favorable position should some of the production troubles of the bituminous industry be overcome.

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Blue Coal Decision

The right of the Delaware, Lackawanna & Western Coal Co., sales agent for the Glen Alden Coal Co., Scranton, Pa., to the exclusive use of blue as an identifying mark for coal has been upheld by the United States Patent Office, in a decision against the Blackwood Coal & Coke Co., Blackwood, Va. The Lackawanna company contended that the application of blue specks to coal mined by the Blackwood company would be confusing to the public.

Alabama Coal Men Unite to Combat Natural Gas; Regulation Issue Stressed Last Month

AN ADVERTISING campaign to last for six months has been undertaken by a committee representing 49 Alabama operators and sales companies to tell the story of the state's coal and check the inroads of natural gas. Railroads serving the coal fields have been advised of the losses faced by both the operators and the carriers because of the new competition. The first step in the educational campaign was taken with the insertion of full-page advertisements in the newspapers of the state, signed by the firms subscribing to the movement.

The Federal Trade Commission also has entered the Alabama picture to investigate charges that the fuel value of the state's coals is being misrepresented by distributors of natural gas, and D. W. Gatling, attorney-examiner of the commission, has been sent into the territory to make a survey. The Alabama Mining Institute presented documentary evidence to the commission tending to show the alleged misrepresentation.

Business and labor interests in the anthracite fields of Pennsylvania also took a stand in opposition to natural gas in December. On Dec. 18, the Scranton, Wilkes-Barre, and Hazleton Chambers of Commerce advised the bureau of public conveniences of the Pennsylvania Public Service Commission of their opposition to the Allegheny Gas Corporation's application for permission to distribute natural gas in the hard-coal region. On Dec. 19, John Boylan, president, District 1, United Mine Workers, in accordance with a unanimous resolution of the tri-district miners' executive board, filed a similar protest with the Public Service Commission. As a result of the action of the workers, the gas company filed an amendment to its application for a charter, excluding a large part of Luzerne County, including the city of Hazleton, though the new form of application provides for extension of service into several other anthracite counties.

More natural gas for sections of the anthracite region appeared to be on the way last month, with the filing of an application of the Pennsylvania Power & Light Co. with the Public Service Commission for the incorporation of a subsidiary company to supply this service. The projected company plans to produce, distribute, and sell natural gas within the territory in which the parent company now operates.

Sales of natural gas in October, as reported by the American Gas Association, totaled 37,364,813,000 cu.ft., a decline of 9 per cent from the 1929 figure. Sales for the first ten months of 1930 were 437,091,877,000 cu.ft., a loss of 1 per cent from the total of 442,078,401,000 cu.ft. in the same period in 1929. However, sales by the Allegheny Gas Corporation, a subsidiary of the Appalachian Gas Corporation, amounted to 190,715,000 cu.ft. in October, an increase of 101 per cent over the total in the same month last year. In house heating, according to the report of the American Gas Association, the number of consumers heating their houses with gas increased 10 per cent between September, 1929, and September, 1930. On the other hand, the volume of gas sold for this purpose declined 20 per cent.

Federal regulation of pipe lines has been asked by Senator Capper, of Kansas, in a bill introduced in Congress last month. The bill was introduced at the request of the Kansas Public Service Commission, and would bring "gas pipe-line agencies," their rates, charges, services, practices, rules, and regulations under complete jurisdiction of a Federal Gas Pipeline Commission, proceeding under the rules and practices established by the Interstate Commerce Commission.

In Kansas, the Public Service Commission has filed a suit in the U. S. District Court charging that the Cities Service Gas Co. maintains unreasonable and discriminatory city-gate rates at 82 towns and cities. This suit, at common law, is said to be the first of its kind. The Kansas commission has for seven years been trying to fix a rate for natural gas delivered to its cities, but has been blocked by the interstate character of the company's business. In Missouri, the same gas company has been ordered by the Public Service Commission to file a schedule of industrial gas rates for all its product delivered in the state either by itself or through any agent.

An increase of 400 per cent in natural gas rates of the Bowdoin Utilities Co. has been authorized by the Montana Public Service Commission. In the future, domestic consumers in the cities of Glasgow, Malta, and Hinsdale will pay 75c. per M cubic feet, instead of 15c. An even higher rate, the commission said, will not produce the fair return allowed upon the present valuation of the gas company.

Natural gas for Washington, D. C., has been delayed from the first of 1931 until the early spring, the Washington Gas Light Co. announced. Mains have been laid from Kentucky through Pennsylvania and a portion of Maryland, but construction delays have retarded completion.

A partial list of new natural-gas pipe lines reported in December is as follows: construction decided on—United Pipe Line Corporation, 383½ miles of 14- to 2-in. line from Jasper County, Texas, to St. Mary Parish, La.; Western Service Corporation, 100-mile line in Missouri; proposed—Public Service Corporation of Nebraska, 16-in. line from the Hugo-

Fred C. Honnold

ton field in Kansas to points in Nebraska and Wyoming; New York Oil Co., 400-mile line from Muskrat, Wyo., to Nebraska; Memphis Natural Gas Co., 12-in. line to west Tennessee towns. In addition to the above, the Chicago, Rock Island & Pacific Ry. has leased to the Continental Construction Co. the right to lay two 24-in. pipe lines along its right-of-way from Rock Island, Ill., to Chicago, a distance of 180 miles. The gas will be distributed in Chicago by the Peoples Gas Light & Coke Co.

Coal and Heating Industries Organize in Cincinnati

Formal organization of the "Cincinnati Association of Allied Solid Fuel Heating Industries," to co-operate with the Committee of Ten—Coal and Heating Industries, in the promotion of the use of solid fuels, was completed at a meeting in Cincinnati, Ohio, Dec. 4. By resolutions, the organization committee was appointed to serve as a board of directors for the purpose of electing officers and carrying on administrative affairs prior to the adoption of a constitution and a regular election. Expenses of the association will be defrayed by voluntary contributions from the members.

Glen Alden Buys Mine Interest

A one-third interest in the George F. Lee Coal Co., operating the Chauncey colliery at Plymouth, Pa., was bought by the Glen Alden Coal Co., Scranton, Pa., last month. In exchange for the third interest, the owners of the Chauncey operation were reimbursed in Glen Alden stock. George F. Lee retains management of the company which bears his name, while Charles E. Ash, vice-president and secretary, will represent the Glen Alden company on the Lee board of directors.

Honnold Resigns Illinois Post; Stuart Succeeds Him

Dr. Fred C. Honnold, Chicago, on Dec. 31 ended a notable career of 23 years in the coal industry with his resignation as secretary-treasurer of the Illinois Coal Bureau, a post he had held from August, 1928. Dr. Honnold was born in Maryville, Mo., in 1872, and was graduated from Rush Medical College in 1896. For fourteen years afterward he studied and practiced medicine in Chicago and Riverside, Ill. He first became identified with the coal industry in 1907, when he was elected secretary-treasurer of the Chicago & Big Muddy Coal & Coke Co. In the following years, Dr. Honnold was successively secretary-treasurer, Collieries Investment Co.; secretary, Illinois Coal Operators' Association; secretary, Franklin County Coal Operators' Association; district representative, United States Fuel Administration; and secretary, Coal Operators' Associations (Franklin, Saline, and Williamson Counties, Ill.).

Harold E. Stuart, Chicago, Dr. Honnold's assistant from August, 1928, succeeds him. Mr. Stuart was born in Grand Mound, Iowa, in 1880, and entered business with the Western Tube Co. From 1908 to 1928, he was credit manager, secretary, treasurer, and vice-president of the Saline County Coal Corporation and predecessor companies.

Congress Committee Canvasses Views on Mine Depletion

Although some few metal-mine operators were opposed to basing mine-depletion allowances on 33⅓ per cent of net income before depletion and after depreciation, no opposition was voiced at the hearings Dec. 9-12 before the joint Congressional Committee on Internal Revenue Taxation. Of course, those favoring the new method of calculating depletion advocate it only with the understanding that such allowances shall not be less than if calculated on the basis of cost or of value as of March 1, 1913.

After several long protracted meetings, J. F. Callbreath, secretary, American Mining Congress, Washington, D. C., declared that the tax committee had not been able to arrive at any definite decision as to the stand to take. Several persons, representatives of the metal mining industries, some of them members of the American Mining Congress, however, did appear in favor of the provision for 33⅓ per cent depletion. The same view was expressed by W. B. Reed, counsel, National Coal Association, Washington, D. C., who stated there was substantial unanimity of opinion in the coal industry in favor of the proposed method of depletion.

W. E. Hope, assistant secretary to the Secretary of the Treasury, stated that the Treasury Department does not consider the present system as "entirely ideal" and is prepared to consider percentage depletion with an open mind. B. H. Bartholow, special assistant to Secretary Mellon, however, presented a vigorous argument against a further departure from original investment as a basis for computing allowances for depletion.

Representative Bachrach cited income-tax statistics to show that the mining industry bears a smaller proportion of the income tax than any other. He could not see why the mining industry, which pays only 12 per cent, could make a good case for relief, seeing that the farming industry is paying 21 per cent. For, said Mr. Bachrach, everybody is trying to help the farmer.

Harold E. Stuart

Lambie Institute Elects

At the second meeting of the R. M. Lambie Coal Mining Institute, held at Mullens, W. Va., Dec. 6, a permanent organization was effected and the following officers were elected: president, Everett Stover, Mullens, mine inspector, 18th West Virginia district; vice-president, E. H. Horne, Arista, superintendent, Weyanoke Coal & Coke Co.; secretary-treasurer, E. R. Lynch, Wyco, superintendent, Gulf Smokeless Coal Co.; and publicity secretary, C. R. Stahl, Stotesbury, W. Va., division superintendent, C. C. B. Smokeless Coal Co.

Two committees were appointed for the purpose of studying safety in haulage and timbering. The haulage committee includes Mr. Stahl; Austin Caperton, Slab Fork, general superintendent, Slab Fork Coal Co.; G. H. Thomas, division superintendent, C. C. B. Smokeless Coal Co., Helen, W. Va.; and W. B. Crickmer, McAlpin, general superintendent, MacAlpin Coal Co. The timbering committee is made up of Mr. Horne; Milo W. Summers, Dott, superintendent, Turkey Gap Coal & Coke Co.; and R. D. Tate, Springton, superintendent, Kingston Pocahontas Coal Co.

Lewis Wins Points in Miners' Legal Battle; Cut in Illinois Hours Opposed

SEVERAL points in the legal battle between the regular United Mine Workers and the officers of the insurgent District 12, comprising the state of Illinois, were won by John L. Lewis, international president, last month. Lewis' first score was made when Judge F. W. Burton, of the Sangamon County (Ill.) Circuit Court upheld counsel for the international president and his provisional officers and rejected attempts of the insurgents to serve papers by publication on officials of the Lewis group residing outside the state of Illinois in the legal action to determine control of the Illinois miners. Later, following cross-objections to the Sangamon County justices, Judge Jones granted Lewis a change of venue, selecting Judge Harry Edwards, Dixon, Ill., to try the injunction suit against the Lewisites on its merits.

Aside from the court fight, other developments in Illinois in December included a proposal from Harry Fishwick, retiring president, District 12, that the operators and miners agree to a shorter working day and working week to help the unemployment situation in the coal fields. This proposal, made on Dec. 23, was declined by the Illinois Coal Operators' Labor Association on Dec. 30, for the reasons that such action would give little real relief and, further, would increase production costs, thus allowing foreign coals to take over still more of the natural market of the producers.

