COAL AGE

Devoted to the Operating, Technical and Business Problems of the Coal Mining Industry

McGRAW-HILL PUBLISHING COMPANY, INC.
JAMES H. McGRAW, *Chairman of the Board*
MALCOLM MUIR, *President*
H. C. PARMELEE, *Editorial Director*

SYDNEY A. HALE
Managing Editor

H. W. CLARKE
Publishing Director

Volume 34 NEW YORK, JUNE, 1929 *Number 6*

"The New Tempo"

In Mechanization

"ACCELERATION rather than structural change is the key to an understanding of our recent economic developments:" so begins the analysis of postwar changes in American economic life recently completed by a distinguished committee of the President's Conference on Unemployment. The past decade brought forth little factually or physically new; the significance of the changes which have taken place—particularly since 1922—lies in the quickening tempo of their acceptance by industry.

THIS CONCLUSION finds vivid confirmation in the history of mechanical loading. The record of experimentation in this phase of the mechanization of American mines stretches back to the '80s, but it is only within the last few years that intensified activity has made the new tempo noticeable. As recently as 1923 the quantity of bituminous coal loaded underground by mobile machines, scrapers and self-loading conveyors was only 1,880,000 tons.

SINCE that year, however, the growth of mechanical loading has been swift. In 1924, figures of the U. S. Bureau of Mines show 3,496,000 tons loaded; in 1925 the total was 6,146,000 tons and in 1926 it was 10,022,000 tons. Last year the total reached 14,559,000 tons. In addition to this quantity there was approximately 7,000,000 tons handled by pit-car loaders and hand-loaded conveyors—an increase in this type of loading of 687 per cent over 1926.

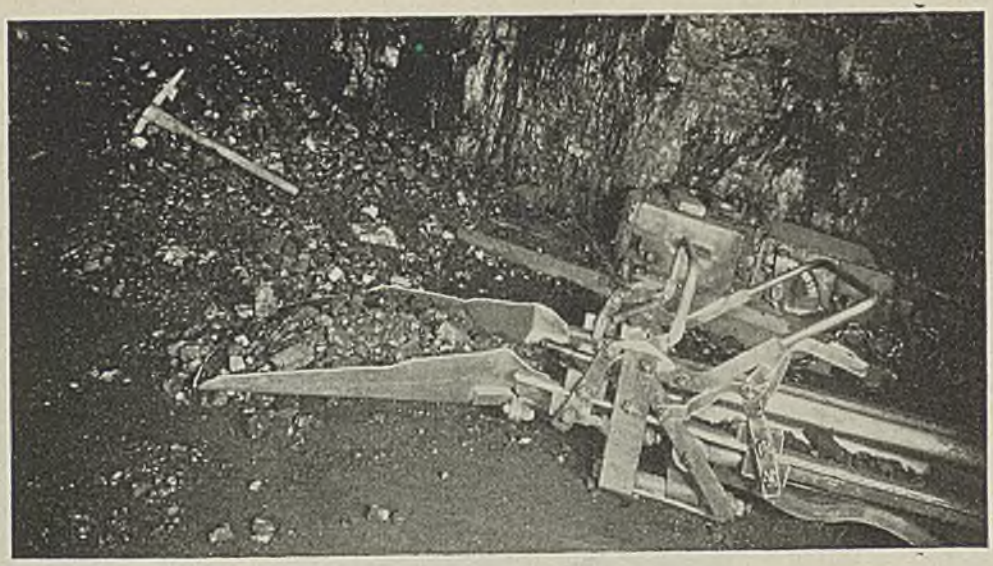
THERE is something irresistibly dynamic in these swelling figures. They show how well the pioneers among both the mine operators and the manufacturers have done their work. They carry a conviction to the open-minded far beyond the power of the exhortations of the special pleaders. From less than 2,000,000 tons in 1923 to more than 14,500,000 tons in 1928 in the face of strong opposition and deep-seated prejudice in many quarters is a record which needs no rhetorical embellishment to point its significance.

ENCOURAGING as this record is, however, it is only the forerunner of greater achievement. In those fields where cost reduction is the immediate objective in the battle to recover lost ground, each convert to the cause of mechanization makes it less easy for others in the same area to cling to the old methods. In the fields where cost-reduction possibilities may not be so readily apparent, competitive pressure from without and industrial relations within will encourage progress. And eventually the impulse to make the miner's occupation more attractive to a newer generation will be the major accelerating factor in all fields.

In the Mahanoy Valley

From an Etching
by Joseph Pennell

Courtesy Kennedy & Co., N. Y.



DUCKBILLING COAL

In Southern Wyoming

By R. Dawson Hall

Engineering Editor, Coal Age

and

J. E. Edgeworth

Union Pacific Coal Co.

AT present and almost since the inception of coal loading by mechanical means in the Rock Springs (Wyo.) district two types of equipment have predominated: scrapers and conveyors. The latter have been either of the shaker or of the flight type.

Modern methods of loading have radically changed mine layout in southern Wyoming. The companies operating in that region many years ago decided that working up the pitch and making the loaded cars pull up the empty ones caused many accidents due to the breaking of ropes and couplings, the collapse of anchor posts and the running away of cars.

So the custom has been to use engine planes down the full pitch and to drive rooms on the strike, not a desirable plan from at least one standpoint, for it adds mules in the room and an engine plane up to the main haulage level to the many forms of haulage, which, even without it, include an electric locomotive along the level, a main engine plane to the surface and assisted gravity whether by mule or man at the tipple. Loss of time and disorganization accompany every change of motive power. The lowering of machine cutters down the engine plane also makes trouble.

With the older plan, in which the rooms were driven up the pitch, the placement of empty cars and their delivery to the level below when loaded was left to the miner, and the engine plane to the main haulage level was not needed, so much complication was avoided. Nevertheless, apparently the plan was abandoned solely because it could not be made safe.

Today, however, the old plan is restored, the numerous panel engine planes are being abandoned and their hoists withdrawn, for the duckbill and the scraper can be worked on the full pitch not only with full assurance of safety but with advantage. The coal comes the more readily down the shaking conveyor because of this inclination.

This is a wholly satisfactory arrangement from a safety viewpoint, for after all the old engine planes at Rock Springs and vicinity were less dangerous only in a degree than the gravity-operated room planes they displaced and putting them out of business increased safety considerably and decreased expense also.

Wherever the roof is good the duckbill conveyors at the mines of the Union Pacific Coal Co. at and around Rock Springs are used in much the same manner as has been developed for scrapers. From the return heading of an entry paralleling the strike of the seam, conveyorways are driven at 140-ft. centers straight up the pitch. It must be said, however, that only one conveyorway is advancing at any time in any one entry and that the distance between one conveyorway and the one that follows it is dependent on experience with the preceding conveyorway, which in turn is the outcome of the roof strength, the stresses set up by earlier workings and by the depth of the cover, all of which are variables.

This is one advantage of concentrated operation. One can profit by experience. One does not open up a large area on a false assumption as to strength of roof and coal to find oneself in error and committed by one's actions to a heavy loss of coal and some expense. Some instances come to mind of large mines where, due to miscalculations, vast areas were closed in by squeezes, including some big pillars purposed to circumscribe such actions.

These conveyorways are driven up

about 10 ft. wide, using the duckbill for feeding the conveyor and flexible pipe with an auxiliary fan for ventilation. The drive on the duckbill and conveyor has a capacity of 25 hp. Aided by the Wyoming law, which permits shooting at all times during the shift or after it, this conveyorway can be advanced about four cuts, or 30 ft., per shift. The coal dust in the Rock Springs basin is not as dangerous as in some Western coal districts. It is usually not so fine and there is no rosin in it. There are instead flakes of non-combustible alkali which doubtless act as a defense against explosions. For this reason shooting during working hours is less hazardous than it is in some regions. As for the precautions, permissible explosives and closed lights are used; the coal at the face is wetted down and rock-dusted, and water on the cutter bar is provided to drench the cuttings.

The conveyor brings the coal down to a center-chain flight-type Link-Belt 6-ft. section conveyor operating along the back heading. By this it is conveyed to another conveyor of similar type that takes it to the main heading and dumps it into a trip of cars. The entry is not level but so driven that the cars will run by gravity past the short or cross conveyor, being fed by a hemp rope passed around a horizonal roller on the side of the track.

In the drawing shown the work is being done on the retreat but in most instances four parallel headings are driven and the work is conducted on the advance. After the conveyorway is driven through to the back heading of the entry above, the pillar is attacked on the left by cutting a kerf along it, shooting the coal and loading it with a duckbill. In this way the pillar is reduced till finally it is only 6 or 8 ft. thick between the new working place and the old. Then the equipment is removed to the right side of the original conveyorway and the pillar toward the next conveyorway is cut, shot and loaded by duckbill until the place is 100 or more feet wide, leaving a pillar between the working face of 30 ft., which will be reduced later by cutting slabs off the left rib of the next conveyorway.

In No. 8 mine at Rock Springs, where this system has been introduced, the coal is about 8 ft. thick. It has marked cleats but not very obvious bedding. The places are driven directly up the pitch, which is inclined about 4 deg. to the horizontal. The roof is good though in places there are large crevices in both roof and coal an inch or two or even wider which are filled with a weakly cemented white sand. This makes it necessary to timber heavily in places.

It will be noted that 2 x 12-in. planks are placed on edge against the timbers to keep the coal from flying into the timber where the duckbill cannot reach it. There are four of these boards at each point where used and three lengths are boarded up, making twelve boards in all. They are moved up as the cut is loaded.

As stated, the long face runs straight up the pitch, which is 30 deg. off the butt. The coal would be won in larger lumps if the long face followed the butt cleat but the size of the coal is not so important at the Union Pacific Coal Co.'s mines as it is at commercial-coal operations. At the Premier mine, of the Ideal Coal Co., where most of the coal is sold for the domestic market, the rooms are driven not up the pitch but at right angles to the face cleat. As a result the ends of the rooms in that mine are not level.

As soon as the room begins to take weight the timbermen enter the goaf and remove the posts, beginning at the upper end and working toward the lower until all the posts are removed and the roof caves. These caves sometimes have been violent, but usually they occur by stages as the timber is removed. As much as

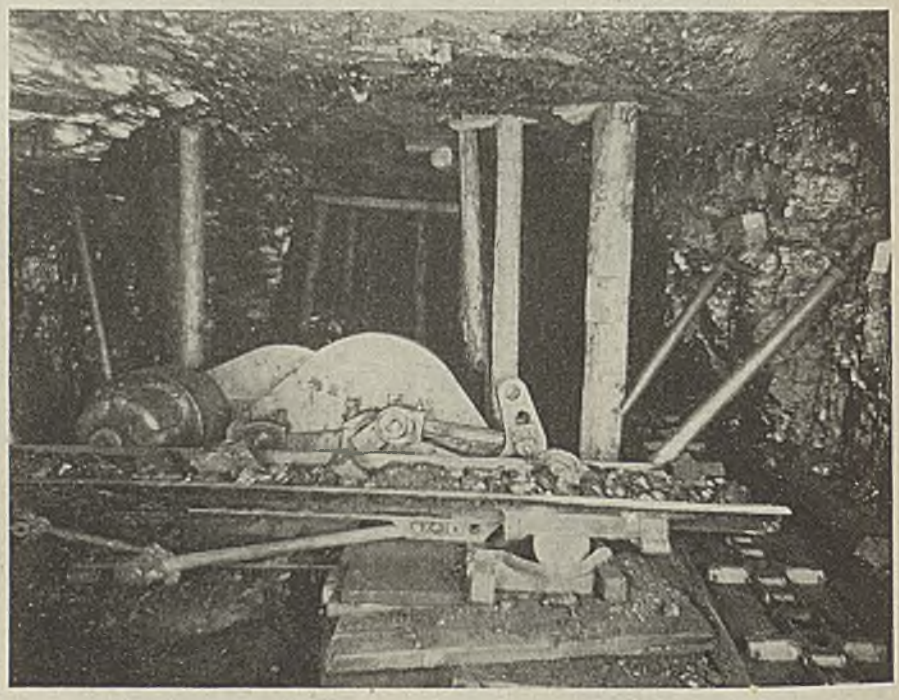


Fig. 1—Shaking Pan and Flight Conveyor With Drive for Shaking Conveyor

Fig. 2—Three Ways of Driving Pans at Right Angles

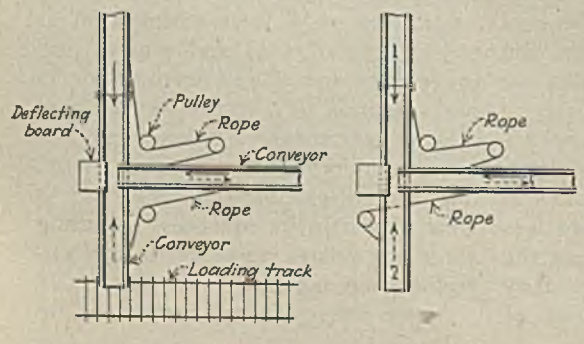
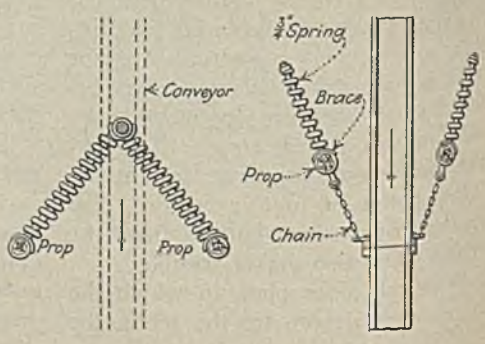


Fig. 3—Two Ways of Supporting Pan on a Pitch



95 per cent of the timber is recovered, which is a remarkable proportion for longwall work, especially under a cover that is from 400 to 1,150 ft. thick and sometimes even more. At the point where the experiment illustrated in Fig. 5 is being made the cover is 1,150 ft.