Insurgents in Illinois held their annual election in December, choosing the following officers: president, John H. Walker, who succeeds Harry Fishwick, retired; vice-president, Fox Hughes; secretary-treasurer, Walter Nesbit. In Iowa, official returns from District 13, a part of the territory controlled by the Lewis group, showed the following to be elected: president, Frank D. Wilson; vice-president, Thos. McCully; secretary-treasurer, Alf Hjort (re-elected); international board member, Neal Crook. In the regular District 11, none of the candidates obtained the necessary majority for election, with the result that a run-off election between the leaders will be held Jan. 13. John L. Lewis, Indianapolis, Ind., was re-elected to his sixth term as international president of the United Mine Workers in December. He with Philip Murray, Pittsburgh, Pa., vice-president, and Thomas Kennedy, Hazleton, Pa., secretary-treasurer, were unopposed.

Miners and operators in Indiana appointed John P. White, Des Moines, Iowa, to decide questions of contract between District 11 and the Indiana Coal Operators' Association, according to the terms of the wage agreement adopted early last year. Early in January, the district headquarters of the miners sent out a notice to all local unions reminding them that a scale convention would meet in Terre Haute on Jan. 26. On Feb. 3, the joint scale committee of the operators and miners will meet in Terre Haute to discuss a new one-year wage agreement to replace the present pact, expiring March 31, 1931.

Work was generally resumed at mines in the strike area in western Kentucky on Dec. 8, though not without considerable disturbance, dynamiting, and bushwhacking. On the whole, however, the miners seemed anxious to get back to their jobs after a suspension lasting from April 1. One operation, the Dempster Coal Co., brought suit against the United Mine Workers for $25,000 damages, charging conspiracy to compel the employment of union labor exclusively.

In the Kanawha field in West Virginia, state police were called out for service at the operations of the F. & G. Coal Co., Whitesville, after strikers had made threats of violence. Between 40 and 50 men, or about half the working force, walked out late in December following a wage dispute. A few days later, however, officials of the insurgent United Mine Workers asserted that they had negotiated a settlement with the coal company embodying the following terms: recognition of the right of the miners to belong to the union, and to set up a mine committee for the presentation of grievances; reinstatement of the men to their former positions without discrimination; and restoration of the old wage scale on Jan. 1.

British and German Miners Stage Strikes

Failure of the miners and owners in Great Britain to agree on the application of the provisions of the British Coal Mines Act resulted in a strike in South Wales Jan. 1. The walkout, involving about 145,000 men, resulted from the owners' insistence on a one-sixteenth reduction in daily wages upon adoption of a 7½-hour day, as provided by the Coal Mines Act. A temporary agreement had previously been entered into pending settlement of the controversy, which expired Dec. 31. Upon failure of the negotiations for a permanent pact, the miners were ordered to strike on Jan. 1.

On Jan. 3, a conference of owners' and labor representatives failed to find a way out of their differences, with the result that the miners carried the question to Prime Minister McDonald on Jan. 5. In the meantime, the dispute showed signs of spreading to Warwickshire, where the miners refused to accept the "spread-over" provision in the act insisted on by the coal companies. On Jan. 7, government officials and South Wales owners and miners reached a basis of discussion, and agreed to meet again on Jan. 9 in an attempt to settle the Welsh controversy.

Miners at twenty collieries in the Ruhr coal field of Germany struck on Jan. 2 as a result of dissatisfaction over an order dismissing 300,000 men on Jan. 15. After that date, according to the order, they would be re-employed only at a reduced wage. It was estimated that only 11 per cent of the total number working walked out, allegedly as a result of Communist activities. Considerable violence is accompanying the stoppage.

Finish West Virginia Appraisal

Appraisal of 99 coal companies in northern West Virginia was completed last month as a preliminary step in grouping them under the management of two or three operating companies, one of which will be the newly incorporated Three Cities Fuel Corporation. Directors of the Three Cities company will select those operations which they will take over, and the others will be grouped under other operating companies yet to be formed.

Wages to Be Studied

A study of wages in the bituminous coal industry has been started by the Bureau of Labor Statistics of the Labor Department. It is expected that the field work will be completed by the middle of March and that the findings of the study will be tabulated and ready for distribution by June. The last study made by the department of wages in the bituminous industry was in 1928. This material will be brought up to date by means of the present study.

West Virginia Blast Kills Eight

An explosion in the Glen Rogers (W. Va.) mine of the Raleigh-Wyoming Mining Co. on Jan. 6 killed eight men of a total of 48 at work. The operation normally employs 450 men. Rock dust was credited with stopping the spread of the explosion and confining it to two or three working places in one section. The cause, while not yet determined, was thought to have been an ignition of gas.

To Correct a Mistake

Through error, it was stated in the October, 1930, issue of *Coal Age* (p. 627) that M. H. Forester was supervisor of supplies for the Consolidation Coal Co., Fairmont, W. Va. This is incorrect, as Mr. Forester is actually manager of inspection, while J. W. Beavers, whose name was omitted, is in charge of supplies.

Taxes and Better Mining Practice Canvassed by Mining Congress

FOR tenseness of excitement nothing in the meeting of the American Mining Congress held Dec. 4-6 at Washington, D. C., exceeded the adjourned session on tax depletion. The afternoon session had deferred action on the proposed 33⅓ per cent tax depletion pending advice from the National Tax Committee.

In the evening the session reassembled, and about midnight, after many amendments, the accountants, engineers, and managers reached a decision. They would rather not have any 33⅓ per cent depletion, but if they must have it, it must not only not jeopardize all the old forms of depletion but must not prevent the establishment of a new form of depletion based on new discoveries of minerals. However, nothing about this new type of depletion appeared in the resolution.

As the coal people apparently can have no new discoveries—at least the court refused it in one case—J. D. Zook, president, Illinois Coal Operators' Labor Association, worked valiantly in favor of the 33⅓ per cent depletion. Coal men there are who favor other forms of charging up the exhaustion of mineral in mining, forms that will enable them to get in a good year, some of the depletion of which they were deprived in the two bad years preceding, due to the fact that they had little or no net income on which depletion could be operative, but even they are protected if all the old options are kept open. Many of the metal-mine accountants were insistent that they did not want the 33⅓ per cent, but if they got it they did not want it in lieu of the new discovery basis of depletion which they hope to obtain.

At the taxation meeting of the morning of Dec. 5, Senator Callahan presided and John T. Keenan, valuation engineer, Internal Revenue Bureau, discussed the depreciation study now being made by the Bureau, not, he said, to hamper the taxpayer but to help the Bureau's valuation engineer who may one day be "checking the computation of your deduction on account of depreciation on mining machinery and other equipment" and "may tomorrow be working on the return of a shoe manufacturer." Even when established, the depreciation allowances would still be subject to exemption where unusual conditions existed.

H. B. Fernald, Loomis, Suffern & Fernald, New York City, discussed the "Inconsistencies in Tax Decisions." He condemned the requirement that the oath be made by an officer of the company instead of by someone having real knowledge of the accounts and of the return. He said the form of the taxation law was made extremely simple, but nearly always misleading. Every provision for filling in the return is effective except as to provisions found elsewhere in the act. This is just where the text leaves a pitfall for the unwary.

Hale Hill, tax department, Jones & Laughlin Steel Corporation, defended the Department of Internal Revenue. He said that both in the 30-day and in the 60-day letter exceptions were taken to each item in the return presented. Mr. Fernald replied that this was often, if not usually, the case, but that the Tax Commissioner did this of courtesy and not of right. Sometimes he does, and sometimes he does not, give his detailed conclusions. The conferee may give opinions, but they are not valid till reviewed by the Review Division and signed by the Commissioner.

At the business meeting Dec. 5 J. B. Warriner, president, Lehigh Navigation Coal Co., Lansford, Pa.; Erskine Ramsay, chairman of the board, Alabama By-Products Corporation, Birmingham, Ala.; E. A. Bendelari, president, Eagle-Picher Lead Co., Chicago; D. D. Moffat, vice-president, Utah Copper Co., Salt Lake City, Utah; J. B. Putman, Pickands, Mather & Co., Cleveland, Ohio, were elected directors.

At a meeting of the board of directors, S. Livingston Mather, president, Cleveland-Cliffs Iron Co., Cleveland, was elected president; Mr. Bendelari first vice-president; Mr. Warriner, second vice-president; J. T. Skelley, vice-president, Hercules Powder Co., Wilmington, third vice-president; J. F. Callbreath, Washington, D. C., secretary. Mr. Mather, L. S. Cates, vice-president, Phelps-Dodge Corporation, New York; R. E. Tally, president, United Verde Copper Co., New York, form the executive committee.

The stabilization conference, planned for the last day, was not held, nor was the scheduled discussion on the useful life of mining structures and equipment. Five standardization sessions were held for the separate consideration of safety rules for installing electrical work in metal mines, a safety code for coal-mine transportation tracks, locomotives and mine drainage, and a general conference on the advisability of preparing coal-mine fire-fighting and fire-prevention standards and standards for coal-mine cars.

Rule 2403 in the proposed Transportation Safety Code for Coal Mines was ordered deleted. This rule reads: "Gathering Locomotives — Permissible electric storage battery, cable reel, crab reel, and combination types of locomotives used for gathering in gassy mines shall be of explosion-proof type of construction, and cable-reel locomotives shall be equipped with twin conductor cable." So much objection was raised by the U. S. Bureau of Mines to the use of any other than electric storage-battery haulage equipment in gassy mines that it was adjudged well to omit all reference to the conditions under which the first or all equipment might be used. The sentence, "Trolley locomotives have been forbidden in gassy mines in Canada; Par. 66, page A-18 of Handbook, A.M.C.," was transferred to Rule 2402 with the words, "and also in several European countries." The other changes made were merely of an elucidatory character.

At the final conference some opposition developed to terming any standards relative to fire-fighting methods, "recommended practices." R. L. Ireland, Jr., general manager, Wheeling & Lake Erie Coal Co., Cleveland, Ohio, said that such practices were so dependent on conditions that any uniformity of rules was undesirable and in presence of a fire no one wanted to be confronted with a set of rules drawn up without reference to the specific exigencies of the situation. J. M. Hadley, standardization engineer, American Mining Congress, Washington, D. C., said that if "recommended practices" was a wording of dangerous purport, the fact should long ago have been discovered, for it had been used without harm for many years.

With regard to mine cars Mr. Hadley said there was $200,000,000 worth of coal-mine cars in use, but conditions were chaotic. One manufacturing concern had made cars to 1,500 designs and never made the same car for two companies. One participant said a standard car could not be designed, but something could be attempted as to standardization of details. Others declared that the car companies had given up an attempt to standardize cars as a whole and were merely trying to arrive at standards for car parts. D. Harrington, U. S. Bureau of Mines, Washington, D. C., denounced the bottom-dump car, which leaked coal on the track. His preference was for the rotary dump. W. E. Meyer, engineer, Enterprise Wheel & Car Corporation, Bristol, Va.-Tenn., said that many attempts had been made to reach a standard, but without result. The meeting, however, concluded that both standards should be attempted, though the pronouncements as to fire fighting should be only "optative" or "elective" and not "recommended practices."

Taggart Heads Committee

Ralph E. Taggart, vice-president, Stonega Coke & Coal Co., Philadelphia, Pa., has accepted the chairmanship of the program committee for the eighth annual convention of practical coal-operating men and exposition of machinery, to be held in Cincinnati, Ohio, the week of May 11, under the auspices of the Manufacturers' Division of the American Mining Congress. As in previous years, L. E. Shugg, of the General Electric Co., Schenectady, N. Y., will act as director of exhibits. E. R. Coombes, assistant of the secretary of the congress, will be secretary of the program committee and will have charge of general arrangements for the convention and exposition.

Obituary

ERNEST C. PRATT, 61, president, Cartersville & Herrin Coal Co., died Dec. 28 at his home in Glencoe, Ill., of pneumonia. Mr. Pratt began his business career as a newspaper man in 1899, and first became identified with the coal industry in 1906 as Northwestern sales agent for the Zeigler Coal Co. In 1917, he organized Pratt Bros., later affiliated with the Phoenix Coal & Coke Co. At the time of his death, Mr. Pratt also was president of the Phoenix company and the Zap Colliery Co.

CHARLES A. BROOKS, Carolina, W. Va., a fireboss at Mine 86 of the Consolidation Coal Co., died of heart failure while making his rounds on Dec. 21. Mr. Brooks, who was 64, was a former superintendent of mines for the Consolidation company.

WILLIAM B. WILLIAMS, 75, general superintendent, Utah Fuel Co., Salt Lake City, Utah, died early last month after nine years of service with the company. Mr. Williams was originally an anthracite man, and before going with the Utah Fuel Co. was general manager of a Missouri coal company.

JOHN INGRAM, 62, mine foreman, Truesdale colliery, Glen Alden Coal Co., died at his home in Nanticoke, Pa., Dec. 28, of pneumonia. Mr. Ingram came to this country from Wales at the age of 17.

THOMAS P. DAVIS, superintendent of the Wadesville colliery of the Philadelphia & Reading Coal & Iron Co., Wade, Pa., died at his home in St. Clair, Pa., Dec. 16. Mr. Davis came to this country from Glamorganshire, South Wales, while still a boy. He was employed at a number of anthracite collieries before going with the Reading company on Jan. 1, 1929.

ERNEST CHILSON, 61, vice-president of the Raleigh Coal & Coke Co., Raleigh, W. Va., died at his home in that city, Jan. 4. Mr. Chilson was born in Williamsport, Pa., and his early business career was spent in construction work in Ohio.

Personal Notes

A. S. BODEN, Aberdeen, S. D., traffic manager of the Aberdeen Chamber of Commerce, has been named as traffic manager of the Western Pennsylvania Coal Traffic Bureau, vice A. B. McElvany.

JOHN O'HARA, Collinsville, Ill., has been appointed mine inspector for Madison County, succeeding William H. Stone, Edwardsville, Ill.

JOHN B. MARKS has been elected vice-president and a member of the board of directors of the Independent Coal & Coke Co., Salt Lake City, Utah, vice the late Louis H. Farnsworth. Mr. Marks was formerly general manager of the company, and will retain this position.

C. A. GIBBONS, formerly safety engineer for the New England Fuel & Transportation Co., Grant Town, W. Va., has been made general manager of the Susquehanna Collieries Co. and the Lytle Coal Co., succeeding the late D. V. Randall. Mr. Gibbons, who will make his headquarters in Wilkes-Barre, Pa., has served with a number of bituminous companies, including the Koppers Coal Co., Pittsburgh Terminal Coal Co., and Coal River Collieries Co.

Coming Meetings

Fifth Midwest Power Engineering Conference and fourth National Fuels Meeting of American Society of Mechanical Engineers, Feb. 11-14, Chicago.

Eastern Ohio Coal Operators' Association; annual meeting, Feb., 9, Cleveland, Ohio.

American Wood Preservers' Association; annual meeting, Jan. 27-29, Benjamin Franklin Hotel, Philadelphia, Pa.

American Institute of Mining and Metallurgical Engineers; annual meeting, Feb. 16-19, 29 West 39th St., New York City.

Engineers' Society of Northeastern Pennsylvania; thirty-seventh anniversary banquet, Jan. 29, 7 p.m., Hotel Casey ballroom, Scranton, Pa.

King Coal's Calendar for December

Dec. 1—Ninety thousand miners in Scotland go out on strike in protest against the owners' contention that the "spread-over" clause in the British Coal Mines Act must be accepted, together with a reduction in wages to accompany the cut in working time per day.

Dec. 2—President Hoover, in his message to Congress, advocates an inquiry into some aspects of the Sherman anti-trust law, citing the ills of the bituminous coal industry as a case where the uncontrolled sway of competition has resulted in hardship for the workers and waste of natural resources.

Dec. 5—The Lewis faction of the United Mine Workers gained a point in the legal controversy with insurgent officials over the control of the Illinois miners when Judge F. W. Burton, of the Sangamon County (Ill.) Circuit Court upheld the contentions of counsel for the Lewis group and quashed service by publication, thus releasing all officers of the regular organization residing outside the state of Illinois. Judge Burton's action reduced the number of defendants in the insurgent suit to four, including Lewis and three Illinois provisional officers.

Dec. 5—A conference of delegates from the various districts of the British Miners' Federation by a small margin decides against a national stoppage in the coal fields of Great Britain. No decision on the "spread-over" clause in the Coal Mines Act was reached and no action interfering with temporary agreements made on the "spread-over" basis was taken.

Dec. 6—Ninety thousand miners in Scotland return to work under the terms of a temporary agreement providing eleven eight-hour working days every fortnight and no reduction in wages.

Dec. 9—Executive committee of the Miners' Internationale, at a conference in Berlin, Germany, demands that the League of Nations resume efforts to solve the coal problem in Europe, with special attention to the development of anti-dumping regulations. The conference was attended by delegates from Austria, Belgium, Czechoslovakia, England, France, Germany, Holland, and Sweden.

Dec. 13—Welsh coal miners vote to accept a three-months agreement with the owners to give the industry an opportunity to place in effect its reorganization schemes under the provisions of the British Coal Mines Act. The truce was voted with the understanding, however, that there would be no reduction in wages.

Dec. 18—Scranton, Wilkes-Barre, and Hazleton (Pa.) chambers of commerce file formal protest with the Pennsylvania Public Service Commission against the application of the Allegheny Gas Corporation for permission to supply natural gas to the anthracite region.

Dec. 19—Judge Norman L. Jones, of the Sangamon County (Ill.) Circuit Court, grants a change of venue to the Lewis group of the United Mine Workers, who are defendants in the suit brought by the officers of the insurgent District 12 to prevent interference in the affairs of the Illinois union. Judge Harry Edwards, Dixon, Ill., was named to hear the final argument on the merits of the controversy. Previous decisions were confined to questions of jurisdiction.

Dec. 19—John Boylan, president, District 1, United Mine Workers, in accordance with a resolution passed by the tri-district executive board, covering the anthracite fields of Pennsylvania, files a formal protest with the Pennsylvania Public Service Commission against the application of the Allegheny Gas Corporation for permission to supply natural gas to the hard-coal fields.

Dec. 23—Harry Fishwick, insurgent president of District 12, United Mine Workers, requests members of the Illinois Coal Operators' Labor Association to agree to a curtailment of working hours and a reduction in the number of working days per week as a means of reducing unemployment in the Illinois coal fields.

Dec. 29—Alabama operators begin a six-months advertising campaign to tell the story of Alabama coal and check the inroads of natural gas with full-page newspaper advertisements. Forty-seven operating and sales companies join in the campaign.

Dec. 30—Illinois Coal Operators' Labor Association declines to agree to a reduction in working hours per day and working days per week to reduce unemployment in Illinois coal fields, as suggested by Harry Fishwick, president of District 12 of the insurgent United Mine Workers. The association pointed out that such a move would give no real relief and that the resulting increase in production cost would allow still more out-of-state coal to enter the natural markets of the producers.

Dec. 31—Miners' Federation orders a strike of 145,000 miners in the South Wales coal field of Great Britain, to begin Jan. 1. The action resulted from the refusal of the owners to agree to abandon plans for a cut in wages to accompany a reduction of working hours to 7½ per day, as provided in the British Coal Mines Act.

Coal-Mine Death Rate Rises in November; Accidents Kill 219 Men

REPORTS received by the U. S. Bureau of Mines from state mine inspectors, for November, 1930, showed that 219 men were killed in the coal mines of the United States during the month, an increase of 25 over the preceding month and 33 over November, 1929. On the other hand the production of coal decreased, the output of 43,329,000 tons in November being 8,397,000 tons less than in October and 9,005,000 tons less than in November a year ago. The larger number of fatalities accompanied by a smaller output of coal resulted in a higher death rate per million tons in November than in the same month last year or in October, 1930. The November rate was 5.05, as compared with 3.55 for November, 1929, and 3.75 for October, 1930. The increase in the rate for the industry as a whole was chargeable entirely to bituminous mines, as the anthracite mines had fewer fatalities in November than in either of the previous months to which reference has been made.

Reports for bituminous mines alone showed that accidents at this class of mines resulted in a death rate of 5.12, based on 195 fatalities and a production of 38,122,000 tons. This rate indicated an increase of 55 per cent over the rate for October, of the same year, and 72 per cent over the rate for November, 1929. The October record was 146 fatalities and 44,150,000 tons, and that for November a year ago was 138 deaths and a production of 46,514,000 tons.

Twenty-four deaths occurred at anthracite mines in November, 1930; the output of coal was 5,207,000 tons, hence the rate was 4.61 per million tons. During the corresponding month a year ago there were 48 deaths and 5,820,000 tons of coal produced, which indicated a death rate of 8.25. In October, 1930, the death rate was 6.34, based on 48 deaths and 7,576,000 tons.

Reports for the eleven months, January to November, of the present year showed a total of 1,863 deaths, as compared with 1,946 for the corresponding period of 1929. During these periods 485,630,000 tons were mined in 1930 and 554,394,000 tons were produced in 1929. While there was a decrease of 83 deaths, there was a larger proportionate decrease in the quantity of coal mined, which resulted in an increase in the fatality rate for the 11-month period of the present year. The rates were 3.84 for 1930 and 3.51 for 1929. Bituminous mines considered separately, also had a higher rate in 1930, but the rate for anthracite was slightly lower.

There were two major disasters—that is, disasters in which five or more lives were lost—during November, 1930. These were explosions, one at Millfield, Ohio, on Nov. 5, which caused 82 deaths, and one at Wilburton, Okla., which resulted in the loss of 15 lives. During the period from January to November, 1930, there were 11 major disasters which resulted in 223 deaths. For the same months in 1929, there were 5 major disasters, causing the death of 83 men. Based exclusively on these major disasters, the fatality rates per million tons of coal produced during the two 11-month periods were 0.150 last year and 0.459 this year.

Comparative rates for the 11-month periods in 1929 and 1930 are as follows:

Cause	1929	Jan.-Nov., 1929	Jan.-Nov., 1930
All causes	3.592	3.510	3.836
Falls of roof and coal	1.941	1.953	2.020
Haulage	.678	.664	.570
Gas or dust explosions:			
Local explosions	.082	.083	.126
Major explosions	.238	.139	.430
Explosives	.145	.146	.142
Electricity	.133	.137	.140
Miscellaneous	.375	.388	.408

Blasting Device Approved

One blasting device was added to the active permissible list of such equipment by the U. S. Bureau of Mines in November. Approval No. 4 was granted to Cardox, Model C, manufactured by the Safety Mining Co., Chicago. Length of shell is 38 13/16 in. and its diameter is 2½ in. Maximum weight of heater ingredient for ⅛-, 3/16-, and ¼-in. disks is 140 grams. Maximum and minimum weights of the carbon dioxide charges for the above disk thicknesses are, respectively, 2.75 and 1.9 lb.

Coal Mine Fatalities During November, 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	1						1					2													2	3
Alaska																									0	0
Arkansas																									0	2
Colorado	2	1	1									4										1		1	5	6
Illinois	6		2		1							9													9	8
Indiana	2		1				1					4													4	2
Iowa	2											2								1			1	2	4	2
Kansas	1		1									2													2	0
Kentucky	7		4									11													11	14
Maryland																									0	0
Michigan																									0	0
Missouri																									0	3
Montana																									0	2
New Mexico				3								3													3	0
North Dakota																									0	0
Ohio	4		2	79					1			86													86	5
Oklahoma				15								15													15	3
Pennsylvania (bituminous)	10	4	1		1		2					18													18	31
South Dakota																									0	0
Tennessee	2		1									3													3	0
Texas																									0	0
Utah	1						1					2													2	6
Virginia	1											1													1	5
Washington																									0	1
West Virginia	15	5	5									25				1	1	1					1	2	28	45
Wyoming		2										2													2	0
Total (bituminous)	54	12	18	97	2		5		1			189				1	1	1		1		1	2	5	195	138
Pennsylvania (anthracite)	9	4	2	1	3						2	21						1			1		1	3	24	48
Total, November, 1930	63	16	20	98	5		5		1		2	210				1	1	2		1	1	1	3	8	219	
Total, November, 1929	97	27	32	4	7		5	1	1		5	179	1				1	2	1			1	2	6		186

Demographical Division Created

W. W. Adams, Washington, D. C., has been made chief statistician of the newly formed demographical division of the health and safety branch of the U. S. Bureau of Mines. This division will conduct statistical studies regarding the health, safety, and welfare of persons employed in the mineral and related industries, and also will carry on the work of the accident statistics section of the mineral statistics division of the Bureau. Mr. Adams first went with the Bureau in 1911, and in 1920 was placed in charge of the statistical work relating to accidents in the mineral industries.