Between the cars at the loading point a plate is put so that when one car is loaded and the trip is moved forward, the coal from the conveyor instead of being spilled between the filled car and the one that is to replace it drops on the plate. As soon as the empty car is in place for loading, a matter of a few seconds, the plate is tilted toward the empty car, into which the coal slides. The plate is then transferred to the space between the car being loaded and the one behind it. Thus the conveyors do not need to stop, and the track is nevertheless kept clear of fallen coal at all times.

For trimming cars an ordinary potato rake is used, which is cheap, light and convenient. It can be purchased for 60c. and is much lighter than the mine blacksmith will make. A heavy rake the trimmers are disposed to reject. They prefer to move the chunks of coal with their hands, which consequently are likely to be hurt. In some mines the lack of a suitable rake results in the cars being trimmed imperfectly, thus reducing the quantity of coal loaded per car. When a conveyor is working at capacity the time for trimming is so short that anything that reduces labor results in increased use of car capacity and in lessened spillage. Incidentally this same type of rake would be ideal for the trimming of railroad cars under a tipple.

The conveyors are kept in line by radius bars at points where the conveyor is swiveled or at any point desired. Jack posts are used as centers for these radius bars which at one end are given a quarter turn and formed in a ring to embrace the foot of the jack post. At a swivel one of the radius bars is put on the straight conveyor and one on the opposite side of the swiveled length. Though the arcs they travel are not parallel except at a single point their divergence is not enough to occasion any real difficulty.

The coal is drilled with an electric machine supported by two men and fed to the working face by hand. One of the prongs of the drill bit is made with a square or chisel point and the other with a diamond point which is arranged to be $\frac{1}{8}$ in. ahead of the other. This has been found to speed cutting considerably. The square point does the cutting, and the diamond bit steers the drill. Two men can drill a hole easily where before four were needed. In 100 minutes it is possible to drill 308 ft. of hole. The holes are sunk to a depth of $6\frac{1}{2}$ ft., thus being where they end a foot short of the back of the cut.

At this mine the props are purchased of the required length instead of being sawn to order near the tipple. The standards are set at 6-in. intervals. Wedges and caps also are bought cut to order. A man can make only 30 wedges or caps underground in a day. Paying these men $6.72 would make these cost 22.4c. apiece for labor alone. There is a disposition at some mines to regard this as all in a day's work, but it is a waste of money that should be avoided. The wedges cost $2\frac{1}{2}$c. apiece, and the caps, which measure 2x8x20 in., cost 4c. laid down at the mine.

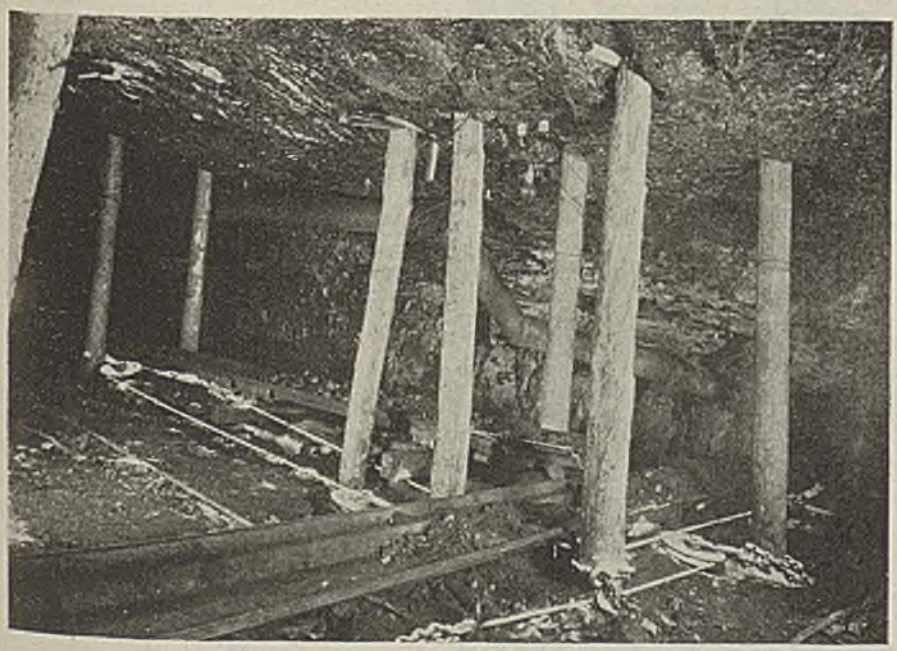


Fig. 4—Making One Pan Drive Another at Right Angles to It

In this way chips, which form a fire menace, especially in the dry atmosphere of the West, are kept out of the mine, and the lumberman is able to make use of all his material. Of course the caps and wedges could be made by power saws outside the mine from broken and shortened props, but the labor is expensive—$5.89 per eight-hour shift—and the practice is not favored. It is found better to sell such waste material rather than to work it up, especially as Wyoming is a state destitute of native timber, and wood of all kinds finds a ready sale.

One cap and wedge are placed over each prop. The cap is merely put in place and the wedge driven. Four blows will make it snug, thus making the emplacement of a prop an easy job. If a hand-cut wedge were used its imperfect outline would make its driving slow and difficult. Sometimes, because of these imperfections, the prop must be taken down and a fresh attempt made. Where a prop can be erected in a few minutes there is less likelihood that it will fail to be erected when and as needed. That is a pointer in safety worthy of being borne in mind.

Many men are killed at mines by roof falls, not because the erection of a prop consumes valuable time, for that can be done in a few minutes, given the needed material, but because it takes so long to get the timber ready and properly fitted for setting with the inadequate tools the miner has available. The industry is still hampered by the idea that every miner is a craftsman and can shape timber, caps and wedges for his need, which is no longer true, and that any job that can be laid on the miner is so much off the shoulders of his employer. The introduction of day wages underground is going to get rid of this habit of mind of the employer, who formerly hired craftless employees to perform a craft job and was often utterly indifferent as to their ability to perform it expeditiously or even safely.

At the C. Superior mine of the

Union Pacific Coal Co. the roof is bad, apparently because the mine lies below water level. Wherever that is the case in this field the roof is handled with difficulty. Yet the quantity of water is strangely small compared with the effects that it appears to produce. There is, moreover, a high percentage of earthy matter in the roof, which is rather a sandy shale than sandstone rock. The earthy material prevents effective cementation of the measures.

In consequence of the weakness of the roof no effort has been made to operate it by long-face methods. The roof, however, has proved far less troublesome than in earlier years because the conveyor-loader methods have speeded operation and because the large percentage and speed of extraction have reduced the stress on the mine roof. In this mine long cross-timbers have to be used over the swivel end of the conveyor and indeed in other places. Under some conditions temporary posting is necessary.

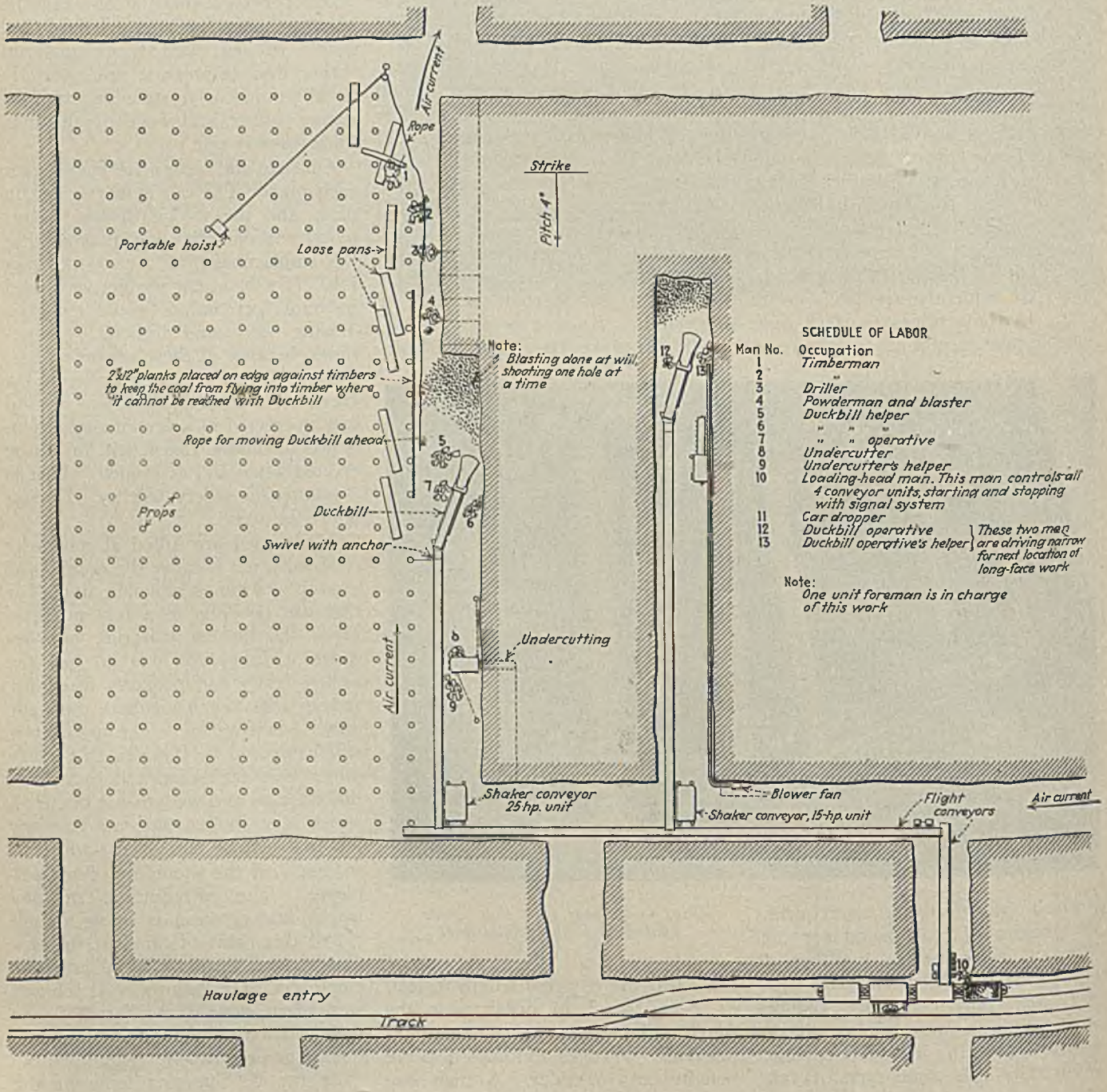
To draw pillars, the conveyor is swung around by swivels toward the rib, and at a distance of 32 ft. from the face a place is cut through the pillar, leaving a 22-ft. stump at the pillar end. This stump is loaded into the conveyor; the props are withdrawn to the pillar line and a breakrow of props is set along the line of the pillar end with another row just behind it.

* * *

Fig. 5—Mining by Slabbing With Aid of Duckbill

Some of the props in the first row are broken but those in the second row remain intact. A few of the crosspieces are lost because they are so long that it is difficult to recover them. There is some loss in the breakrows also, but the recovery on the whole is fair, for the breakrows are by no means close, the posts being set only about 3 ft. apart. The pillars are 20 ft. and the rooms 22 ft. wide. In this mine also the rooms are driven straight up the pitch. The coal is 7½ ft. thick and about 400 ft. below the surface.

(*Turn to page 366*)



Seven Men Cleaning Top Ahead of the Loader

World's Largest Strip Mine

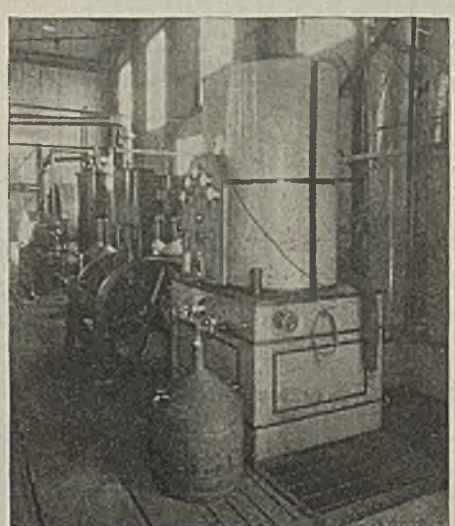
Has Expectancy of 30 Years

IN LESS than ten years strip mining has developed from the small-scale operation requiring little investment outside of that for a stripping and loading shovel to a large enterprise with much greater investment in shovels as well as a heavy outlay for locomotives, cars, tipple and preparation plant, explosives factory and drilling machines. The property of the Enos Coal Mining Co., near Oakland City, Ind., said to be the largest strip mine in the world, is an example of the new order.

The early strip mines had no tipples; the coal was loaded directly into railroad cars without picking and hence was shipped as true run-of-mine. The first tipples erected were for the most part crude and cheaply constructed affairs, one reason being that eight or ten years would exhaust the nearby supply of coal having sufficiently shallow cover for mining with the largest shovels then available. Advent of the huge shovels and the draglines of today extended the strip coal boundaries, making available much greater tonnages in areas that could be economically served from one tipple.

At the Enos mine the tipple stands in the center of a 27,000,000-ton area of remaining No. 5 coal, 5½ ft. thick, which has an overburden of 45 ft. or less. At a million tons per year —the rate of production during the last three years—the tipple can be used for at least 25 more years. Even now overburden 60 ft. thick is being moved in certain places. Taking into account the additional coal that has 45 to 60 ft. of cover, the tipple may operate for considerably longer than 25 years if the rate of production is not increased. The outlying coal will have to be hauled 6 miles, or about twice as far as the present maximum haul.