Coincident with the formation of the demographical division, Dr. O. E. Kiessling, Washington, was appointed chief economist of the mineral statistics division of the Bureau. Dr. Kiessling, who succeeds Frank J. Katz, deceased, has been connected with the Bureau since 1927 as a member of the staff of the economic branch.

Industrial Coal Reserves Rise

Stocks of anthracite and bituminous coal in the hands of industrial consumers in the United States and Canada on Dec. 1 were 34,162,000 net tons, according to the monthly report of the National Association of Purchasing Agents. This figure is equivalent to 33 days' supply, based on the November consumption of 30,884,000 net tons. Stocks and consumption remained about constant in November, as compared with October.

Winding Gulf Operators Elect

At the annual meeting of the Winding Gulf Coal Operators' Association, held at Beckley, W. Va., last month, W. A. Richards, Bluefield, W. Va., president, Pemberton Coal & Coke Co., was re-elected president for the coming year. P. C. Graney, Mt. Hope, W. Va., general manager, C.C.B. Smokeless Coal Co., was again chosen vice-president, and A. W. Laing, Charleston, W. Va., vice-president, MacAlpin Coal Co., was re-elected secretary-treasurer.

N.C.A. and Mine Chiefs Confer On Safety Program

Chiefs of eight state mine departments and a committee of the National Coal Association, meeting at Washington, D. C., on Dec. 5 to formulate an accident-prevention program, suggested safety institutes in every producing field and a nation-wide exchange of information as a means of cutting down injuries to mine workers. These plans and others will be taken up by the association committee at a meeting in Chicago, Jan. 15, where a definite line of action will be shaped for presentation to the mine chiefs at a meeting in Washington at the last of January.

Officials attending the Dec. 5 conference were: Dan Harrington, Washington, chief safety engineer, U. S. Bureau of Mines; Wm. Boncer, Richmond, Va.; John F. Daniel, Lexington, Ky.; Albert C. Dally, Indianapolis, Ind.; Walter H. Glasgow, Harrisburg, Pa.; W. B. Hillhouse, Birmingham, Ala.; John G. Millhouse, Springfield, Ill.; J. J. Rutledge, Baltimore, Md.; and E. W. Smith, Columbus, Ohio.

The operators were represented at the Washington meeting by Milton H. Fies, DeBardeleben Coal Corporation, Birmingham, Ala.; C. W. Connor, American Rolling Mill Co., Ashland, Ky.; R. V. Clay, Hanna Coal Co., Cleveland, Ohio; George Dunglinson, Jr., fuel department, Norfolk & Western Railway, Bluefield, W. Va.; W. B. Lewis, Oakdale Coal Co., Denver, Colo.; and Lee Long, Clinchfield Coal Corporation, Dante, Va.

Washington Institute Meeting Scheduled for January

The fourth annual Mining Institute conducted by the College of Mines, University of Washington, will be held at Seattle, Wash., the week of Jan. 19. The program will consist of a series of lectures and addresses by men in the mining industry, supplemented by experimental work in mining, metallurgy, ore dressing, coal washing, and clay working in the Mines Laboratory and trips to operations in the vicinity. On Jan. 21, the institute will meet at dinner with the North Pacific Section, A.I.M.E., at which time N. D. Moore, vice-president, Pacific Coast Coal Co., Seattle, will analyze the fuel situation in the Pacific Northwest under the title "Trends of the Fuel Industry."

Industrial Notes

ILLINOIS STOKER CO., Alton, Ill., has opened an Eastern office at 30 Church St., New York City, in charge of Alex Girtanner.

F. W. PEEK, JR., consulting engineer for the General Electric Co., has been made chief engineer of the Pittsfield (Mass.) works. The General Electric Co. has co-ordinated its various plastic activities into one department, known as the plastic department, responsible for the sales, engineering, and manufacturing of these products. R. E. COLEMAN has been made manager, with an advisory committee consisting of vice-presidents J. O. BARRY, W. R. BURROWS, and C. E. EVELOTH.

STOKER BOY SALES CORPORATION, with headquarters at the Straus Building, Chicago, has been formed to distribute nationally the "Stoker-Boy" automatic domestic stoker, F. R. Craig, president of the Pettigrew Foundry Co., Harvey, Ill., manufacturer of the equipment, announces.

CLAXTON E. ALLEN, formerly manager of the Southwestern district of the Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., has been elected commercial vice-president to co-ordinate sales activities in domestic appliances, such as refrigerators and radios. Mr. Allen has been associated with the Westinghouse company since 1909.

MANUFACTURING operations of the Fuller Lehigh Co., a subsidiary of the Babcock & Wilcox Co., New York City, have been removed from Fullerton, Pa., to the Barberton (Ohio) works of the parent company. Management, sales, and engineering departments of the Fuller Lehigh company will move to New York City and the corporate identity of the company will be maintained. E. G. BAILEY, president of the subsidiary, has been elected a vice-president of the Babcock & Wilcox Co.

UNITED CONVEYOR CORPORATION, Chicago, has opened an office at 101 Park Ave., New York City, in charge of J. J. MCNULTA.

HERCULES POWDER CO., Wilmington, Del., has formed a new foreign relations department, which will be in charge of PETER W. MEYERINGH, formerly manager of the N. V. Hercules Powder Co., Rotterdam, Holland. The department will co-ordinate sales abroad.

JAMES K. AIMER has been made assistant general manager of sales of bar iron, billet, and railroad, locomotive, and car equipment for the Reading Iron Co., with headquarters at 230 Park Ave., New York City. Mr. Aimer, who also will have charge of the sales of charcoal-iron boiler tubes, succeeds G. H. WOODROFFE, metallurgical engineer. Mr. Woodroffe will now handle complaints and serve in an advisory capacity to the general sales organization.

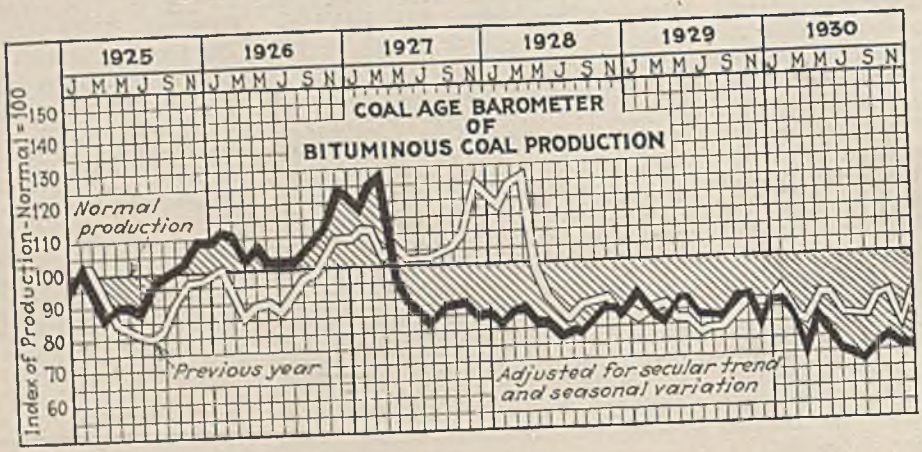
TRUMBULL ELECTRIC MFG. CO. announces that the name of the A. G. Electric Mfg. Co. has been changed to the Trumbull Electric Mfg. Co., Pacific division, with manufacturing plants at Seattle, Wash., and Los Angeles, Calif. Headquarters of the Pacific division will be at 432 Fourth St., San Francisco, Calif., under the management of H. F. YOST. Mr. Yost will have charge of the distribution of Trumbull products in California, Washington, Oregon, Montana, Utah, Idaho, Wyoming, Arizona, Nevada, and western Canada.

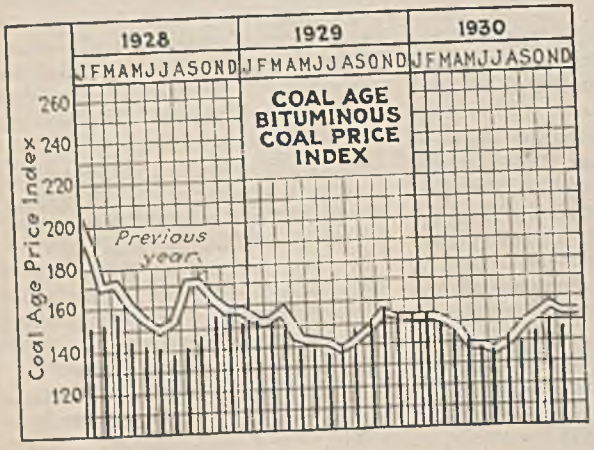
UNITS of the Carbide & Carbon Corporation manufacturing products used mainly in oxyacetylene welding and cutting will in the future market their products, including oxygen, carbide, Prest-O-Lite dissolved acetylene, and Oxweld, Prest-O-Weld, and Pyrox apparatus and supplies, through the Linde Air Products Co.

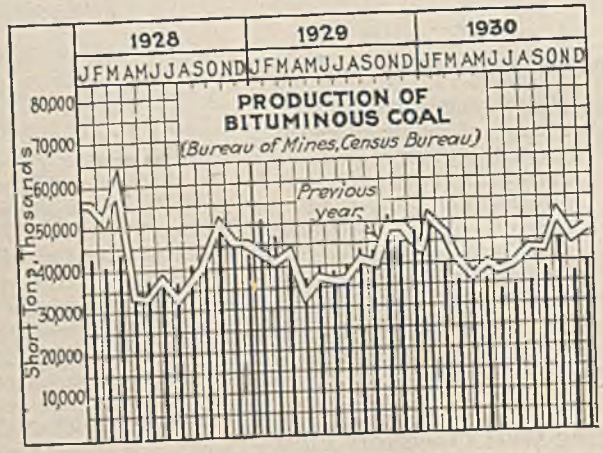
HARRY S. RANSOM, special representative of the sales and engineering department, has been made manager of sales for the Fort Pitt Steel Casting Co., McKeesport, Pa.

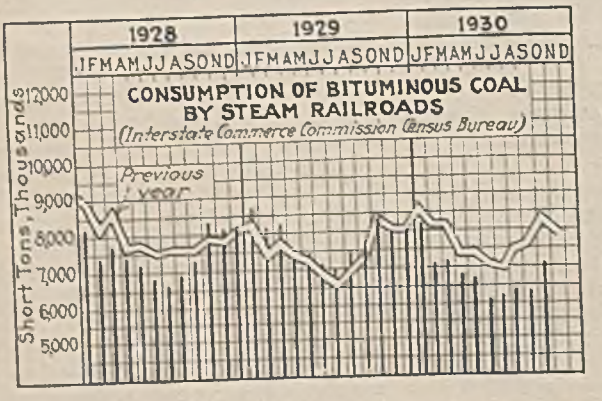
PANGBORN CORPORATION, Hagerstown, Md., has opened district sales offices in Cincinnati, Ohio, and Milwaukee, Wis. THOMAS J. DOUGHERTY has been appointed a special sales engineer to cover the Hagerstown district.