The Liquid-Oxygen Output Is 2½ Tons Per Day



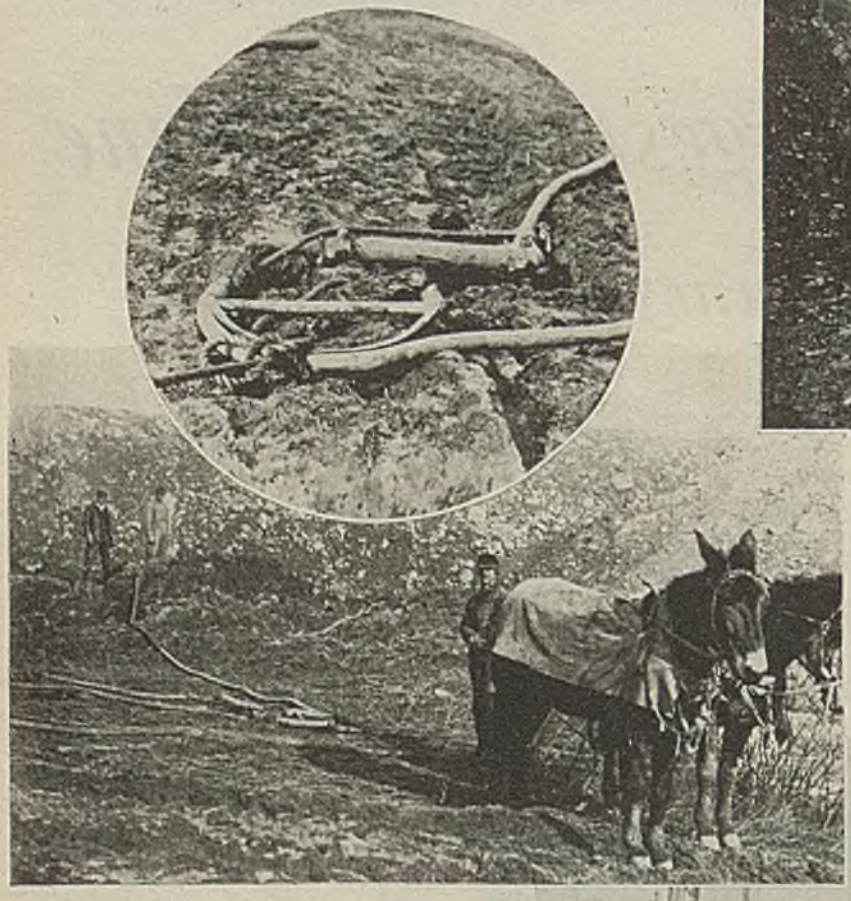
The tipple, which was built in 1921 and includes a rescreener, has handled a maximum of 5,207 tons in 8 hours. This record was made during last January. In 1927 the rescreener capacity was increased. A crew consisting of fifteen men pick all coal which passes over 3-in. primary screens. In addition to these men there are twenty others employed in and about the tipple.

Three sizes of screenings, ¾-, 1- and 1¼-in., and the following nut sizes are regularly made in the rescreener: ¾x1½, 1¼x2, 1½x2½, 3x2, 1¼x3 and 1½x3. By changing all screens of the tipple and rescreener, combinations totaling 30 sizes can be made.

In addition to the rescreener grades, 6-in. lump, 6x3 egg and various combinations with the regular

Left to Right: Machine Shop, Office and Warehouse

Twelve Yards or More at a Bite Scooping Up 5½ Ft. of Coal

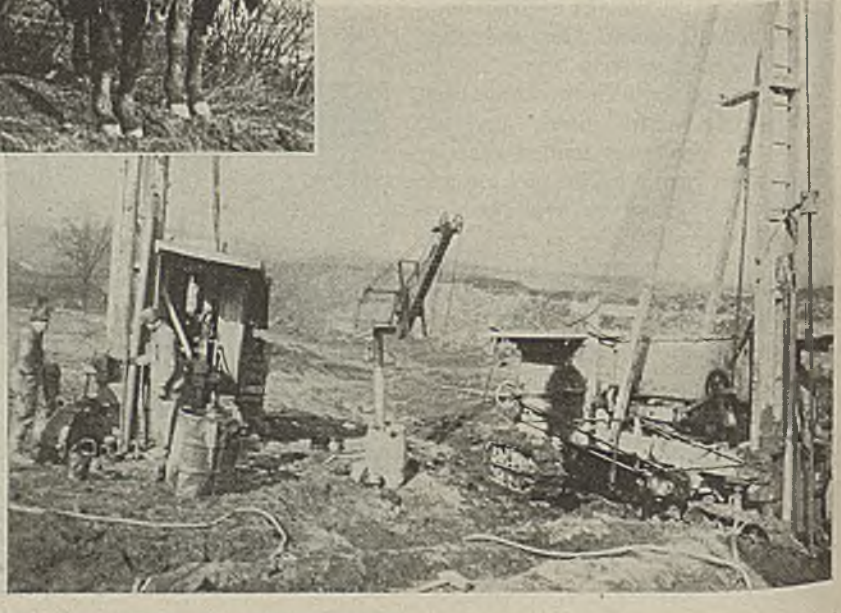


In Circle—Hitching for Dragging 4,000-Volt Cable; Here It Happens to Be Attached Next to a Bronze Sleeve Covering a Splice in the Cable

* * *

Dragging Ahead the 4,000-Volt Rubber Trailing Cable of the Stripper Without Cutting Off Power

Shooting Overburden Ahead of the Big Stripper Keeps Three Drill Rigs Busy



rescreener grades, there also is shipped a special railroad fuel. This grade, known as modified egg, consists of 6x3 egg with which has been mixed 15 per cent of 1½-in. screenings.

The under-3-in. coal is kept surprisingly clean by painstaking preparation in the pit. Team-drawn scrapers, picks, shovels and wire brooms are the implements used to remove that dirt which the stripper cannot get from the top of the coal. At times as many as seven men are thus engaged ahead of a loading shovel. Although it means some loss of coal, careful supervision is exercised to prevent digging into the bottom with the loading shovels. The tipple crew immediately reports any sign of dirty coal which indicates that this is taking place, and in a few minutes an investigation is made to discover the cause.

In the first picking on the tipple all lumps of coal which show impurities are thrown out with the rock. After this product passes over a picking table, where the lumps of free impurities are removed, it is crushed and loaded as a separate product. This is sold to nearby steam plants which can handle a high-ash fuel.

In December, with four of the five strip pits working, over 100,000 tons of coal was shipped from the mine. The overburden handled during that month by four of the five strippers totaled about 620,000 cu.yd. A 12-yd. electric shovel handled 85.5 per cent more material than the best producer of three 7-yd. steam machines. The difference in dipper capacity is 71.5 per cent. William H. Nichol, general superintendent, thinks that the electric shovel will give five years or more of service before it will have to be "torn down and rebuilt from the ground up," as has been necessary about every two years with the steam shovels.

All Overburden Is Shot With L.O.X. Made at This Local Plant

L.O.X., the liquid oxygen and carbon explosive, is used for shooting all overburden excepting in the box or crop cuts, where no shooting is done. Enos was the first strip pit in this country to use L.O.X. Approximately 2½ tons of liquid oxygen is being used per day.

Haulage from the pits to the tipple is over narrow-gage track—36-in., to be exact. Including both tracks of a mile of double-tracked main haul, there are about 17 miles of the narrow-gage track in use. The pit haulage equipment consists of fourteen rod locomotives of 18- to 30-ton sizes and cars of the contractor's side-dump type in 5- and 6-ton capacities. The coal company also owns and operates a 6-mile standard-gage connection to Oakland City. One heavy locomotive handles the mine output over this line.

IT IS to be expected that a well-equipped shop and a large force of men would be required to maintain the considerable machinery used at the mine. Not including the shovel operators, who are supposed to keep up their own machines, there are seventeen men on inspection, regular maintenance and general overhauling. Nine of these are shop men and the other eight outside men.

The machine shop is housed in a modern steel building equipped with a traveling crane. In it there are a 6-ft. radial drill, 42-in x 12-ft. lathe, 20-in. x 6-ft. lathe, power hack saw, 42-in. x 8-ft. planer, Lincoln type milling machine and a 20-in. post drill. In the adjacent blacksmith shop is a 1,200-lb. steam hammer.

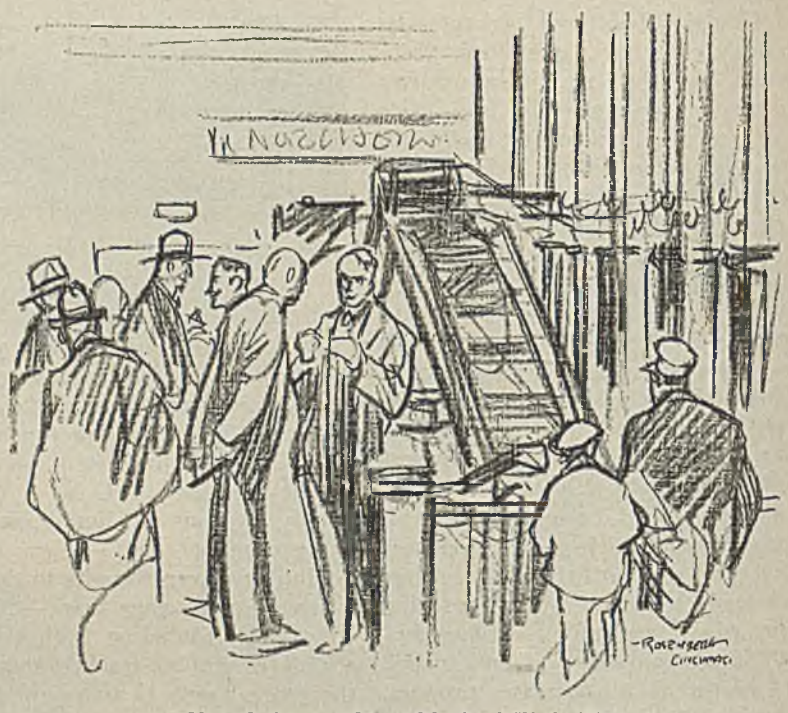
An unusual feature for a strip mine is a nicely finished fireproof building of two stories housing the general superintendent's office, accounting office, engineering department, conference room, first-aid room, and bachelor quarters for several office men. Contiguous to this structure is a one-story building of the same construction serving as a warehouse.

Operation of a strip pit is thought of by many as a problem of efficient handling of expensive machinery. That human engineering is still an important part of the job, however, will be understood when it is stated that there are 300 men on the payroll at Enos. To be sure, manual labor has been displaced for the actual handling of material excepting for some of the top cleaning and the picking of rock at the tipple, yet outside of this work about 250 men are employed at supervision, repair, machine operation and the various auxiliary jobs.

Dinkey Locomotives Deliver 5,000 Tons to the Tipple in 8 Hours

Caterpillar Mountings Take These Electric Drilling Machines Over Rough, Muddy Ground

Technical Advances in



How Delegates Spent Much of Their Time

THAT mechanization is taking on a new meaning was definitely evidenced at the sixth annual convention of coal-mining men held in Cincinnati, Ohio, May 13 to 17, under the auspices of the Manufacturers' Division of the American Mining Congress. Whereas in earlier years it was applied rather strictly to the process of mining coal by some type of conveyor or loading machine, mechanization has now been liberalized by actual practice to embrace all mechanical means or methods by which coal is produced.

All the factors are being so closely connected and interrelated today that such phases as mine-car design, drilling, haulage, ventilation, pumping, power distribution and cleaning are assuming aspects which are as much a problem of mine mechanization as is the conveyor or machine loader. This is merely another way of saying that practically all appliances and methods are tending to change.

One of the notable changes in this year's convention was the sectionalizing of the program by geographical grouping of states. Thus the anthracite operators had their meeting, as did the mining men in several groups of states embracing the bituminous fields. A great many of the companies "double-shifted" the convention by having one group of their mine officials leave as another arrived at Cincinnati. Manufacturers asserted that the sectional arrangement facilitated their task of giving attention to the inquiries of the coal men taking in the exhibits. A high mark left by the convention is the fact that mechanization thus far has caused a decline in accidents in mines where it is practiced.

The scope of the papers and discussions was universally broad. Besides the mainstay topics of the meetings—coal cleaning, mechanical loading and safety—problems in ventilation, rock-tunnel developments, rock disposal, labor relations, power, mining methods, maintenance and inspection, training of men, drainage and pumping, haulage and strip mining were analyzed. Practically none of these subjects was considered in the abstract; that is, each was considered in terms of mechanization.

A spirit of optimism pervaded the group of manufacturers who exhibited at Cincinnati. The manufacturers are alert to the great technical changes taking place in the mining of coal. They are visualizing future developments and are planning to anticipate the part which they, as individuals, will play in the technical evolution of mining coal. With few exceptions, the manufacturers represented at Cincinnati reported an upturn in business in the mining fields.

There were many sidelights at the convention, of first importance being the informal dinner and musical review, followed by dancing. Get-together breakfasts, luncheons and dinners were the order of the week and more than one argument was decided by the outcome of a golf match. An evening session was devoted to the advancement of technical education, many educators and heads of operating companies being present. The results of a questionnaire circulated by the Congress showed that graduations for 1928 exactly equalled those in 1914.

C. L. Herbster, Hockensmith Wheel & Mine Car Co., was elected chairman of the Manufacturers' Division. F. J. Maple, John A. Roebling's Sons Co., and Charles C. Whaley, Myers-Whaley Co., were advanced to first and second vice-chairman, respectively, leaving a vacancy in the third vice-chairmanship, to which Ralph C. Becker, McGraw-Hill Catalog & Directory Co., Inc., was elected.

Coal Mining

Registered at

Cincinnati Convention

THE technical activities of the convention opened Monday afternoon with a general session dealing with the status of mechanization in 1929. Otis Mouser, president of the Stonega Coke & Coal Co., who presided, remarked that no operator can any longer turn eyes and ears away from the very real development in mine mechanization and kindred production methods. The breadth of the meeting embraced England, France and Belgium and showed the trends in practices by states in this country.

Dr. L. E. Young, vice-president of the Pittsburgh Coal Co., reviewed the history of mechanization, dealt with its position today and stressed the importance of giving immediate attention to considerations for the future. While progress in mechanization is indicated somewhat by milestones yet it should be viewed in no other light than as an evolutionary process, he said. As pointed out by Howard N. Eavenson in the 1924 convention, the operator must assume the responsibility of giving generous assistance to the manufacturer in the development of machines. Young mining men and others making their initial venture into machine mining should not grow anxious or disappointed over slowness of progress in the earlier stages of their work, as those who are now successfully operating loading machines and conveyors experienced identically the same difficulties in earlier days.

Tonnage of Bituminous Coal Produced by Mechanized Mining in 1928

(In addition to bituminous, a total of 2,113,173 tons of anthracite was mined mechanically)

Loaded by machine:	Net Tons	Per Cent
Mobile loading machines	11,811,000	81.1
Scraper loaders	1,548,000	10.6
"Duckbills" and other self-loading conveyors	1,200,000	8.3
Total loaded by machine	14,559,000	100.0
Handled by conveyors:		
"Duckbills" and other self-loading conveyors	1,200,000	14.6
Pit-car loaders	4,117,000	50.2
Other hand-loaded conveyors	2,883,000	35.2
Total handled by conveyors	8,200,000	100.0
Recapitulation, less duplications		
Mobile loading machines	11,811,000	54.8
Scrapers	1,548,000	7.2
Pit-car loaders	4,117,000	19.1
Conveyors, including duckbills	4,083,000	18.9
Grand total	21,559,000	100.0

Mining of coal by machinery has had definite effects on the operating structure of coal-company organizations. It has toned up the morale of both officials and workers, placed face preparation on a higher basis, brought out the necessity for close attention to equipment maintenance and tended to increase the financial gain of all individuals involved. He suggested in connection with machine loading that more attention be directed to cost keeping, to depreciation and obsolescence charges to equipment, to the item of increase in capital investment, to advantages of double shifting, to rules governing the conduct of workers and particularly to the relation of costs derivable from the time factors of mine development on the one hand and mine exhaustion on the other; also to determining savings in ventilation and mine examination.

A credible achievement in the work of Glenn B. Southward, mechanization engineer of the American Mining Congress, is a compilation and interpretation study which he has just completed, with the help of the mechanization committee, covering conditions and methods in 100 mechanized mines scattered through twelve states. The information thus derived is the basis of a paper which he presented on "Practical Application of Mechanization in Coal Production."

Mechanized loading, said Mr. Southward, is now as firmly established in many mines as mechanical cutting or haulage. Of the 100 mines in the group studied, 43 are using mechanical loaders, 29 have adopted conveyors, 17 are operating pit-car loaders and 11 have selected scrapers. The total number of mechanical units of the type mentioned in these mines is 1,045 and their daily capacity is estimated at 90,000 tons. The largest completely mechanized plant in the group produces 6,000 tons a day. Mechanical cutting is a practice in 98 of these mines, mechanical drilling in 94 and mechanical haulage in 72.

Only three of the mines are operating mechanical loaders in coal less than 5 ft. thick, indicating a preference for this equipment and also the pit-car loader in thick coal. Roughly two-thirds of the mines using conveyors and 90 per cent of those using scrapers are in coal less than 4 ft. thick. Partings in the coal seams worked do not seem to have influenced unswervingly the choice of a particular type of machine. Paradoxically, the majority of the conveyors are operated in clean coal whereas most of the mechanical loaders are worked in seams with partings. Modified longface layouts are employed in 24 of the mines studied.

F. G. Tryon, chief statistician of

Comparative Increase in Tonnage Handled by Principal Types Of Machines, 1926 to 1928

	1926 Net Tons	1928 Net Tons	Increase Net Tons	Increase Per Cent
Mobile loading machines	7,786,000	11,811,000	+4,025,000	+ 51.7
Scraper loaders	1,554,000	1,548,000	— 6,000	— 0.4
"Duckbills" and other self-loading conveyors	682,000	1,200,000	+ 518,000	+ 76.0
Total loaded by machines	10,022,000	14,559,000	+4,537,000	+ 45.3
Pit-car loaders	523,000	4,117,000	+3,594,000	+687.2
Other hand-loaded conveyors	.....	2,883,000	.....	.....

the coal division of the U. S. Bureau of Mines, reviewed the progress in mechanical mining in terms of statistics, some of which are presented in tables elsewhere in these pages. As a study of these tables will indicate, by far the greatest contribution to the production of 21,559,000 tons of coal by mechanical methods in 1928 was made by mobile loading machines. He explained that his figures are aside from 20,000,000 tons of coal loaded by power shovels in strip pits and 2,113,173 tons of anthracite handled mechanically last year.

"Mechanization of British Mines" was the title of a paper by J. A. S. Ritson, of the University of Leeds, England, which was read by McCormick Goodhart, commercial secretary of the British Embassy. In England, states Mr. Ritson in his paper, mine managers and owners show a more pronounced willingness than formerly to entertain the application of new machinery even though an entirely new mine layout might be involved. None of them is working on the supposition that merely to install machines will improve the financial return from a coal property. That should be the last consideration, the first being a complete revision of physical methods and practices.

Of greatest significance to American mining is Mr. Ritson's statement to the effect that while wooden or timber supports are good, steel supports are better. During the last year English mine owners have made great strides in the development and use of roof supports of steel. In any contemplation of change in mining methods in the British Isles safety is made the first consideration. It is from this angle that engineering changes are being viewed.

Trends of mechanized mining in France and Belgium were given in a paper by R. H. Touwaide, consulting mining engineer, Belgium, which was read by Dr. Henry Mace Payne, of the American Mining Congress. The World War altered the economic setup of the coal industry in these two countries and developed such sharp competition from producers in neighboring countries that mechanization appears to be the only effective weapon left for France and Belgium.

"New Needs, New Ways," Anthracite Slogan

WHAT the anthracite industry is doing and will do to meet the problems of the present were recounted by Messrs. Kynor, Humphrey, Lee, Lamb and Evans at the morning session of May 14, under the chairmanship of the last-mentioned. These problems arise from the mining of thin beds, the remining of thick beds, rock disposal and coal cleaning. Though all are old, all take on a new complexion as the mines get deeper, coal gets scarcer, and the markets for anthracite become more finical.

"Recent Developments in Anthracite Mining" were described by H. D. Kynor, manager, Northumberland Mining Co., Excelsior, Pa., who explained that the mining of thin beds in the northern fields was made difficult by reason of their light dip. Not much coal can be found pitching at 25 deg. and coal of less than that inclination cannot be mined without the use of cars, conveyors or scrapers, as it will not run on sheet iron to the gangway after it has been dislodged. When cars are used in thin beds the top or bottom rock must be removed for their reception, and this removal is prohibitively expensive, hence the extensive introduction of scrapers and conveyors.

Mechanical cutting of coal has been limited by the variable seam inclinations, which decrease the efficiency of coal-cutting machines, and by the hardness of the seam, which makes it necessary to renew the cutting pick points too frequently for economy.

Anthracite and Bituminous Men Compare Notes

At first the scrapers were operated by four-drum portable hoists mounted on self-propelled trucks. Two of the drums hauled the scraper back and forth, the other two drums pulling the empty and loaded cars into place. This type of hoist is passing from general use, for with it a separate track must be provided to transfer it from one room to another. The wide heading thus made necessary increased the cost of development, so now a two-drum stationary hoist is used, located in a crosscut between the gangway and the airway and handling the scrapers in at least five rooms.

The scraper loader is flexible and works equally well in room or pillar work or for longwall. It can be used concurrently to rob two or even three pillars and with longwall can handle either one or two faces. The scraper when working to capacity will produce up to 125 tons per working shift. The chain conveyor is too cumbrous for room work but it finds its appropriate place in longwall. With such a loading device the coal can be cleaned as it is being shoveled, whereas that cannot be done with the scraper. The shaking conveyor has been used mostly in room-and-pillar work. It finds its peculiar suitability in removing the pillars in old caved rooms, for it requires but little width, which little is all that is available when pillars are being skipped. By the mechanical means described beds as thin as 20 in. are now being mined successfully.

Loading machines are little used because little virgin coal is left that is both thick and flat enough for their operation. They are successful in driving tunnels and cleaning up the falls in old gangways. Mechanical jacks have been used in longwall for controlling roof.

In discussion Mr. Kynor remarked that cogs and packwalls threw the weight on the face and in consequence their use had been discontinued. Cadwallader Evans, general manager,

Hudson Coal Co., Scranton, Pa., declared that as the law required the shooting of timber, jacks could not be used. In consequence no timber was recovered in the Hudson operations. The cost of timber accordingly was about 50c. per ton.

E. P. Humphrey, general manager, Hazle Brook Coal Co., Jeddo, Pa., in an article entitled "Rock Gangways Under Heavy Pitch," described the general practice of mining thick seams under heavy cover by tunnels driven below or even above the seam in rock or in a thinner coal seam with rockholes or chutes communicating with the seam itself. He declared that, where the coal was friable and deep, haulways even in virgin coal, were not permanent and should be displaced by roadways in more solid measures, especially if the removal of the coal in the seam concurrently with the driving of the gangways is purposed. Where the measures pitch heavily the various seams are connected by levels from the main slope and then at points below the thick seam where it is intersected by the levels gangways are driven in the rock along the strike and connected with the seam by rockholes.

Mr. Humphrey detailed the methods at the Girard Colliery of his company. Here the main slope is driven in the Holmes bed, which is about 8 ft. thick. The slope continues in this seam to the abrupt bottom of its basin and has been extended in the rock till it strikes the Mammoth bed, which is about 30 ft. thick. The Holmes seam was worked entirely by gangways within the bed, as it was not so thick or under such excessive pressure as would prohibit that procedure. The Buck Mountain bed, which is 14 ft. thick, has not been penetrated by the main slope but has been tapped and worked from the levels. Rock gangways are not excessively expensive; in fact, when all costs are considered, they are less expensive than gangways driven through broken ground, the bare cost of driving such gangways averaging $35 per yard.

When timber sets have to be replaced the labor cost alone may run from $12 to $25 per set. The cost for material where the timber is of 14-in. diameter will be about $8, including sprags and blocking. It is easy to see that a rock gangway with rockholes is an economy as compared with the driving and maintaining of a gangway in the coal bed being worked. The rock gangways are driven by contract at a cost of $50 to $55 per linear yard, depending on the number of faces being driven, the company furnishing compressed air, water and fuel for blacksmithing, transporting and disposing of the rock and providing compensation insurance.

The gangways are 7 ft. high over the rail and 11 ft. wide and have an 18-in. ditch 1 ft. below the bottom of the sills. About 6 ft. can be driven per day with a single shift but with more shifts a progress of 300 ft. per month can be attained. The rock gangways to the seam usually are 5 ft. high and 9 ft. wide on an angle of 35 deg. The contract price generally is $30 to $40 per linear yard.

By driving rock gangways the coal can be cleaned up as the gangway is being driven forward. Otherwise it might be necessary to drive up the gangway before removing the coal.

Mr. Humphrey declared that by the aid of rockholes the Mammoth bed recovery could be increased to 40 per cent. With the old method of mining within the bed itself the recovery could hardly be expected to exceed 20 per cent.

In the discussion W. S. Rausch, chief mining engineer, Lehigh Coal & Navigation Co., Lansford, Pa., said that where the Mammoth bed was 60 to 80 ft. thick it had been found necessary to make the rockholes 100 ft. long. With a 75-ft. thickness of bed it was not possible to get a recovery in excess of 50 to 55 per cent.

Mr. Humphrey, H. H. Otto, Hudson Coal Co., Scranton, Pa., and R. W. Montz, chief engineer, Lehigh Valley Coal Co., Wilkes-Barre, Pa., all declared that no evidence of silicosis could be found in their rockwork operations, the first two stating that water drills were used. George S. Rice, chief mining engineer, U. S. Bureau of Mines, Washington, D. C., said that some silica dust seemed relatively safe. In a kieselguhr mine the product of which was 98 per cent silica there had not been much trouble, whereas in the workings where the percentage was much lower silicosis was prevalent.

"Rock Disposal in the Anthracite Field" was discussed by J. Latimer Lee, special engineer, Susquehanna Collieries Co., Wilkes-Barre, Pa. Mr. Lee defined "breaker rock" as rock separated from coal at the breaker. In the northern field the coal will contain about 10 per cent of rock and in the southern fields 20 to 40 per cent by volume and more by weight. When last year 61,000,000 tons of coal was mined over 20,000,000 tons of rock had to be handled, a quantity that would cover an area of 17 square miles to a depth of a foot, that would be a volume equal to that of the rock from 528 shafts 1,000 ft. deep and having a cross-section equivalent to 35x17 ft. That quantity of rock would build a dump a mile long, 1,000 ft. wide and 90 ft. high.

Speaking regarding the dumping of rock underground, A. H. Lewis, Lehigh & Wilkes-Barre Coal Co., said that the rock often had to be transported too far from the mine to the dump for such transportation to be profitable. Again, the mine might be hoisting to capacity and any rock dumped underground would relieve the hoist of that much rock and permit it to raise more coal. In other cases dumping space was lacking at the surface. The rock could be dumped into chambers having an inclination of 25 deg. or less.

Scraper loading operations, according to E. W. Lamb, assistant general superintendent, Scranton Coal Co., Scranton, Pa., in his paper on that subject, had increased the production of the company per producer per start 2.2 tons and, with due consideration to all elements of the final result, reduced the cost 24 per cent. It must be remembered that the bed has an average thickness of 30 in. and contains 3 in. of bone at intervals. The roof and bottom are both of sandstone and of irregular contour, yet practically flat. The average cover is only 150 ft. The headings and air-

Getting the Low Down on New Equipment

ways are driven 6 ft. clear of the rail, 12 ft. wide in the bottom and 20 ft. in the coal and 500 ft. apart in the clear. Rooms 30 ft. wide on 54-ft. centers are driven from adjacent headings to meet. Four chambers are allotted to each scraper unit. The equipment and installation cost for one unit, including all props and loading chutes, is $1,604. Wooden rollers are used on the tail-rope side of each room, increasing the life of the rope 45 per cent.

Undercutting has proved disappointing. It improved the product, but it increased the cost unduly. In one 36-in. bed at one colliery it saved 9c. per ton, but only in that one installation did the cutting machine develop a profit. Mr. Lamb in discussion said that each unit produced 100 short tons daily with a 25-hp. hoist. Each unit he had previously said required nine men, a contractor who supervises and helps where needed, a miner and helper to drill the holes, blast the coal and prop the room, three shovelmen to see that the scoop takes a full load, to set the jacks and to extend the "scoopway," two car toppers to trim the cars, remove refuse and place cars and one hoistman.