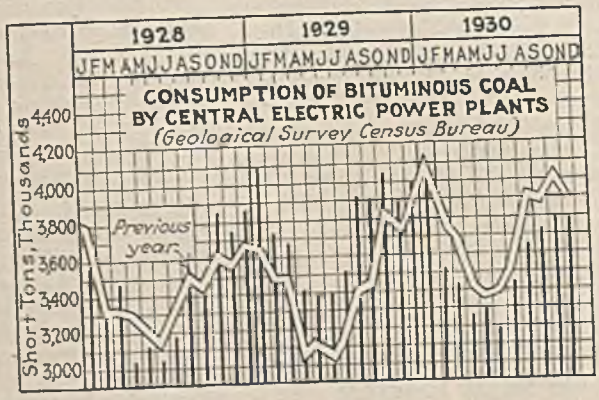
Indicators of Activities in the Coal Industry

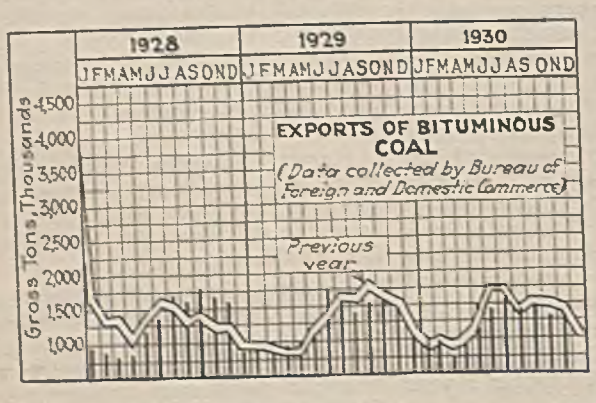


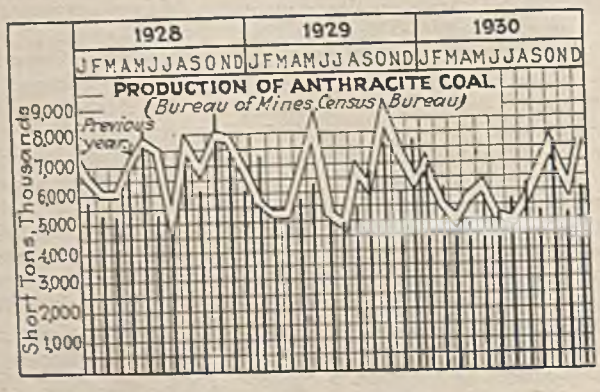












MARKETS in Review

QUIETNESS featured the demand for domestic lump in the bituminous markets of the country in December. This condition resulted in numerous curtailments in production, with the result that intermediate sizes —egg and nut in particular—moved into a much stronger position than they have occupied in recent months. Reduction in output also decreased the available supply of slack and screenings to a point where it failed to come up to the demand. Consequently, price increases on these sizes were reported in a large majority of the consuming centers.

December production of bituminous coal is estimated by the U. S. Bureau of Mines at 39,716,000 net tons, an increase of 1,054,000 tons over the November production but a decrease of 7,330,000 tons from the total in December, 1929. Anthracite production is estimated at 6,150,000 net tons for December. This compares with 5,207,000 tons in the preceding month and 7,377,000 tons in December, 1929.

Shippers of the country, through estimates submitted to regional advisory boards, anticipate a decrease of 3.8 per cent in shipments of coal and coke in the first quarter of 1931, as compared with the total in the same period in 1930. Total car loadings of coal and coke for the first quarter in 1931 are expected to be 2,379,632, against the 1930 figure of 2,473,227.

Coal Age Index of spot bituminous prices (preliminary) was: 146, Dec. 6; 145, Dec. 13; and 147, Dec. 20 and 27. Corresponding weighted average prices were: $1.77, Dec. 6; $1.76, Dec. 13; and $1.78, Dec. 20 and 27. Revised Index figures for November were: 147, Nov. 1 and 8; 146, Nov. 15; 147, Nov. 22; and 148, Nov. 29. Corresponding weighted average prices were: $1.78, Nov. 1 and 8; $1.77, Nov. 15; $1.78, Nov. 22; and $1.79, Nov. 29. The monthly Index for November was 147, as compared to the unrevised figure of 146¼ for December.

Total dumpings at the lower lakes failed to come up to last year's record. By classes, the 1930 figures were as follows: cargo, 36,839,923 tons; fuel, 1,320,553 tons; total, 38,160,476 tons. In 1929, the dumpings were: cargo, 37,933,249 tons; fuel, 1,450,593 tons; total, 39,383,842 tons.

In spite of cold weather, the anthracite markets of the country went through a quiet month in December. Demand for stove and egg was light. Chestnut, on the other hand, had a good month. Pea coal moved into position as the ranking domestic size, and the supply was never sufficient to cover the demand. In the steam division, buckwheat was the favored size, though the supply was not as tight as in previous months. Rice and barley were plentiful.

WARM weather and the holiday season were not conducive to domestic buying in the Chicago market in December, with the result that prices eased. On the other hand, steam sizes finished the month in a much stronger position, with prices firm, particularly at the lower end of the range. Illinois, Indiana, and western Kentucky screenings registered an advance of 10@15c.

Screenings, as a rule, were scarce and tight. Secondary grades from Middle Western fields sold at 75c. Western Kentucky varieties strengthened with the return of striking miners to work, rising from 15@25c. to 35@50c. Domestic grades from western Kentucky, on the other hand, declined. Lump and egg were offered at $1.85@$2, against former quotations of $2@$2.25. The month was characterized by the growth of a bullish feeling on screenings. Producers expect domestic tonnage to be moderate for the rest of the coal-burning season, with consequent curtailment in the available supply. Domestic "no bills" increased in Illinois, Indiana, and western Kentucky in December.

EASTERN coals fared no better than the Middle Western product in December. Smokeless lump and egg were soft, with spot prices in many cases down close to the regular mine-run contract figure of $2.25. Most of the sales, however, were made at $2.50 for lump and $2.75 for egg (against the contract of $3.50 and $3.75, respectively). Stove maintained its position fairly well, but small nut was very weak, selling at 25@50c. under the contract price of $2.25. Contract shipments of smokeless mine-run were meager. Spot prices ranged from $1.75 to $2. Eastern high-volatile business lagged, and quotations eased to the following: ordinary block, $2@$2.50; egg, $1.75 up; premium block, $2.75@$3.25; egg, $2 up. Eastern high-volatile slack, on the other hand, improved. The low end of the range of quotations advanced 25c., and little slack, either smokeless or high-volatile, sold at under 50c. in the last ten days of December. In general, lows for both varieties were: smokeless, 75c; and high-volatile, 60c.

Lack of coal-burning weather and the usual Christmas avoidance of buying resulted in a dull domestic market in St. Louis in December. However, the trade professed to foresee increased January business in the slack December

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

		Week Ended—							
		Dec. 6, 1930		Dec. 13, 1930		Dec. 20, 1930		Dec. 27, 1930	
	Market Quoted	Independent	Company	Independent	Company	Independent	Company	Independent	Company
Broken	New York	.....	$8.50	.....	$8.50	.....	$8.50	.....	$8.50
Egg	New York	$8.40@$8.65	8.65	$8.25@$8.65	8.65	$8.25@$8.65	8.65	$8.25@$8.65	8.65
Egg	Philadelphia	8.65@ 8.90	8.65	8.65@ 8.90	8.65	8.65@ 8.90	8.65	8.65@ 8.90	8.65
Egg	Chicago*	7.77	7.77	7.77	7.77	7.77	7.77	7.77	7.77
Stove	New York	9.00@ 9.15	9.15	8.90@ 9.15	9.15	8.90@ 9.15	9.15	8.90@ 9.15	9.15
Stove	Philadelphia	9.15@ 9.40	9.15	9.15@ 9.40	9.15	9.15@ 9.40	9.15	9.15@ 9.40	9.15
Stove	Chicago*	8.21	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	8.65
Chestnut	Philadelphia	8.65@ 8.90	8.65	8.65@ 8.90	8.65	8.65@ 8.90	8.65	8.65@ 8.90	8.65
Chestnut	Chicago*	7.77	7.77	7.77	7.77	7.77	7.77	7.77	7.77
Pea	New York	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00
Pea	Philadelphia	5.00@ 5.25	5.00	5.00@ 5.25	5.00	5.00@ 5.25	5.00	5.00@ 5.25	5.00
Pea	Chicago*	4.46	4.46	4.46	4.46	4.46	4.46	4.46	4.46
Buckwheat	New York	3.00	3.00†	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	3.00@ 3.25	3.00	3.00@ 3.25	3.00
Rice	New York	1.60@ 1.85	2.00	1.65@ 2.00	2.00	1.65@ 2.00	2.00	1.70@ 2.00	2.00
Rice	Philadelphia	2.00@ 2.10	2.00	2.00@ 2.10	2.00	2.00@ 2.10	2.00	2.00@ 2.10	2.00
Barley	New York	1.15@ 1.40	1.50	1.15@ 1.40	1.50	1.15@ 1.40	1.50	1.15@ 1.40	1.50
Barley	Philadelphia	1.50@ 1.60	1.50	1.50@ 1.60	1.50	1.50@ 1.60	1.50	1.50@ 1.60	1.50

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

situation. An increase in the number of small underfeed stokers also was pointed out as promising better business in the future. Fine sizes finished the month at much higher prices, and with little surplus on hand at the mines. A number of buyers were reported to have closed for the balance of the season at what are considered to be bargain prices, though they were double those of a few weeks ago.

Retailers were the only people reporting December to be a good month in the Southwest; producers and wholesale interests found business unsatisfactory, with the result that the mines ran only a few days a week. Screenings held firm at $1.50 for Kansas varieties and $1.25 for Missouri grades. Domestic circulars showed no change over the month, though many sales were reported at as low as $2.25 for Kansas lump.

Cold weather throughout the month of December brought increased domestic orders to the Rocky Mountain trade, though the level of business was below that of December, 1929. Lump was the only size, however, to benefit by the increase in business, as the number of "no bills" on other domestic sizes was noticeably large, particularly in the nut range. Demand for screenings was excellent. Prevailing prices at the end of the month were: bituminous lump, $5.50; nut, $4.50; washed chestnut, $3.25; steam sizes, $1.25@$1.50; Crested Butte anthracite furnace and egg, $9.25; base burner (2x¾-in.), $8.25; small base burner (1¼x¾-in.), $7; Rock Springs-Kemmerer 7-in. lump, $4.20; 3-in. lump, $4.25; 7x3-in. grate, $4; 3x1⅝-in. nut, $3.75.

Demand for prepared sizes in the Louisville market was light in December, though price levels maintained an unusual steadiness. Ruling quotations for the month were: western Kentucky block, $2.25; lump and egg, $1.75@$2; nut, $1.25@$1.50; Harlan block, $2.25@$2.50; egg, $1.50@$1.85; Hazard and Elkhorn block, $2@$2.50; egg, $1.25@$1.75; Hazard lump, $1.75@$2; Hazard nut, $1.25@$1.50. Conditions in the mine-run market paralleled those in the domestic market, with quotations as follows: western Kentucky, $1@$1.35; Harlan, $1.40@$1.65; Elkhorn, $1.35@$1.65; Hazard, $1.25@$1.50. Screenings finished the month in a much stronger position as a result of forced curtailment in production caused by slack domestic demand. At the end of December, prices were: western Kentucky, 40@60c.; Harlan and Elkhorn, 75c.@$1; Hazard, 65@85c. Some Harlan and Elkhorn byproduct slack sold at better than $1.

Precedents failed to hold in Cincinnati in December, and the market quickened instead of going into a slump. Demand for slack and small sizes materially increased, and egg, which had been in the doldrums for months, received a reasonable share of attention. Inquiries for block and large lump slacked off, but without much recession in the price level. Smokeless business went through December without much change of position, though egg and lump softened slightly at the middle of the month, largely because of oversupply. Despite curtailed working time, signs of overstocking became so marked that lump and egg prices were cut to 25c. below circular. Stove also was slightly affected. Demand for mine-run, on the other hand, was better, as a number of rescreening plants again entered the market. Standard shippers continued to hold their prices on slack, though off-grades sold down to 50c. at the first of the month. However, these again advanced to 75c.@$1 at the end.