Cadwallader Evans presented a paper on "Coal Cleaning at the Marvine Colliery, Hudson Coal Co.," showing that the number of attendants at the Marvine breaker, which was 69, is now only 28, a reduction of about 60 per cent. It was pointed out in the discussion that 28 persons, as many as now run the plant, were engaged in picking refuse, and Mr. Evans said that this was almost wholly made necessary by the change in the standards of cleaning that the jigs installed could not meet. Mr. Evans said that as much as 40 to 60 per cent of the domestic coal at some collieries was being condemned and even when cleaned to meet inspection at considerable loss the coal did not satisfy the sales forces, because of the competitive character of the market. Almost one-fourth of the running time was spent in re-running condemned coal.

In consequence three plans were suggested: To increase the number of jigs and operate them at lower capacity; to operate the existing equipment at its present capacity and recover from the waste a marketable product or to install entirely new equipment. The first plan promised a considerable expenditure and almost complete reconstruction of the plant with uncertainty as to the results when the change was made.

The second plan was tested by shipping the entire waste from the Marvine breaker for two days to the Laflin breaker to be treated through the Chance cones there located. The coal obtained from this second treatment was a product none of which was of excessive gravity but none of which was of low gravity. As a product unmixed with better coal it was not marketable. In consequence it was decided to install new equipment, and four Chance cones were installed.

Something had to be done, as 36.9 per cent of the refuse was material of a gravity under 1.75 which if salable as coal would have a value of $3.11 per long ton. All this could be obtained without crushing. Crushing the refuse egg and stove to nut, the value recovered by washing could be increased from $3.11 to $3.68. Crushing the refuse nut to pea and washing again, the total value recovered would be $3.82 per long ton.

With only two months of operation Mr. Evans was not disposed to present final conclusions. He said the equipment would clean 6,000 tons daily in a single shift, as had been clearly proved. The coal was of good appearance and had practically no slate. Only a relatively small percentage of coal has had to be condemned. Losses at the bank have been reduced and maintenance is as yet an unknown factor.

Mechanical Loading Flourishes in Far West

DEVELOPMENTS in mining methods in Colorado, Wyoming, New Mexico, Utah and Montana were described in a paper by D. A. Stout, chief engineer of the Colorado Fuel &Iron Co. at the Tuesday afternoon session, of which H. N. Taylor, president the United States Distributing Corporation, was chairman. In these five states there are 42 mines using some type of mechanical device for putting coal into mine cars, the total number of units being 180. Shovels and pit-car loaders have found greatest favor in Montana, Wyoming and Utah. In Colorado, New Mexico and southwestern Wyoming conveyor types predominate. It is expected that the tonnage loaded by machines in 1929 will represent an increase of about 17 per cent over production in 1928. Mr. Stout made the point that selective mining is as desirable in the winning of coal as in the recovery of other raw materials. He asserted that men attending the machines will not likely go back willingly to the hard unskilled labor involved in old methods.

In the Far West group Wyoming has outstripped her sister states in the adoption of loading devices. Utah comes second, Montana third and then Colorado and New Mexico. In New Mexico one operator conducted mining by six scrapers and one conveyor on a contract basis and reports favorable results by this wage arrangement. Mr. Stout declares the mechanized mines in the Rocky Mountain region are evidence that the output per employee can be doubled by change from the old methods of working.

*Rank of States in Per Cent of Total Output Produced Mechanically in 1928**

(Includes also pit-car loaders and hand-loaded conveyors)

State	Per Cent Loaded by Machines	Per Cent Handled on Pit-Car Loaders and Hand-Loaded Conveyors	Per Cent Mined Mechanically
Wyoming	36.4	5.0	41.4
Indiana	19.4	2.1	21.5
Utah	18.0	0.2	18.2
Montana	15.9	2.5	18.4
Illinois	6.1	7.2	13.3
Virginia	6.0	0.4	6.4
Alabama	0.6	3.0	3.6
Pennsylvania	1.2	1.0	2.2
West Virginia	1.5	0.2	1.7
Kentucky	0.8	0.2	1.0
United States	3.1	1.4	4.5

*Strip-pit output excluded.

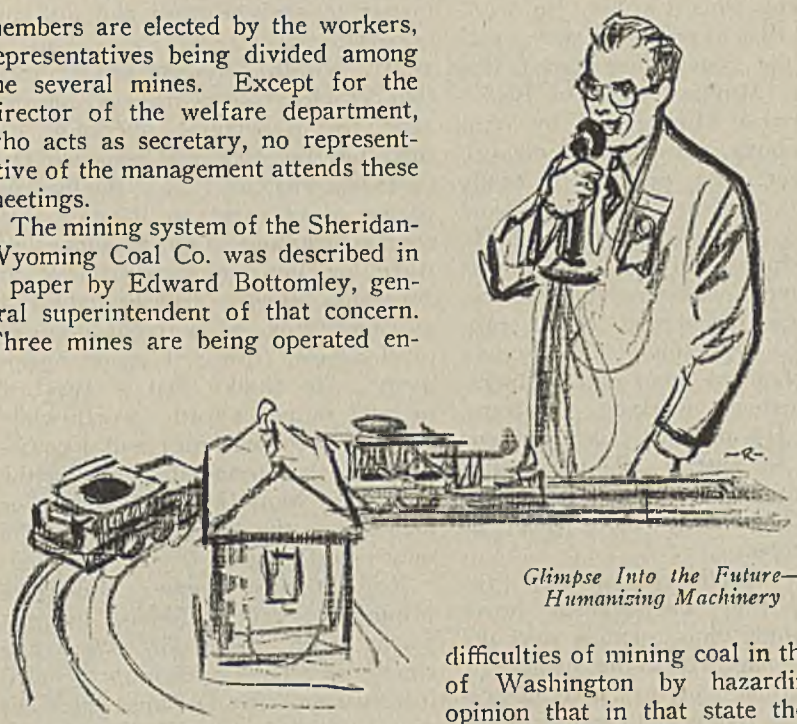
Seventy per cent of the men in the employ of the Stag Canon branch of the Phelps Dodge Corporation have served two to twenty years, remarked W. D. Brennan, manager, in a paper on handling labor, which was read at the Tuesday afternoon session by K. O. Wood, of the Temple Fuel Co., Trinidad, Colo. Mr. Brennan queried whether the fact that almost no other industry experiences so great a labor turnover might be due

to the operators not giving merited study to labor problems and perhaps not to the character of the industry. Lack of reliable statistics regarding labor turnover mirrors this reflection. He asked if the human factor, which, after all, is perhaps the most important for consideration, is not being overlooked in the fast strides of mechanization acceptance. Needless changes in the forces are accompanied by a very definite financial loss. At Stag Canon an employment office is maintained and here are kept detailed records of every employee. Mr. Brennan believes advertising for labor is bad practice because it might create the impression that the mine was an undesirable working place and few of the resultant applicants stick to the job.

His company is making determined efforts to whip the problems of seasonal demand for coal. An arrangement has been made with the railroad-company buyers by which the latter take their coal during dull seasons. Work is distributed more equitably among the workers by allowing certain ones of the mine crews to enter the mines and clean up their places on idle days. Each man usually produces two to three cars of coal on these days.

This company has profited by giving the employees the right of self-expression. An employee committee, which functions somewhat after the manner of a town council, meets monthly and at these meetings are discussed such measures as will redound to the betterment of social, living and working conditions. The recommendations made by the committee display sound judgment, so much so that about 90 per cent of them have received the sanction of the management. The committee members are elected by the workers, representatives being divided among the several mines. Except for the director of the welfare department, who acts as secretary, no representative of the management attends these meetings.

The mining system of the Sheridan-Wyoming Coal Co. was described in a paper by Edward Bottomley, general superintendent of that concern. Three mines are being operated entirely mechanically by this company. The machines used are mobile loaders and the seam worked is the Monarch, which is 22 ft. thick. As the result of mechanization of these mines labor turnover is extremely small. The mines have produced 4,000,000 tons of coal by machine loading without a single fatal accident. Further, the cost of major accidents per ton has been reduced from 2c. to 0.45c.



Glimpse Into the Future—Humanizing Machinery

A paper entitled "Power at the United States Fuel Co." was omitted from the meeting owing to absence of its author, L. D. Anderson, chief engineer, United States Smelting, Refining & Mining Co. George Watkin Evans, consulting coal mining engineer, Seattle, Wash., gave an illustrated talk on the mining of pitching coal seams. He indicated the difficulties of mining coal in the State of Washington by hazarding the opinion that in that state there exists a wider variety of perplexing conditions than perhaps anywhere in the country.

Longface mining with the shaker conveyor and duckbill was discussed in a paper by J. E. Edgeworth, mining engineer of the Union Pacific Coal Co., Rock Springs, Wyo. By this method as much as 360 tons has been gotten by a crew of nine men in eight hours, and the average daily output is about 250 tons. Mr. Edgeworth considers the method of joining pans of the shaker conveyor by bolts an antiquated practice which causes the loss of much time in setting up the conveyor. The Machatson pan fastener has been developed at Rock Springs to take the place of the bolt arrangement. It consists merely of a shank, a strap and a wedge which can be joined by three blows of a hammer.

Race Between Mining Systems in Midwest

IN HIS introductory remarks as chairman of the Wednesday morning meeting, J. M. Pauley of Chicago, chairman of the board, Miami Coal Co., said that with many of the highest grade and most favorably located coals nearing exhaustion, it is now the operator's job to learn to mine and prepare more efficiently the lower grade coals.

In a paper, "Development of Mining Methods in Illinois, Indiana and Western Kentucky," David Ingle, who was the first operator in Indiana to adopt loading machines, said deep mines were forced to mechanical loading to meet the competition of cheap production from strip operations. He is disposed to believe that the days of hand loading as a common practice, in Indiana, at any rate, are numbered. His reason for this statement was that no wage-scale adjustment can be made that would enable the man to compete with the machine in handling so bulky a material as coal.

At the conclusion of his paper he called attention to the greater savings possible in a mine opened on a plan for complete mechanization. He remarked that few mines have been opened up on a complete mechanical-loading basis from the start, for which reason many of the possible savings have not as yet been realized.

Snubbing pans, Cardox, Joy loaders, and two locomotives were features of the system described in the paper on "Mining System of Bell & Zoller Coal & Mining Co." by William P. Young, assistant general superintendent. At present the daily tonnage is composed as follows: hand loading, 1,100; pit-car loading, 2,600, and machine loading, 1,800. The features mentioned refer to the operation of the mechanical loaders producing the 1,800 tons. This production is obtained from six machines, five of which, working in rooms, average 314 tons per day and one working in entries 249 tons. For all six the average production, delivered on the parting, per man shift has been 19 tons.

Cardox explosive is used for double-shifting development work and snubbing pans, such as were described on page 210, in the April, 1929, issue of *Coal Age*, are used in preparing both rooms and entries for the mechanical loaders. The seam is the No. 6, containing a 1¾-in. dirt band which occurs about 18 in. from the bottom. The bed is 9½ ft. thick and 18 in. of top coal is left to protect the roof. Two locomotives are employed to serve each loading machine after the first breakthrough has been made.

According to Mr. Young, not only is poor supervision costly, but it deviates from the purpose of mechanical loading. Then answering a question put by Mr. Pauley, he conceded that to obtain a good percentage of lump and keep a high loading rate more money must be spent on shooting.

H. A. Treadwell, general superintendent, Chicago, Wilmington & Franklin Coal Co., the operations of which include the Orient mines, briefly outlined the salient points of a paper on maintenance and inspection of the company equipment. A report which takes the motorman, mining machine operator or loading machine boss not over 5 minutes to fill out is sent to the office each day and within 24 hours the shift operating data are posted on the master card for the machine.

With this card as a guide it is an easy matter to detect the faults or mistakes of the boss, the operator of the machine, the repairman and to determine weak parts of the machine or when oil and repair costs are inordinately high. Whatever might be the troubles, they are so clearly seen that it becomes a comparatively simple matter to analyze them and also to correct them.

Mr. Treadwell emphasized the fact that simple reports are very necessary for economical operation of machines but that making such reports is a waste of time if the man in charge of operation at the top does not use them to note shortcomings and if he does not take immediate action for improvement. He brought out an interesting point regarding the much-argued fusing of inside equipment. He thinks that a fuse of proper rating affords worth-while protection to machines and locomotives and has found that making the operative himself responsible for maintaining the designated fuse is the only practical way.

Roy Adams' paper, "Longface Mining in Southern Illinois," brought forth much discussion, consisting chiefly of requests for more detailed information. Mr. Adams, chief engineer, Old Ben Coal Corporation described the longface mining which was started about three years ago in the company's No. 8 mine, at West Frankfort.

Ordinarily 7 ft. of the 9-ft. seam is taken. The work was begun in the recovery of 110-ft. barrier pillars, but later new territory was developed and now only one of the five units is working in the barrier. A retreating "Y" system affording two loading faces is the plan followed. Roof bending is combated and caving encouraged by chopping out props and at times placing shots in the roof. Mr. Adams did not mention the make of loading machine used; it is the Goodman hydraulic shovel.

Tonnage Produced by Loading Machines, Pit-Car Loaders and Conveyors in Various States in 1928

(States are arranged in descending order of tota mechanized tonnage)

State	Handled on Pit-Car Loaders and Hand-Loaded Conveyors	Loaded by Machine	Total Produced by Mechanized Mining
Illinois	3,761,000	3,210,000	6,971,000
Wyoming	324,000	2,358,000	2,682,000
Pennsylvania	1,178,000	1,504,000	2,682,000
Indiana	234,000	2,192,000	2,426,000
West Virginia	183,000	2,007,000	2,190,000
Utah	10,000	868,000	878,000
Virginia	52,000	743,000	795,000
Alabama	519,000	95,000	†614,000
Kentucky	125,000	473,000	598,000
Montana	50,000	317,000	367,000
Other states	*564,000	792,000	*1,356,000
Total	7,000,000	14,559,000	21,559,000

*In order of tonnage: Arkansas, Washington, Missouri, Colorado, Oklahoma, Maryland, Iowa, New Mexico and Tennessee.