IN THE high-volatile list, egg and slack proved to be surprises. After months of neglect, curtailment of lump and block production brought in a flood of inquiries for the latter, while demand for furnace use strengthened egg materially. Just before Christmas the demand became so insistent for these sizes that "no bills" were practically eliminated. In the block and lump classifications, premiums were favored and prices were maintained without effort. Other grades also held well over the month.

December proved to be a quiet month in the Columbus market. Warm weather stifled domestic demand, with the result that prices were correspondingly weaker. Continuance of hand-to-mouth tactics and inventory taking also militated against any real activity. Steam business was quiet, though large users showed no disposition to curtail takings. Prices continued to be extremely low, but give-away quotations were not so frequent.

Movement of all grades of coal was slow in the Cleveland market in December, in accordance with the usual seasonal decline. Supplies were plentiful, and demand was confined to immediate necessities. Mine-run prices declined slightly, while other quotations were firm.

December opened in the Pittsburgh

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

	Market	Week Ended			
LOW-VOLATILE, EASTERN	Quoted	Dec. 6, 1930	Dec. 13, 1930	Dec. 20, 1930	Dec. 27, 1930
Smokeless lump	Chicago	$3.50@$3.75	$3.50@$3.75	$3.00@$3.50	$2.50@$3.50
Smokeless egg	Chicago	3.75@ 3.90	3.75@ 3.90	3.25@ 3.75	2.75@ 3.75
Smokeless stove	Chicago	3.50	3.50	3.00@ 3.50	3.00@ 3.50
Smokeless nut	Chicago	3.25	3.25	2.50@ 3.25	2.50@ 3.25
Smokeless pea	Chicago	2.25	2.25	1.75@ 2.25	1.75@ 2.25
Smokeless mine-run	Chicago	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	.40@ 1.35	.60@ 1.35
Smokeless lump	Cincinnati	3.25@ 3.50	3.25@ 3.50	3.25@ 3.50	3.25@ 3.50
Smokeless egg	Cincinnati	3.50@ 3.75	3.50@ 3.75	3.50@ 3.75	3.50@ 3.75
Smokeless stove	Cincinnati	2.75@ 3.25	2.75@ 3.25	2.75@ 3.25	2.75@ 3.25
Smokeless nut	Cincinnati	2.00@ 2.25	2.00@ 2.25	2.00@ 2.25	2.00@ 2.25
Smokeless mine-run	Cincinnati	1.75@ 2.25	1.75@ 2.25	1.75@ 2.25	1.75@ 2.25
Smokeless slack	Cincinnati	.50@ 1.35	.50@ 1.35	.60@ 1.35	.75@ 1.35
*Smokeless nut-and-slack	Boston	3.35@ 3.40	3.35@ 3.45	3.41@ 3.50	3.41@ 3.64
*Smokeless mine-run	Boston	4.20@ 4.30	4.15@ 4.35	4.15@ 4.40	4.20@ 4.40
Clearfield mine-run	Boston	1.30@ 1.55	1.30@ 1.55	1.30@ 1.55	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
Cambria mine-run	Boston	1.75@ 2.00	1.75@ 2.00	1.75@ 2.00	1.75@ 2.00
Somerset mine-run	Boston	1.50@ 1.75	1.50@ 1.75	1.50@ 1.75	1.50@ 1.75
Pool 1 (Navy Standard)	New York	2.15@ 2.35	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
Pool 9 (super low-vol.)	New York	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
Pool 10 (h. gr. low.-vol.)	New York	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
Pool 11 (low-vol.)	New York	1.40@ 1.50	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
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
Pool 54-64 (gas and st.)	Philadelphia	1.00@ 1.15	1.00@ 1.15	1.00@ 1.15	1.00@ 1.15
Pittsburgh s'd gas	Pittsburgh	1.70@ 1.80	1.70@ 1.80	1.70@ 1.80	1.70@ 1.80
Pittsburgh gas mine-run	Pittsburgh	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
Pittsburgh slack	Pittsburgh	1.00@ 1.15	1.00@ 1.15	1.00@ 1.15	1.00@ 1.15
Connellsville coking coal	Pittsburgh	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
Westmoreland egg	Philadelphia	1.75@ 1.85	1.75@ 1.85	1.75@ 1.85	1.75@ 1.85
Westmoreland 1-in. lump	Philadelphia	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
Westmoreland slack	Philadelphia	1.05@ 1.25	1.05@ 1.25	1.05@ 1.25	1.05@ 1.25
Fairmont lump	Fairmont	1.60@ 1.75	1.50@ 1.75	1.60@ 2.00	1.50@ 2.25
Fairmont egg	Fairmont	1.35@ 1.65	1.35@ 1.50	1.35@ 1.60	1.35@ 1.60
Fairmont 1-in. lump	Fairmont	1.40@ 1.75	1.40@ 1.60	1.40@ 1.65	1.15@ 1.75
Fairmont mine-run	Fairmont	1.10@ 1.35	1.10@ 1.35	1.10@ 1.50	1.10@ 1.35
Fairmont slack	Fairmont	.75@ .90	.75@ .90	.75@ .90	.50@ 1.00
Kanawha lump	Cincinnati	1.75@ 2.50	1.75@ 2.50	1.75@ 2.50	1.75@ 2.50
Kanawha egg	Cincinnati	1.25@ 1.65	1.25@ 1.65	1.35@ 1.65	1.50@ 1.65
Kanawha nut-and-slack	Cincinnati	.40@ .60	.40@ .60	.50@ .75	.50@ .75
Kanawha mine-run (gas)	Cincinnati	1.10@ 1.35	1.10@ 1.35	1.10@ 1.35	1.10@ 1.35
Kanawha mine-run (st.)	Cincinnati	1.35@ 1.60	1.40@ 1.60	1.40@ 1.60	1.40@ 1.60
Williamson (W. Va.) lump	Cincinnati	1.75@ 2.25	1.75@ 2.25	1.75@ 2.25	1.75@ 2.25
Williamson (W. Va.) egg	Cincinnati	1.25@ 1.65	1.25@ 1.65	1.35@ 1.65	1.50@ 1.65
Williamson (W. Va.) nut-and-slack	Cincinnati	.40@ .65	.40@ .60	.50@ .60	.50@ .65
Williamson (W. Va.) mine-run (gas)	Cincinnati	1.15@ 1.35	1.15@ 1.35	1.10@ 1.35	1.10@ 1.35
Williamson (W. Va.) mine-run (st.)	Cincinnati	1.35@ 1.60	1.35@ 1.60	1.35@ 1.60	1.40@ 1.60
Logan (W. Va.) lump	Cincinnati	1.75@ 2.10	1.75@ 2.25	1.75@ 2.25	1.75@ 2.25
Logan (W. Va.) egg	Cincinnati	1.25@ 1.50	1.25@ 1.50	1.40@ 1.50	1.50@ 1.65
Logan (W. Va.) nut-and-slack	Cincinnati	.25@ .50	.25@ .50	.25@ .60	.50@ .65
Logan (W. Va.) mine-run	Cincinnati	1.10@ 1.35	1.10@ 1.35	1.10@ 1.35	1.10@ 1.35
Logan (W. Va.) slack	Cincinnati	.25@ .40	.25@ .40	.25@ .50	.50@ .60
Hocking (Ohio) lump	Columbus	1.90@ 2.00	1.90@ 2.00	1.90@ 2.00	1.90@ 2.00
Hocking (Ohio) nut-and-slack	Columbus	.75@ .90	.75@ .95	.75@ .95	.75@ .95
Hocking (Ohio) mine-run	Columbus	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
Pitts. No. 8 (Ohio) 1-in. lump	Cleveland	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
Pitts. No. 8 (Ohio) slack	Cleveland	.50@ .60	.50@ .60	.50@ .60	.50@ .60

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

market with a well-defined demand for domestic coal, which held until the last ten days. But despite this improvement, prices, ranging from $2@$2.25, continued to be unsatisfactory to the producers. Coincident with the revival in domestic movement, a scarcity of steam slack developed. As a result, some sales were made at as high as $1.15, or nearly three times the price in earlier fall months. At the end of the month, quotations settled at 80c. @$1. Gas slack prices also rose to $1@$1.15, where they held for the month. Demand for industrial coal for heating purposes improved, though manufacturing demand failed to show any life. Railroads continued in their lukewarm attitude toward buying.

December proved to be a dull month for the northern West Virginia trade. Demand for both domestic and steam sizes failed to show any real life. Slack, in particular, was a drug on the market. Mine-run was quiet. There was little change in the price levels formerly prevailing.

Both domestic and steam business in the central Pennsylvania market improved to some extent in December, largely as a result of demand engendered by low temperatures. Price levels, however, failed to rise. Prevailing quotations 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, $1.40@$1.60.

THE end of the year in the New England market brought in its train a better demand for steam coal than has existed for months. This coupled with improved co-ordination in production, resulted in a marked strengthening in prices. Current buying was to meet actual needs, still another encouraging sign. At the end of the month, choice grades of No. 1 Navy Standard mine-run were quoted at $4.30@$4.40 per gross ton, f.o.b. Virginia terminals, while ordinary grades sold at $4.15@$4.25. Nut-and-slack went at $3.41@$3.64. Demand for all-rail coals from central Pennsylvania showed a marked improvement in December, though there was no change in the prevailing level of prices.

Demand for steam coal held up well in the New York market in December, though the usual falling off was noted during the holiday season. Shutdowns at industrial plants were numerous and in some cases lasted for a week or more. In addition, buyers curtailed purchases pending completion of inventories. However, light stocks militated against any drastic cuts in buying. Heating requirements were seasonably large, which swelled the volume of shipments to large consumers and retail yards, although the lump takings were not sufficient to increase appreciably the production of slack.

Demand for coal in the Philadelphia market, while only ordinary for December, showed some increase over that in the previous month. The continued drought stimulated use by utilities, and while no great change was apparent in industrial takings, prospects were brighter at the end of the month. Bunkering continued to be the major activity in the tidewater trade.

The Birmingham domestic market, despite cold weather, failed to show any signs of life in December. Producers of medium-grade fuels moved the greater part of the tonnage, while high-grade coals dragged badly. Prices showed no change from previous levels. Steam coal demand was poor and undependable throughout the month. Bunkering was quiet.

In spite of weather conditions, the New York anthracite market experienced a poorly balanced demand in December. Certain sizes moved in good volume, but others lagged so badly that colliery sidings and tidewater terminals at times were greatly congested. This forced suspensions at the mines, with the result that the output fell below a year ago. Stove and egg were the sizes in which accumulations were most marked. Chestnut tonnage moved easily, and more pea coal would have been absorbed had it been available. Demand for No. 1 buckwheat was good, but ample supplies moved into the market. Better grades of rice were tight, while barley was weak.

December was just an ordinary month for the Philadelphia anthracite trade. Such orders as were transmitted were for small amounts, as buyers persisted in taking supplies only for immediate needs. Chestnut was the favored size. Stove was quiet, while demand for egg was light. Pea coal moved into a position of unusual importance, with the result that demand outstripped production. Among the steam fuels buckwheat was, as usual, the favored size, though it was not as tight as in previous months.