†In order of tonnage: Ohio, Arkansas, Washington, Missouri, Colorado, New Mexico, Oklahoma, Tennessee, Maryland, Iowa and Michigan.

Roof is not positively controlled, according to Mr. Adams. Manifestations of a squeeze are known to the officials and though they cannot foretell with certainty exactly when one will occur they are reasonably certain of one after about 50 per cent or more of the coal is taken from an area of 4 or 5 acres. A squeeze may occur at any time within a period of one year. With the exception of two 4-ft. strata of limestone, the 450 ft. of cover consists principally of gray shale.

Mr. Adams stated that the three years of experimentation have shown results which justify continuation of the general plan. The plan was initiated for the purpose of eliminating lost time from the changing of cars, but additional advantages were recognized, such as higher recovery, more lump coal, better efficiency from cutting machines, together with greater concentration and those advantages which thereby are derived. An unusual practice is the driving of rooms ahead of the long face to provide working places for the loading-machine unit in case of roof troubles. This was tried when the working time was only three or four days per week and when occasionally a face was lost. This method is now standard practice.

Answering a question as to safety, J. E. Jones, safety engineer of the company, said that with the system described by Mr. Adams the frequency of accidents is about one-third that with hand loading. With the hand loading about 4,000 tons is produced per injury as compared to 15,000 tons by mechanical loading on long face.

The final paper of the Wednesday morning session, "Coal Washing Plant for No. 9 Mine, Wheeling & Lake Erie Coal Mining Co.," by R. S. Walker, construction engineer for the company described a Simon-Carves washer now being built for the No. 9 mine, Fairport, Ohio, which mine is being reopened as a proving ground for mechanical mining. The washer will contain one 100-ton-per-hour unit. Mr. Walker said the following points influenced the decision to use the equipment mentioned: moderate investment, proved method, ability to clean 4-in. to 0 collectively and this with minimum degradation, ability to remove fine sulphur, simplicity of control, low operating cost and low maintenance cost.

South Analyzes Its Problems

WEDNESDAY afternoon was devoted to the progress of the Southern regions, with Alexander Bonnyman, chairman of the board, Blue Diamond Coal Co., Knoxville, Tenn., in the chair. D. A. Thomas, president, Montevallo Coal Mining Co., Aldrich, Ala., described briefly the "Recent Developments in Mining Methods in Southern West Virginia, Virginia, Eastern Kentucky, Tennessee and Alabama." He remarked that one Cahaba operator was using ten "paving breakers" in mining coal on a 15-per cent pitch. As a result of their installation the mine produced 8 per cent more of its product as lump and egg than it had by earlier methods. The tonnage per man on the longwall increased 15 per cent. The seam thus mined was 48 in. thick with a "middleman" 15 in. from the bottom. Powder consumption was decreased to such an extent that 1 lb. of powder was used as an average for every 32 tons of coal.

L. B. Abbott, division engineer, Consolidation Coal Co., Jenkins, Ky., described the mining methods of his company in the Elkhorn division, where the coal is divided into two layers by a most inconvenient fireclay parting which may be only 1 in. thick and may be 52 in., though that maximum is found only in prospect entries. In No. 205 mine the thickness varies from 8 to 18 in. Such a parting might result in a dirty coal but with the methods devised an excellent product has been obtained, the fireclay parting being removed by first cutting a kerf in the coal over the parting with a Goodman slabbing machine having an 11-ft. cutter bar.

The cuttings are loaded by a Myers-Whaley machine. As the parting is too hard to cut, four holes are then drilled on the upper surface of the lower coal layer and the parting is shot upward and shattered. As soon as the machine has made its cutting round it goes in turn to the rooms where the parting has been loosened by shooting and rakes out the loosened rock. One sweep usually will bring out most of the material but sometimes two are needed.

The Myers-Whaley machine again visits the place and loads the parting material into cars in which it is taken to the surface. The coal is then shot, three shots being placed in the upper layer and three in the lower, and finally loaded out mechanically.

In an article Lee Long, vice-president, Clinchfield Coal Corporation, Dante, Va., described the new

A Good Ear for News

Menzies Hydro-Separator and Arms air concentrator plant at Dante. It has a rated capacity of 300 tons daily. The Menzies washers wash the coal in three sizes, ⅜ x 1 in., 1 x 2 in. and 2 x 4 in. The Arms concentrator cleans the 0 x ⅜-in. coal. The dust is removed by an automatic self-cleaning Pangborn cloth-screen dust collector. The air from a group of dust hoods is partially de-dusted and used again as supply air to a second group of tables, decreasing the power capacity required for dust collection.

In the absence of C. P. Anderson, chief coal inspector, The New River Co., Macdonald, W. Va., his paper on "The Training of Men for Foremen and Superintendents" was not read.

Discussing the paper, J. W. Bischoff, general superintendent, West Virginia Coal & Coke Co., said that mine foremen often were more important to the efficient operation of a plant than the superintendent. It was the custom of his company to hold foremen's meetings twice a month. Lately it has been the custom to invite the superintendent of a neighboring mine to spend a day in the mine from which the foremen's meeting is recruited and to speak at the meeting when it takes place. It has been his preference to choose local men exclusively for filling company positions. F. R. Vinton said that the employment of engineers as superintendents usually was a disastrous experiment. As a rule they seemed to lack tact in handling the affairs of their office. He believed that engineering should be divorced from management.

Charles Enzian, chief engineer, Berwind-White Coal Mining Co., Windber, Pa., and Mr. Bonnyman expressed themselves as friendly to the technically trained engineer.

In conclusion R. M. Watt, Kentucky Utilities Co., Pineville, Ky., delivered an address on "Power Problems in Relation to Bituminous Production," in which he declared that no planning to reduce power consumption should overlook the fact that any reduction of the power bill that increased the labor cost more than it reduced the power cost failed to constitute a real saving.

In most cases, Mr. Watt said, the synchronous type of rotary converter is preferable. The synchronous motor-generator set, though it has a lower efficiency in conversion, maintains a better power factor where there is a highly inductive load to carry as well as direct-current equipment to be operated.

He advocated bringing fan equipment up to date. An inefficient fan, he said, is a continuous source of loss. It is cheaper to buy a new fan than to continue to meet this steady drain. Cleanliness is a leading need at mines. When tracks are covered with coal and slate the wheels do not give good electrical contact, and dust on the windings of motors, before long, works through the insulation and causes the coils to burn out.

Many mines, Mr. Watt averred, are using twice as much power as should suffice to do the work. The operator should know where his current is going. The quantity used by the mining village may be greatly in excess of what might be imagined.

Making the Mine Safer for the Worker

IN the years 1928 and 1929, said L. E. Young, vice-president, Pittsburgh Coal Co., Pittsburgh, Pa., mechanical loading caused no major accidents in bituminous or anthracite mines either directly or indirectly, if by a major accident is meant one causing the death of five or more persons.

This statement formed part of the opening paper of the Thursday morning session, over which M. D. Cooper, assistant general superintendent, Hillman Coal & Coke Co., Pittsburgh, Pa., presided. Mr. Young's article was entitled "Reducing Accidents in Mechanical Loading." His co-authors were C. A. McDowell, safety and personnel manager, and J. T. Clark, superintendent, Banning No. 2, both of the Pittsburgh Coal Co.

As the result of a questionnaire, said Mr. Young, it was ascertained that in 140 mines using mechanical loading appliances only 11 reported an increase in accidents, and, of this number, three reported a slight increase and four a probable increase in such minor accidents but without substantiating record to prove that conclusion. Seventy-four, on the other hand, reported that accidents had decreased.

Mr. Young reported in some detail the experiences at Banning No. 2 mine, where 10 in. of coal is left to support the drawslate and where the coal is 6½ ft. thick. The rooms are 14 ft. wide and are turned on 90-ft. centers. The coal is top-cut, sheared where convenient and drilled by track-mounted electric drills, the coal, both when advancing and retreating, being loaded from working faces not over 14 ft. wide. The overburden averages 350 ft. and the pillar line is laid at 45 deg. to the face. Four-ton cars are used, hauled from face to parting by 8-ton double-cable reel locomotives using current at 550 volts.

However, about one-third of the coal in this mine is and will continue for some time to be loaded by hand, as there is an area in the mine too remote from mechanical-loading sections and too restricted in size for mechanization. In this hand-loading the drawslate is removed.

The Bosses Talk It Over

In 1928 the number of accidents in the mechanical-loading section was eight and in the hand-loading section eleven times that number. Whereas 28,472 tons was loaded per accident by machine, only 3,683 tons was produced per accident in hand loading. With hand loading, accidents were 4.42 times more frequent per million hours worked than with machine loading; they were 13.7 times as severe in days lost per thousand hours worked; they were 22.3 times as great a loss reckoned in days lost per thousand tons produced. For the first three months of 1929 the figures were even more favorable to machine loading.

T. W. Stedelin, Marion County Coal Co., Centralia, Ill., said that in 1923, with hand loading, 185 tons was loaded per face accident whereas in 1928, with machine loading, 7,228 tons was loaded per face accident.

Fred Norman, Allegheny River Mining Co., Kittanning, Pa., said that 24 per cent of the coal of his company is loaded by scrapers. In the six mines, five have mechanical loading. Two of the smaller mines are wholly operated by machine loaders, some by the V-system and some with rectangular pillars. The Upper Freeport, Lower Freeport, Lower Kittanning and Brookville are all being worked.

With hand loading the fatality rate was 0.55 per 100,000 tons; with machine loading it was 0.45 for the same tonnage. With hand loading there were 12.04 accidents per 100,000 tons and with machine loading only 8.1. Greater intelligence in those employed in machine loading, more supervision, less men and multiplied detection of hazards explain these results.

Frank B. Dunbar, general superintendent, Hillman Coal & Coke Co., Pittsburgh, Pa., said that in the period from 1920-1926 4,000 tons was mined per accident, all accidents being included, no matter how insignificant. From 1926-1929 these accidents declined, so that 4,500 to 4,700 tons was mined per accident. In 1926 there was one conveyor and on April 23 of this year there were 21.

At first 24-ft. rooms and 24-ft. pillars were used. Then the rooms were increased in width to 40 ft.

This was found to give a bad cycle of operation, so the width was reduced to 35 ft. Blower fans are used, not for regular ventilation but solely to remove smoke from the room after shooting.

Lee Haskins said that with mechanical loading his company had no falls of coal from the face. With hand loading it had many because the men permitted the face to overhang. Other speakers were A. V. Sprole, Pocahontas Fuel Co., Pocahontas, Va.; F. S. Pfahler, Superior Coal Co., Gillespie, Ill., and H. A. Treadwell, Chicago, Wilmington & Franklin Coal Co., Chicago.

Eugene McAuliffe, president, Union Pacific Coal Co., Omaha, Neb., protested against the figures because they were mostly on the tonnage basis. He said that mechanical loading could only establish itself as a safer method of mining if and when it showed a decrease in accident rate per man-hours of exposure. The work was done in mines with one-fifth as many men, and to show a clean record accidents should be reduced accordingly.

He believed in giving his men a two-weeks holiday as a means of affording them a real vacation. Each mine will be laid off for two weeks yearly and the run of that mine will be increased prior to the vacation so that the men will not lose wages. He thought as far as accidents were concerned the industry was slipping rather than advancing.

Thomas G. Fear, general manager of operations, Consolidation Coal Co., Fairmont, W. Va., described in an article the safety courts of his company. These are formed by company employees and all of them, whether officials or workmen, are subject to the courts for any violation of the safety rules. Each court has a judge, a clerk, a prosecuting attorney, an attorney for the defense, all of whom are employees. There also is a sheriff and safety police, the latter being secretly named by the former, the names not being known till offenders are brought into court.

The accused can use the regularly appointed attorney for the defense, choose his own attorney or defend his own case. He also can demand trial by a jury of three persons nominated by the judge, but both attorneys have a right to challenge two of the jurymen so named. The verdict is according to the conclusions of a majority of the jury. Sessions are held monthly. If the accused does not appear on summons he is adjudged guilty.

Dr. J. J. Rutledge, engineer of mines, State of Maryland, said he had been instrumental in introducing the safety court into Maryland and that it has proved efficacious in reducing accidents. Mr. Fear stated that in 1926 there were 258,727 tons mined per fatality and up to April 1 in this year 1,261,754 tons per fatality. The court was made a recognized part of the safety campaign on Jan. 1, 1928.

The article by C. L. Lutton, safety director, H. C. Frick Coke Co., on "Underground Safety Inspections" was not presented. J. A. Saxe, chief engineer, Ellsworth Collieries Company, Ellsworth, Pa., briefed his article on "Modern Mine Ventilation, Including the Use of Altimeters." Mr. Saxe said that though fans can now be purchased with a guarantee of 80-per cent efficiency, 75 per cent was commonly obtained. However, owing to losses in motor and drive the figure was more nearly 70 per cent, or a loss of 30 per cent.

Early Birds

The average fan installed 15 years ago was about 50 per cent efficient and the over-all efficiency was about 45 per cent. Thus 55 per cent of the energy was lost, or 25 per cent more than with a modern installation. A saving of 25 per cent on the power bill might therefore be effected by installing a modern fan.

Pressure - distribution efficiencies are about 65 per cent and quantity efficiencies quite commonly only 35 to 45 per cent, but with a large mine 70 per cent can be obtained. The over-all efficiency is only 32 per cent for a well-operated mine but 8 to 15 per cent is quite usual.

Playing Safe

Mr. Saxe said that a gaseous mine might cost $50,000 more to ventilate per year than a non-gaseous mine, the cost per ton being 6 to 8c. He described his method of making air surveys with the Paulin altimeter. After the engineer makes his regular air survey, which is every six months, his report and recommendations are received in a conference at which the mine foreman, superintendent, mine inspector and engineer are present. This group decides on the changes to be made.

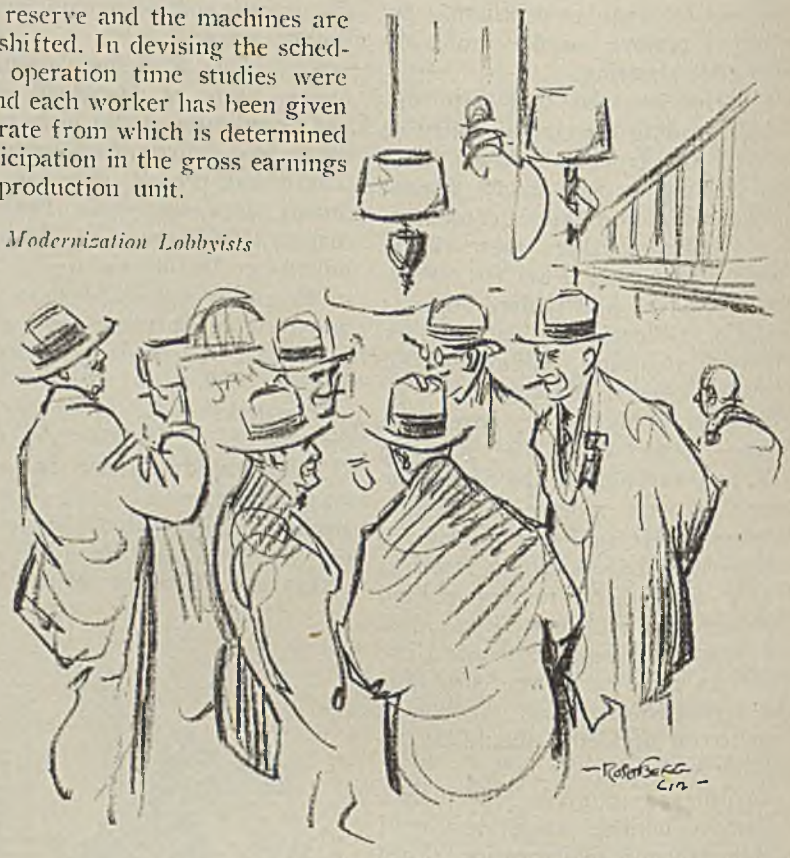
The cost of running the fan at a higher speed than is necessary to meet the requirements of the mine is so great that every fan should have a variable speed drive. Mr. Saxe said that any split in the mines of which he is engineer which generates 0.5 per cent methane is shut down or the ventilation increased. Where the percentage falls below 0.25 per cent a reduction of the quantity of the air in the split should be considered. At his mines about 2½ times as much air is used as is legally required. As firedamp with 5 per cent methane is explosive, ventilation that would maintain that percentage could be regarded as having a safety factor of 1. Where the air is maintained with a percentage of methane of from 0.25 to 0.50 the factor of safety is between 20 and 10.

East Shows Broad Technical Advances

OPERATORS of the Pittsburgh seam mines have made important advances in the direction of general betterment of operating methods, declared W. L. Robison, vice-president, Youghiogheny & Ohio Coal Co., who presided at the Thursday afternoon session. The most genuine progress made by this group has been in improving the quality of coal shipped. H. W. Showalter, president, Continental Coal Co., Fairmont, W. Va., struck a dissenting note in remarking that efficiency has been carried to the point of inefficiency. He said that the widespread introduction of machines underground is creating a new problem which will be marked by still greater overproduction and many more idle miners. Though he granted sound engineering in the betterment of coal-preparation methods he does not see sound judgment in the present preparation trend, feeling that it further sharpens competition and consequently further spoils the buyer. His views are contained in a short paper which he read at this meeting.

How, by complete mechanization of underground operations and a general revision of preparation and management methods, the Wheeling Township Coal Mining Co. strengthened its marketing position was described in a paper by E. J. Christy, consulting engineer, Adena, Ohio. The No. 2 mine of this company, where the change was made, is now provided with equipment for ten mechanical production units, each unit having one loading machine, one gathering locomotive, one cutting machine, one electric drill and a given number of 3½-ton mine cars, fabricated of steel and equipped with roller bearings. One of the ten equipment batteries is kept in reserve and the machines are double-shifted. In devising the schedules of operation time studies were made and each worker has been given a basic rate from which is determined his participation in the gross earnings of the production unit.

Modernization Lobbyists



A paper on "Drainage and Pumping in the Windber Field of the Berwind-White Coal Mining Co.," by E. J. Newbaker, general manager, was read by R. G. Pfahler, mining engineer of the company. The project involves the drainage of six mines in a basin, the lowest of which is the Maryland shaft mine. In this mine has been constructed a pumping station which handles about 3,500,000 gallons of water each day. The pumps are controlled and primed automatically.

The new station has relieved the old No. 35 central pumping station of about 40 per cent of its load, which in 1928 averaged about 4,500,000 gallons per day. It has transferred to other work eight men whose job under the old system was the maintenance and operation of pumps. It has eliminated 53 pumps from the service. The new station has resulted in a lower pumping cost in the first quarter of 1929 and it is expected that a gradual reduction will be experienced for some time to come.

"Some Economies in Longer Mine Haulage" was the topic of a paper by Newell G. Alford, of Howard N. Eavenson and Associates, mining engineers, Pittsburgh, Pa. The relation which a longer transportation system bears to the life of a plant in many instances is such that coal lying remote from a plant might be taken to it at a better profit than would accrue from the erection of a new plant. As a general proposition, said Mr. Alford, the ton-mile cost of the longer haul should be less than that of the short haul. He presented as illustrations of this cost-saving opportunity the methods of a number of mines where hauls are long and where large locomotives and cars are used

Increase in Tonnage by Machine, 1926 to 1928

(Includes mobile loading machines, scrapers, "duckbills" and other self-loading conveyors)

State	1926	1928	Increase — Net Tons	Increase — Per Cent
Illinois	2,036,000	3,210,000	1,174,000	57.7
Indiana	2,167,000	2,192,000	25,000	§1.2
Pennsylvania	856,000	1,504,000	648,000	75.7
Wyoming	1,142,000	2,358,000	1,216,000	106.5
Utah	115,000	868,000	753,000	654.8
Montana	.....	317,000	317,000	.....
Kentucky	182,000	473,000	291,000	159.9
West Virginia	2,001,000	2,007,000	6,000	0.3
Virginia and Alabama	1,198,000	838,000	†360,000	†30.0
Other States*	325,000	*792,000	467,000	143.7
	10,022,000	14,559,000	4,537,000	45.3

*In order of tonnage: Ohio, New Mexico, Tennessee, Arkansas, Iowa, Colorado and Michigan. §Excluding scrapers, Indiana shows an increase of 17 per cent. †Decrease.

and heavy track is laid. The main haul at the Vesta No. 4 mine of the Vesta Coal Co. is now seven miles long and eventually will be ten, 90-lb. rail being used. In the Rosedale mine of the Bethlehem Mines Corporation trips are handled at the rate of ten miles per hour in a trip of 140 cars by a 35-ton locomotive.

M. D. Cooper, assistant general superintendent of the Hillman Coal & Coke Co., said longer hauls mean larger units, heavier track equipment and better maintenance methods. He described the interconnection of three adjoining mines of his company into a single haulage system seven miles long. This arrangement will allow complete extraction, including the shaft barriers, as it is the intention to connect these operations eventually with the workings of a new mine. In layouts calling for longer haulage systems, he believes, bigger barriers should be maintained in order that the output during the last years will be sufficient to justify the continuance of operation.

Mr. Alford pointed out the advantages derived by longer hauls under such circumstances as prompted the H. C. Frick Coke Co. to install the Colonial and the Palmer belt conveyor systems, the former already having handled over 14,000,000 tons of coal. The freight differential from the Colonial Docks to the Clairton coking plant of the Steel Corporation is the difference between $1.01 by rail and 22c by water per ton. When asked for a comparison of costs as between belt and rail systems for underground haulage of large tonnages, Mr. Alford said one company reports a transportation cost of 2 to 2¼c per ton mile by belt.

E. K. Davis, electrical engineer, Peale, Peacock & Kerr, Inc., St. Benedict, Pa., presented a paper describing the Peale-Davis pneumo-gravity dry process of cleaning coal. In this system sizes ranging from dust to 6 or 7 in. are treated simultaneously on one table. For more refined results a second or re-treatment table is used. Thomas Frazier, of the Hydrotator Company, stated it is desirable in the cleaning of coal to treat individual sizes differently. He asked Mr. Davis if, for instance, it is possible by his system to handle nut coal and dust as individual products on the one table. Mr. Davis said the process provides this feature in the characteristic performance of the table in handling all sizes simultaneously.

Southwest, Home of Longwall and Strip Pits

LAST on the program but by no means last in inventive faculty, the Southwest with J. G. Puterbaugh, president, McAlester Fuel Co., McAlester, Okla., in the chair, held a morning session on Friday, May 17. After words of introduction by the chairman, Franklin Bache, president, Kali-Inla Coal Co., Philadelphia, Pa., described long-face operation with caving roof at the edge of roof jacks. This company formerly used room-and-pillar methods.

The coal is 4 ft. thick. The floor is hard and the roof sometimes is fair and sometimes good, but there are local spots when it is distinctly treacherous and slickensided. The headings on either side of the advancing long-face were driven so as to have 30-ft. pillars. The face was 250 ft. long and on a 10-per cent slope. The coal was conveyed to mine cars in the upper heading of the lower entry.

The pillar between the headings in the upper entry suffered much from the crush till the cribbing that had supported its lower side was replaced by a timber wall set like cordwood with the timber lying at right angles to the heading and 3 ft. 6 in. long. However, it was difficult to ventilate these entries, which were kept in advance of the longwall, and it seemed likely that it would be better to take up 4 ft. of bottom and with the heading thus made 8 ft. high try to do with tracks at two levels in one heading what had been done with two tracks in two separate headings.

It was decided that it would be difficult to drive the headings beyond the long-face without having two of them in each entry. In consequence it was planned to place a conveyor in the one remaining heading of the lower entry at right angles to the long-face conveyor to receive its coal and to deliver it to the cars at such a distance from the long-face that a whole trip could be run under the conveyor, the 8 ft. of height providing ample opportunity.

Getting Together

But now without two headings in the entry there would be no room for storage of empties, so a standing track was provided for empties over the top of the loading car track but wholly on the outby of the loading point. When the empties are brought in they are freed from the locomotive and raised by a hoist up a vertical switch with detachable rails to a track which is laid level with the bottom of the coal and supported on crossbeams. After the detachable rails have been removed the locomotive proceeds to the loaded cars and hauls them to the tipple.

The Langham jacks are capable of supporting 550 tons apiece but they are inadequate to hold the entire weight of 500 vertical ft. of roof, supposing the shelf or cornice along the working face is 15 ft. wide and all the weight of it falls on the jacks. As a matter of fact compression tests of the jacks, with timber above them, have shown that a piece of red oak 8x6x12 in. will fail at 97 tons and be compressed to half its original thickness when subjected to that pressure. A piece of red oak 2 in. thick is compressed to 1 in. at 103 tons and to ⅞ in. at 200 tons. As the cap pieces are rarely compressed to destruction the jacks under them can be subjected only to a pressure such as will afford them a safety fac-

tor of 5.5. Hence they never break.

They are supporting only 12 per cent of the entire weight. The intention is to use less compressible capping material, thus giving more effectual support, but the other 88 per cent seems to be well provided for either by frictional resistance between the undisturbed and broken strata, by the strength of the cornice or possibly, according to Mr. Bache, by the roof fracture turning back toward or over the pillar so that the cornice has above it broken strata which rest not on the cornice but on the fallen material of which it is a part.

Mr. Bache says the air all goes across the face without loss in the caved area. He finds that the holes are easier to drill after the coal is cut, for then, doubtless, the pressure is relieved. He is thinking of using self-dumping cars or perhaps boxes which will be carried on four- or two-wheel pedestal cars and will be held 3 in. clear of the rail. They can be wider than the tracks, and should carry a heavy load of coal. Why not? asks Mr. Bache; with the present arrangement the trips of cars need never be broken. Mr. Bache said that 20c. per ton would provide for the 4-ft. trench and 3½-ft. timber wall. He said he had used 2-ft. timber with success.

V. C. Robbins, chief engineer, McAlester Coal Co., McAlester, Okla., said that 65 per cent of the coal in the Paris field was conveyor-loaded, 30 per cent scow-loaded and 5 per cent hand-loaded. He practically outlined the same form of mining as was described by Heber Denman in *Coal Age* in the issue of May, 1928, p. 282 *et seq.*

K. A. Spencer, in charge of engineering, Pittsburg & Midway Coal Mining Co., discussed in a paper the handling of 25- to 50-ft. strip mining in the Kansas-Missouri field, where the coal has a dip of only 20 to 22 ft. per mile, or less than 0.5 per cent. The ground also is level and only 20 per cent of the over-burden has to be shot. It is easy and fast-digging material. For this reason as much as 15 ft. of overburden can be removed for 1 ft. of coal.

The overburden is so thin that it is possible often to swing the shovel only 90 deg., thus speeding up operations. Some of the seams that are being uncovered are only 12 in. thick and the thickest seam, the Cherokee or Weir-Pittsburg is only 3 ft. 8 in. thick. Another difficulty is the fact that with the Cherokee seam 13 per cent of the theoretical tons in place is horsebacks. The seams are drilled before operating at points 660 ft. apart and sometimes as close as 330 ft.

The thin cover has made it advisable to use equipment somewhat different from that used in other fields. The loading of coal also varies. Sometimes a 42-in. gage track is laid in the pit with 60-lb. rails. The berm need not be made wide, as the dirt, not having been shot, stands well; thus the stripper can be set so that its caterpillars are within 2 or 3 ft. of the edge of the coal. This reduces the swing of the shovel. The 10-yd. machine has moved 308,000 cu.yd. in 68 eight-hour shifts.

The "bank-machine," or "bank-haulage," system is peculiar to the Kansas-Missouri field. There are with this system no tracks in the pit; the track is maintained on the surface near the high wall. Either self-dumping skips are filled with coal and hoisted by a derrick, or else cars are lifted bodily from the track, lowered into the pit and there loaded and replaced on the track, one car being loaded while another is being hoisted and a third lowered. This method eliminates the berm in the pit and so reduces the swing of the stripper.