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

	Market	Week Ended			
MIDDLE WEST	Quoted	Dec. 6, 1930	Dec. 13, 1930	Dec. 20, 1930	Dec. 27, 1930
Franklin (Ill.) lump	Chicago	$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
Franklin (Ill.) mine-run	Chicago	2.15	2.15	2.15	2.15
Franklin (Ill.) screenings	Chicago	1.10@ 1.60	1.20@ 1.60	1.35@ 1.60	1.35@ 1.60
Central Ill. lump	Chicago	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
Central Ill. mine-run	Chicago	1.70	1.70	1.70	1.70
Central Ill. screenings	Chicago	.75@ 1.00	.70@ 1.00	.90@ 1.05	.80@ 1.05
Ind. 4th Vein lump	Chicago	2.50@ 2.75	2.50@ 2.75	2.50@ 2.75	2.50@ 2.75
Ind. 4th Vein egg	Chicago	2.30@ 2.50	2.30@ 2.50	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
Ind. 4th Vein screenings	Chicago	1.00@ 1.40	1.20@ 1.50	1.20@ 1.50	1.25@ 1.50
Ind. 5th Vein lump	Chicago	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
Ind 5th Vein mine-run	Chicago	1.50@ 1.85	1.50@ 1.85	1.50@ 1.85	1.50@ 1.85
Ind. 5th Vein screenings	Chicago	.35@ 1.10	.75@ 1.10	.95@ 1.10	.85@ 1.10
Mt. Olive (Ill.) lump	St. Louis	2.50	2.50	2.50	2.50
Mt. Olive (Ill.) egg	St. Louis	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
Mt. Olive (Ill.) screenings	St. Louis	.40@ .75	.50@ .90	.60@ 1.00	.70@ 1.00
Standard (Ill.) lump	St. Louis	2.25	2.25	2.25	2.25
Standard (Ill.) egg	St. Louis	1.70@ 2.10	1.70@ 2.10	1.70@ 2.10	1.70@ 2.10
Standard (Ill.) mine-run	St. Louis	1.25@ 1.60	1.25@ 1.60	1.25@ 1.60	1.25@ 1.60
Standard (Ill.) screenings	St. Louis	.25@ .65	.35@ .80	.40@ .85	.50@ 1.00
West Ky. lump	Louisville	2.25	2.25	2.25	2.25
West Ky. egg	Louisville	1.75@ 2.00	1.75@ 2.00	1.75@ 2.00	1.75@ 2.00
West Ky. mine-run	Louisville	1.00@ 1.35	1.00@ 1.35	1.00@ 1.35	1.00@ 1.35
West Ky. screenings	Louisville	.25@ .40	.15@ .25	.25@ .40	.40@ .60
West Ky. lump	Chicago	2.25	2.00@ 2.25	2.00@ 2.25	2.00@ 2.25
West Ky. egg	Chicago	2.00	1.85@ 2.00	1.85@ 2.00	1.85@ 2.00
West Ky. screenings	Chicago	.15@ .45	.25@ .50	.25@ .50	.35@ .60
SOUTH AND SOUTHWEST					
Big Seam lump	Birmingham	$2.00@$2.25	$2.00@$2.25	$2.00@$2.25	$2.00@$2.25
Big Seam mine-run	Birmingham	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
Harlan (Ky.) egg	Chicago	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
Harlan (Ky.) block	Louisville	2.25@ 2.50	2.25@ 2.50	2.25@ 2.50	2.25@ 2.50
Harlan (Ky.) egg	Louisville	1.50@ 1.85	1.50@ 1.85	1.50@ 1.85	1.50@ 1.85
Harlan (Ky.) nut-and-slack	Louisville	.40@ .75	.40@ .75	.50@ .85	.75@ 1.00
Harlan (Ky.) mine-run	Louisville	1.40@ 1.65	1.40@ 1.65	1.40@ 1.65	1.40@ 1.65
Harlan (Ky.) block	Cincinnati	1.75@ 2.50	1.75@ 2.50	1.75@ 2.50	1.75@ 2.50
Harlan (Ky.) egg	Cincinnati	1.35@ 1.65	1.35@ 1.65	1.50@ 1.75	1.50@ 1.75
Harlan (Ky.) nut-and-slack	Cincinnati	.50@ .75	.50@ .75	.60@ .85	.60@ .85
Harlan (Ky.) mine-run	Cincinnati	1.10@ 1.50	1.10@ 1.50	1.10@ 1.60	1.10@ 1.60
Hazard (Ky.) block	Chicago	2.50@ 2.75	2.50@ 2.75	2.50@ 2.75	2.50@ 2.75
Hazard (Ky.) egg	Chicago	1.50@ 1.65	1.50@ 1.65	1.50@ 1.65	1.50@ 1.65
Hazard (Ky.) slack	Chicago	.15@ .80	.15@ .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
Hazard (Ky.) egg	Louisville	1.25@ 1.75	1.25@ 1.75	1.25@ 1.75	1.25@ 1.75
Hazard (Ky.) nut-and-slack	Louisville	.25@ .50	.25@ .50	.40@ .75	.65@ .85
Hazard (Ky.) mine-run	Louisville	1.25@ 1.50	1.25@ 1.50	1.25@ 1.50	1.25@ 1.50
Hazard (Ky.) block	Cincinnati	1.75@ 2.25	1.75@ 2.25	1.75@ 2.25	1.75@ 2.25
Hazard (Ky.) egg	Cincinnati	1.25@ 1.65	1.25@ 1.65	1.35@ 1.65	1.35@ 1.65
Hazard (Ky.) nut-and-slack	Cincinnati	.35@ .50	.35@ .50	.40@ .60	.40@ .60
Hazard (Ky.) mine-run	Cincinnati	1.10@ 1.40	1.10@ 1.35	1.10@ 1.40	1.10@ 1.40
Elkhorn (Ky.) block	Chicago	2.25@ 2.50	2.25@ 2.50	2.25@ 2.50	2.25@ 2.50
Elkhorn (Ky.) egg	Chicago	1.65@ 2.00	1.65@ 2.00	1.65@ 2.00	1.65@ 2.00
Elkhorn (Ky.) slack	Chicago	.50@ 1.00	.50@ 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
Elkhorn (Ky.) egg	Louisville	1.25@ 1.75	1.25@ 1.75	1.25@ 1.75	1.25@ 1.75
Elkhorn (Ky.) nut-and-slack	Louisville	.40@ .75	.40@ .75	.50@ .85	.75@ 1.00
Elkhorn (Ky.) mine-run	Louisville	1.35@ 1.65	1.35@ 1.65	1.35@ 1.65	1.35@ 1.65
Elkhorn (Ky.) block	Cincinnati	1.75@ 3.50	1.75@ 3.50	1.75@ 3.50	1.75@ 3.50
Elkhorn (Ky.) egg	Cincinnati	1.35@ 1.75	1.35@ 1.75	1.45@ 1.75	1.50@ 1.85
Elkhorn (Ky.) nut-and-slack	Cincinnati	.50@ .75	.50@ .75	.60@ .85	.65@ .85
Elkhorn (Ky.) mine-run	Cincinnati	1.10@ 1.60	1.10@ 1.60	1.10@ 1.60	1.10@ 1.60
Kansas shaft lump	Kansas City	3.75@ 4.25	3.75@ 4.25	3.75@ 4.25	3.75@ 4.25
Kansas strip lump	KansasCity	3.00@ 3.50	3.00@ 3.50	3.00@ 3.50	3.00@ 3.50
Kansas mine-run	Kansas City	2.50	2.50	2.50	2.50
Kansas screenings	Kansas City	1.50	1.50	1.50	1.50

WHAT'S NEW
IN COAL-MINING EQUIPMENT

Power Applications and Control Systems Covered in New Equipment Offerings

A number of new items have been added to the line of photo-electric relays (*Coal Age*, June, 1930, p. 397) for the control of industrial machinery and other equipment by the General Electric Co., Schenectady, N. Y. In addition to the original unit, CR-7505-A-2, an alternating-current relay, the company offers the following: direct-current relay, CR-7505-B-1; outdoor, weatherproof, alternating-current relay, CR-7505-C-2; interior light control unit, CR-7505-D-1; interior measuring devices, both alternating- and direct-current types, CR-7505-E-1 and F-1, respectively; indoor light source, alternating or direct current, CR-7500-A-1; and outdoor, weatherproof light source for alternating current, CR-7500-B-1.

For controlling the operation of remote automatic electric equipment by means of audio-frequency impulses, the General Electric Co. offers a control known as the audible, selector-type, supervisory equipment. Indications of electrical conditions at the remote equipment are given by means of audio-frequency impulses, rather than the visual signals, and the company says that the control can be used with automatic hydro-electric generating plants in central station systems, automatic pumping stations, and similar installations.

Dispatcher's Control Panel, Automatic Supervisory Equipment

According to the maker, an operative at a point remote from the equipment he controls can open and close valves and circuit breakers, start and stop pumps, and receive automatic indications of the position of valve gates, whether pumps are running or stopped; and warning when bearings run hot, gaskets blow out, oil level drops in tanks, or when pressures run down. A minimum of equipment is involved, it is asserted, and only two line wires are used. As the equipment operates through insulating transformers, open wires paralleling high-tension lines may be used.

Supervising equipment, located in the dispatcher's office, consists of a wall panel on which is mounted a calling dial, a reset key, howler, and audio-frequency transmitter. Equipment in the outlying station includes selector switches, auxiliary relays, and other devices necessary to adapt the supervisory system to the control circuits of the machines.

When the dispatcher desires to operate a machine, he dials the proper code to select the unit. A series of audio-frequency impulses is thus transmitted over the wires to the selector switches at the machine. The latter take positions corresponding to the numbers dialed and start a code sending device which checks the position of the selectors by sounding the howler in the dispatcher's office. Two tones, high- and low-pitched, enable the howler to indicate whether the equipment is running or stopped. Thus, the dispatcher, knowing the switches are set on the position corresponding to the machine he wishes to operate, and also whether it is in motion or not, can dial a start or stop signal. He immediately receives a signal via the howler to indicate whether or not the desired action has taken place.

When an automatic change in the electrical condition of the machine occurs, a signal is sent to the howler in the dispatcher's office. From the code and tone the latter can tell immediately what has taken place. If more than one automatic operation takes place at a time, audible signals are sent to the howler one at a time.

New grease for ball- and roller-bearing motors has been announced by the General Electric Co., which asserts that the product embodies all the necessary qualities for this type of service. It has been used by the company for the initial lubrication of all general-purpose motors with these types of bearings, and it is said that it has been successfully applied to ball-bearing equipment operating at speeds as high as 25,000 r.p.m. and at temperatures ranging from —25 to 250 deg. F. However, the company recommends it only for use for the lubrication of motor bearings where the motors were originally grease-lubricated.

Advantages claimed for the new product follow: high-grade materials; ability to maintain an operating consistency under severe conditions and over as wide a temperature range as is likely to be encountered in service; complete ball and roller motion; little tendency to gum-cake or separate; contains no free acids or water, and will not turn rancid; and has unusual film strength, enabling it to withstand severe thrusts and heavy bearing loads. The lubricant is supplied in 2-oz. tubes and 1-lb. cans.

Type WF-1 Current Transformer

A new type of instrument-current transformer, said to embody compensating features which practically eliminate ratio and phase-angle errors has been developed by the General Electric Co. It bears the designation WF-1, and is built in ratings of from 5 to 800 amp. The equipment is recommended by the company for use in connecting watthour meters, instruments, and relays, the combined burden of which does not exceed 50 volt-amperes. It has, it is stated, practically straight-line accuracy down to 5 per cent load. The new transformer supersedes the WC-12 type, with which it is interchangeable in dimensions.

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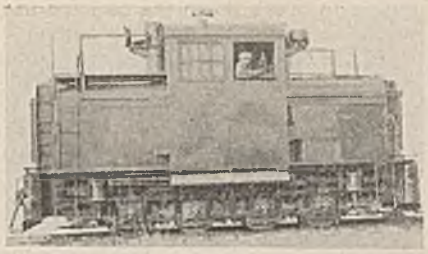
New Oil-Electric Locomotive For Switching Service

The Geo. D. Whitcomb Co., Rochelle, Ill., is now building oil-electric locomotives in both the 0-8-0 rigid wheelbase types and 0-4-4-0 double-truck



Whitcomb 80-Ton Oil-Electric Locomotive

types for railway and industrial switching service. In addition, the company now offers a four-wheel locomotive of the oil-electric type for the same service. On the 0-8-0, 80-ton machine, two 300-hp. oil engines drive a Westinghouse generator, which supplies current to four Westinghouse motors. Maximum starting tractive force on a clean rail is 40,000 lb., according to the company, and on a sanded rail is 48,000 lb. One-man control, dual control stations, central cab, and full visibility in both directions are features mentioned by the company. Other oil-electric locomotives may be obtained in weights of from 15 to 100 tons, in all practicable track gages.

Variety of Uses Claimed For Inspection Car

The Jeffrey Mfg. Co., Columbus, Ohio, offers a mine inspection car which the company declares may be used also for emergency transportation of tools, equipment, or men, and as a first-aid car. The company states that the car is of standard mine-locomotive construction.

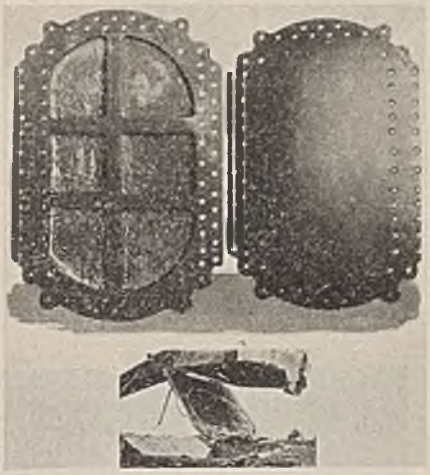
Jeffrey Mine Inspection Car

and that it is especially suited for use in low coal, where walking is difficult. The car is made of steel, with a wood-lined floor. Headlights are mounted on each end, and the underslung construction, it is said, prevents teetering or dragging when the weight is all in one end.

Four to six men, besides the operative, can be carried in a sitting position, the company claims, or two men and the operative in a lying position. Maximum speed of the car is 7 m.p.h. Operation, it is said, is based on the standard mine locomotive control. All electrical and moving parts are shielded to prevent injury. Either one or two trolley equipments can be furnished. Over-all height is 25½ in., and the floor of the car is 7 in. above the rail.

Dipper Reinforcement Offered

The American Manganese Steel Co., Chicago Heights, Ill., now offers the Meyer "Turtle Back" reinforcement for dipper doors on shovels. The casting, made of "Amsco" manganese steel, can be applied, it is stated, to any door that is flat inside and has not become distorted. It is convex to the work and, the company claims, of ample size and strength to protect the door and mechanism from severe shock and distortion. Reduction in wear and



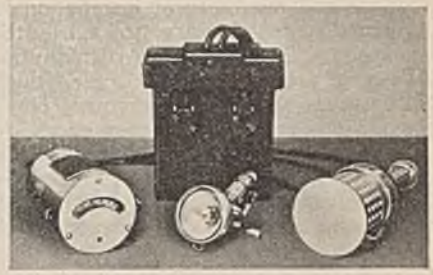
Meyer "Turtle Back" Dipper Reinforcement

elimination of door and latch troubles caused by falling rocks are the principal advantages claimed. The reinforcement may be obtained to suit all dipper sizes and, it is said, can easily be secured to the inside of the door so as not to interfere with the door braces and latch mechanism.

Methane Indicating Detector Is Portable

The Union Carbide Sales Co., New York City, has announced the new U.C.C. methane indicating detector for testing air in coal mines. The distinctive features of the instrument, the company says, are portability, a scale which shows the percentage (from 0.1 to 7) of methane present, a detecting head that can be located wherever desired, and exceptional accuracy. The outfit, it is said, consists of a detector head, meter case, portable storage battery, and a cap lamp. Combustion of a methane and air mixture on the surface of a glowing, non-catalytic filament increases its temperature and electrical resistance, thereby actuating a milliammeter needle, the maker explains. Other details of the equipment, as outlined by the company, follow:

The complete outfit weighs about 12 lb., is worn strapped to the back and chest, and will operate continuously for 5 hr. without change of battery. The detecting head is attached to a flexible cable and can be placed anywhere a test



U.C.C. Methane Indicating Detector

is made. On top of the meter case, which is worn on the chest, is the indicating dial; the control switches are recessed in the bottom. Illumination for reading and inspection is furnished by the cap lamp. Safety features which permit changing of filaments in gaseous areas are included. A spare battery and tools go with the instrument.

Conveyor Drive Developed

Conveyor Sales Co., New York City, offers the C-20 shaker conveyor drive, primarily for use in coal mines, which is said to embody a proper relation between acceleration and retardation of the driving stroke. Outstanding features claimed are simplicity and compactness. Over-all dimensions are: height, 24¾ in.; width, 84¼ in., plus from 20⅞ to 35⅝ in. for the motor; and length, 44 in. Weight installed is said to be 6,400 lb. As a result, the company claims that the drive can be installed almost anywhere, regardless of space limitations.

The mechanism to provide the correct relation between acceleration and retardation is said to consist of a gear train and cross-arm which convert the rotary motion of the motor into the reciprocating motion of a crosshead. The latter is connected to the conveyor trough, and transmission, it is asserted, is accomplished with a minimum loss of energy. With the arrangement in use, according to the company, the peak velocity of the forward motion comes beyond 120 deg. of the full revolution, while the peak of the reverse or retarding stroke comes before 240 deg. of the revolution, the ideal condition for drives of this type. Consequently, it is claimed, there is no waste of power and no tendency on the part of the material to slip backward. Maximum length of stroke is 11 in., but the maker states that it is possible easily to alter it by a few slight changes. Altogether, fourteen different strokes, ranging from 11 in. to 0, are available for any setting of the drive, it is asserted.

"Cosco" C-20 Conveyor Drive

Ease and flexibility of installation in cramped spaces also are stressed by the company. The mechanism is totally inclosed in a heavy cast-steel case, which also serves as an oil reservoir. Three covers are provided for easy access to any part of the mechanism. Four sockets are cast into the top of the case for the reception of the ratchet-holding jacks and, since the drive straddles the conveyor, the company declares that twisting strains are not likely to loosen the jacks. The driving motor is bracket-mounted, the necessary pads being cast integrally with the base. Motors are rated at 20 hp., and may be either direct- or alternating-current types, permissible or open, as required. Automatic remote control with time-limit acceleration and full protection against overload and under-voltage is provided for the motor, the company asserts.

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New Loader of the Pit-Car Type Offered Coal Mining Men

THE Charleroi Iron Works, Charleroi, Pa., is now manufacturing a new Lang loader, said by its designer, George R. Lang, to have the following advantages over the older machine (*Coal Age,* September, 1929, p. 534): greater digging speed, as the result of doubling the lifting capacity of the shovel digger (Fig. 3) and tripling the prying height; higher tramming speed; and positive feed for digging and loading. Easier operation, as compared with the older machine, also is claimed by the designer, who says, in addition, that the elimination of the separate rear conveyor in building the new machine permits lumps to be transported more swiftly and gently from the face to the pit car. Features of the construction and operation of the loader, as outlined by Mr. Lang, follow:

Two methods may be followed in loading out a cut of coal. With the first, track is laid up to the face and the coal shot down before the machine is brought in. Under the second system, which is the one most used, the machine is run into the place and the shovel digger inserted in the kerf. The face is then shot down on the machine, after which it is started by pressing a push button, of which there are three, one on each side of the loader and one on the top near the headlight. The latter enables the operative to ride in narrow places and still have the loader under full control. An up-and-down prying motion is imparted to the digger by side arms driven by a crankshaft through connecting rods. Coal loosened and broken down by the digger is caught up by the conveyor arms and carried back to the pit car.

The loader is forced into the coal by a ratchet feed, which acts on all four wheels to give a forward speed of 4 ft. per minute. A link connects a "live" dog with the connecting rod on one side of the machine (Fig. 3). Each revolution of the crankshaft causes the "live" dog to engage a tooth in the ratchet, which is fastened to the front axle, thus moving the loader forward. A "dead" dog prevents backward movement. Front and rear axles are connected by a chain, so that the forward motion is transmitted to all four wheels. Weight of the machine—4½ tons—gives traction usually sufficient to allow the digger to break down the coal for loading at the rate of 1 ton per minute.

Fig. 1—Adjustable Deflector on Lang Loader

In the old loader, forward motion was accomplished by a ratchet which operated on a chain anchored in the undercut. For ordinary use, this method of moving the machine forward has been discarded, though a modification of the system (Fig. 2) can be used in working on a rise or where tight shots must be removed. The front end of the feed chain is carried to the face and held in place by a machine jack prop, while the rear end works in a pocket sprocket on the rear axle. The speed at which the loader is pulled forward is controlled by the ratchet shown in Fig. 3, and the sprocket can be engaged or disengaged at the will of the operative. Use of the chain will allow coal to be loaded on a pitch at 10 per cent.

In working under drawslate in entry driving, coal may be loaded without the operative going under the bad roof by starting the machine and allowing it to proceed to the back of the cut. After the loader is withdrawn, the slate can be posted and the coal along the sides cleaned up by hand. Upon finishing the hand-loading, the slate can be shot and loaded by the machine.

The rigid car pusher of the older loader has been replaced by a snubber (Fig. 3). With a rope running through a snatch block back along the track, a car may be moved easily during the loading operation. Cars may be loaded equally well from either the front or the rear end, as there are no return flights on the under side of the conveyor. Elimination of the return flights on the under side of the conveyor also gives an additional 4 to 6 in. of height for the coal in the car. The rear end of the conveyor is fitted with an adjustable deflector for guiding the coal into the cars on curves (Fig. 1).

Tramming speed for traveling from place to place, either in forward or reverse, is 200 ft. per minute. Height of the loader can be adjusted by removing two bolts, one on either side of the machine, and lowering or raising the frame the desired distance. Two men comprise a crew. The loader by itself will load at the rate of 1 ton per minute.

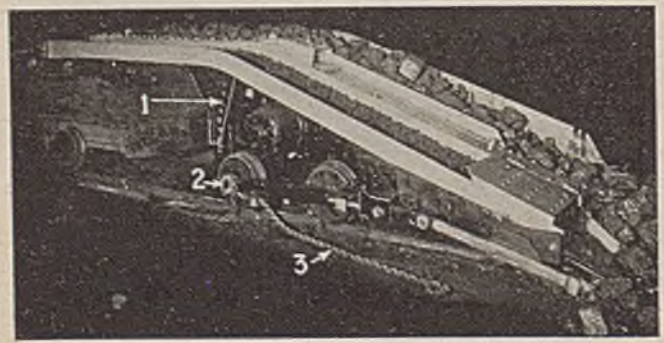

Fig. 2—Right Side of Lang Loader. 1, Height Adjustment; 2, Sprocket; 3, Feed Chain

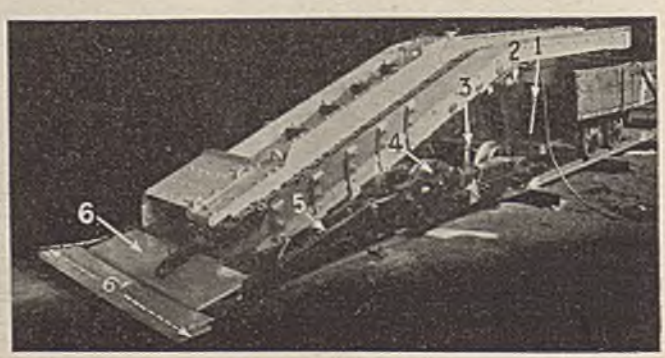

Fig. 3—Left Side of Lang Loader. 1, Brake Lever; 2, Snubber; 3, Tramming Clutch Lever; 4, Feeding Mechanism; 5, Side Arm; 6, Shovel Digger