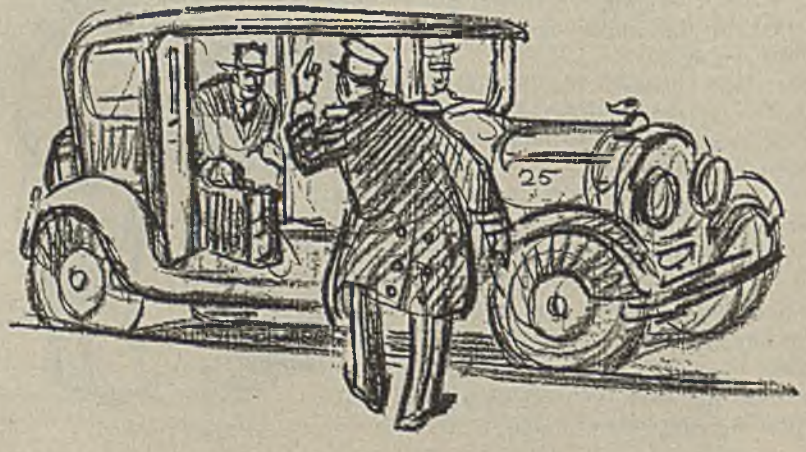
A horizontal-type loader with a boom built of structural members and normally on a horizontal plane is being used for digging coal. This machine shoves the bucket out on the boom into the powder-broken coal. It then hoists the entire boom and swings with the bucket around to the cars. There the bucket is tripped. A 2¾-cu.yd. bucket makes a complete cycle every 28 seconds. This kind of shovel is particularly well-suited for removing horsebacks, the material of which it stacks at the foot of the spoil bank. The coal of the Pittsburg & Midway Coal Mining Co. is cut by a vertical cutter which travels along a transit-directed line, thus protecting the track and lining up the stripper so that the swing of the shovel can be kept to minimum dimensions.

Drop-bottom cars are fast becoming standard. They range up to 15-ton capacity and have eight wheels. All the coal is cleaned before it is sold. At mines producing 1,500 tons daily as much as 60 tons may be picked and thrown away as refuse.

R. D. Hall, engineering editor, *Coal Age,* read a paper by W. H. Lesser, mechanical engineer, Madeira-Hill anthracite interests, on the Morea anthracite stripping. The area occupied by this operation is 4,000 ft. long and is only 350 ft. wide. The coal dips heavily on both sides of the basin so that the lower seam being mined will be 170 ft. deep in its deepest point. The two seams are the top and bottom beds of the Mammoth. They run from 10 to 30 ft. thick.

Of the original coal, 774,000 long tons remain, only a little of the deposit having been first-mined. To get this coal 2,180,000 cu.yd. will have to be removed, 90 per cent of which will be rock. The ratio of overburden to coal will be 2.82. One 4-yd. railroad-type shovel, one 3-yd. full-revolving type shovel and two 1½-yd. full-revolving type shovels are being used, all on caterpillars. The power used is 0.88 kw.-hr. per cubic yard of excavation.

Stepping Out to Cut Costs



KEEP OUT FIRES

. . . *Nature Will Do the Rest*

By R. Dawson Hall
Engineering Editor, Coal Age

REFORESTATION does not mean necessarily tree planting, according to A. C. Neumuller, the forester of the Lehigh Coal & Navigation Co., Lansford, Pa., one of the leading companies in the preservation of its timbered acres. It is frequently better for the owner of forest land to let hardwood growth renew itself from the sprouts of the old trees instead of planting new seedlings and waiting for them to grow.

Young trees newly planted would be a long time developing the splendid root system of the older trees which have been cut down, and if others are planted there will be competition for air and light between them and those shoots which spring up naturally. Especially will it be difficult for conifers to exist when crowded by vigorous hardwood sprouts, for they are successful only when they have the field to themselves.

Mr. Neumuller, who was for a while forester for New River Co., at Scarbro, W. Va., was a student under the celebrated Dr. Fernau at Toronto University. He said in an interview that it was better to plant conifers on areas that had been farmed and were abandoned than on cut-over, burned or blighted areas. There were many such—areas that should never have been cultivated, for they were too steep for tractor ploughing.

The conifers in such places could not be crowded out by hardwood growth and so did well. The Lehigh Coal & Navigation Co.'s subsidiary, the Panther Valley Water Co., had planted thousands of conifers on watersheds in order to get a canopy of evergreens that would keep the snow from melting away too rapidly in the spring. The companies saved water by thus arranging for a slow run-off. They rarely, however, planted conifers with any other purpose.

Anthracite companies would find less advantage than water companies in grown conifers. A 6-in. oak or other hardwood tree having a long strong grain would serve for certain kinds of mine timber, such as heavy forepoling or lagging, but a conifer of such a small diameter would be useless. The grain of the wood generally is too short. For that purpose a 12-in. stick is needed, but it may take 100 years to grow a 12-in. hemlock stick. White pine has a more rapid growth. It will attain that diameter in 75 years. Larch will take 40 years and oak as much as 125 years. Clearly, it is a forehanded company that will look forward to producing the heavier timber, whether hemlock or oak. Water companies, on the other land may, with reason, favor the conifers because even when small they protect the ground from the sun.

SO after all, the big work of the forester is not to plant saplings but to protect the forests from fires and to extinguish the latter whenever they occur. A secondary service is to get a balanced growth, that is to cut down the timber that, being too large and umbrageous, keeps light and air from the lesser trees, and to remove the under-growth for the same purpose.

Trees can be cut down close to the ground, and a ring of shoots will come up from the stump if the tree at the time of cutting is young enough to have the virility required. Thereafter the shoots can be allowed to grow, trimming off a few, however, if the growth at any point becomes too dense.

The net value of a ten-year re-

established forest is not great. An acre of such ground may bring a crop worth $40. On the other hand an acre of trees may have a stand of 20,000 board feet, which at $25 a thousand is worth $500 but consider how long a time—50 to 100 years—is needed to attain the results. In the anthracite fields in growing large trees the rate of return is much less than when timber of small diameter is sought and the fire risk is too great. It is much better to buy the large-dimension material and grow only the smaller—that is, at the ruling prices.

One of the Signs

THERE has been in past years a perfect mania for planting, and conifers have had the preference, but a saner point of view should replace it. The young trees are peculiarly susceptible to being burned, for it is some time before they develop any fire resistance and are large enough to kill the grass and weeds around them by their shade. Furthermore they are so long maturing that they may not be ready to cut before the coal is exhausted or until the ground is needed for some other purpose.

The area between the Schuylkill and Lehigh rivers is a part of the Weiser district, which has a third of the fires in the state and has suffered a third of the damage to timber. It was important to reduce this loss, all of which was the result of thoughtlessness. Evidently here was an opportunity for advertising education. Substantial annual expenditures are being made by the Lehigh Coal & Navigation Co. to educate the public in the necessity of caution in the use of fire in or near the woods.

Along the roads huge printed bulletins are displayed on boards measuring 8 ft. 3 in. x 10 ft. 6 in. During the period when the dangers of fire are imminent these are changed. The rest of the year they are used to advertise anthracite. Snappy slogans have been devised to carry the message. To further promulgate it, the company exhibits floats on appropriate occasions. Mr. Neumuller makes addresses at the schools and before organizations of all kinds.

In order to create interest in forestation and pride in the forests the Lehigh Coal & Navigation Co. has planted conifers along some of the highways and in some cases the children of the schools themselves have been intrusted with the work of planting the seedlings. It is realized that what they have created with their own labors they will not be disposed to destroy by carelessness nor willingly see others destroy to their detriment.

SOME of these trees have shown wonderful progress, partly because of the care with which they have been kept free of rival growth and partly because last year the moist weather made growing conditions unusually favorable. The larch trees increased their height in that year on an average 18 in., the white pine 14.9 in., the Scotch pine 8.6 in. and the Norway spruce 6.8 in.

Clear Away Undergrowth and Superfluous Trees That Rest May Grow

In 1913, when the forester service was definitely inaugurated, there were said to be 68 fires but it is probable that only the big ones were recorded, for during that year 15,000 acres was burned over. The management then decided that some action must be taken. Next year, as result of that activity, though 102 fires were recorded, only 1,402 acres was devastated by fire. The accuracy with which every fire, however trifling in outcome, was reported, as being potential in mischief, caused as many as 143 fires to be registered as occurring on the company's property in one year, but the acreage of devastation decreased.

However, the work could hardly be considered done till all needless fires were prevented, so the advertising campaign just described was devised and started. It was realized that many fires were being initiated by the company's own locomotives and steam shovels. This being brought home to the superintendents, a record was made in 1928 in that not a single fire was found that could be ascribed to the locomotives or shovels of the coal company or to its dumps. This, it is believed, has not been duplicated by any other mining company having long surface railroads and tramroads operated by steam engines.

SOME of this safety comes from keeping the spark arresters in good condition but much is due to precautions taken to provide "safety strips" on the sides of the mine roads. These vary in width. Where the contours are steep, wide strips are not necessary. Where the gradients on the tramroad favor the load the engines puff less and less sparks are emitted. Consequently the width of the strips can be decreased. When

(*Turn to page 354*)

Mine Inspectors Take Lid Off

Ventilation and Electrical Hazards

SEVERAL fresh aspects of safety, dealing chiefly with ventilation and electrical dangers, signalized the annual meeting of the Mine Inspectors' Institute of America, held May 7, 8 and 9 at Knoxville, Tenn. The Southern Appalachian Operators' Association entertained the institute with a banquet in the Whittle Springs Hotel and in an automobile trip into the Great Smoky National Park with luncheon at Gatlinburg, Tenn. The meeting was attended by fifty members and thirteen visitors representing sixteen states and including thirteen chief state inspectors. The institute now has 240 members as compared to 106 four years ago. Columbus, Ohio, was selected as the next meeting place.

Walter Glasgow, Secretary of Mines of Pennsylvania, was elected president. Other officers elected were: First vice-president, C. W. Stuart, district inspector, Upper Darby, Pa.; second vice-president, O. P. Pile, Nashville, Tenn.; third vice-president, Thomas Hunter, district mine inspector, Springfield, Ill.; secretary, C. A. McDowell, safety and personnel manager, Pittsburgh Coal Co.; assistant secretary, W. B. Hillhouse, chief mine inspector, Birmingham, Ala.; treasurer, J. J. Rutledge, chief mine engineer, Maryland Bureau of Mines, Baltimore; editor-in-chief, James T. Beard, Danbury, Conn.; publicity editor, J. H. Edwards, associate editor, *Coal Age*.

C. H. Crocker, state mine inspector, Johnstown, Pa., described the common ventilation practice in the 32- to 44-in. Upper and Lower Kittanning seams of western Pennsylvania, in which several individual mines have been developed to an annual production of 500,000 to 1,000,000 tons within a few years after being opened. In this field little gas is encountered in development but a considerable quantity may be liberated in second mining.

All air coming in contact in any way with a pillar area is diverted directly to the outside. Only permissible electrical equipment is operated within these areas. By providing air drainage channels leading into the next main at the top end of each butt or room entry and using overcasts at each butt, the coal-extracted area is used for the return and yet the butt aircourse is available for return if the fallen area closes itself.

If samples taken at the return end of a split show as much as 0.5 per cent methane, work is stopped until the condition is remedied. Because of bad roof and heaving bottom, long airways are abandoned in favor of additional shafts and fans near the active areas. The shafts usually are of the double-compartment type and average about 300 ft. in depth.

Replying to a question by Thomas Stockdale, district mine inspector, Bramwell, W. Va., Mr. Crocker said that a mine producing 1,000,000 tons per year from one of these low seams employs 800 to 1,000 men, has 32 to 36 air splits and is equipped with three fans which force a total of 500,000 cu.ft. of air per minute into the mine.

In a paper, "Utilize Electricity to End Uncertainties of Sectional Ventilation," J. H. Edwards, associate editor of *Coal Age*, proposed a flameproof, electrical supervisory system for keeping the mine management informed every minute of the 24 hours as to the continuity of air circulation in each section of a gassy mine. The paper represented an expansion of the ideas set forth by him in *Coal Age* last year (vol. 33, p. 164).

Following the reading of this paper J. J. Forbes, of the U. S. Bureau of Mines, said he thought well of the idea and asked for information on the probable cost of such an installation. Mr. Edwards replied he had not attempted to make detailed estimates but felt certain that the cost would be less than or comparable with the complete cost of spare ventilation equipments installed at some mines.

The discussion then centered on whether automatic devices can be made sufficiently reliable to be more trustworthy than human supervision. Edward Flynn, safety inspector for mines of the Tennessee Coal, Iron & Railroad Co., the Alabama subsidiary of the United States Steel Corporation, said experience has taught him that "the mechanical element is more reliable than the human element." K. L. Marshall, division engineer of the U. S. Bureau of Mines, cited the automatic train stop now used on several railroads to bring out the point that the ventilation supervisory system would not cause the mine bosses and men to become more lax but instead would cause them to be more alert. Reporting of open doors and other ventilation failures by the automatic system would better the supervision. A man could no longer leave a mine door open with-

out the fact coming to the attention of the officials.

John Daniel, chief inspector of Kentucky, said he is convinced of the practibility of the system and will put it before officials of some of the large operations of Kentucky as soon as he can obtain sufficient detailed data.

IN his paper, "Mine Safety," R. E. Howe, secretary of the Southern Appalachian Coal Operators' Association, said the word "accident" no longer appears in the association reports, but instead the word "failure" is used. "There are practically no accidents at the mines or anywhere else. So-called accidents are nearly always caused by failure on the part of someone to obey a rule or to use ordinary caution. They are often caused by the thoughtlessness or failure to think, failure to be careful, failure to obey the rules or failure to obey the laws of the state or the laws of common sense."

Referring to compensation and insurance, Mr. Howe warned his audience of a forthcoming bold statement, then said: "I am firmly convinced that the workmen's compensation laws tend to increase personal injuries." He thinks workmen, generally speaking, are inclined to be less careful and "the employer also becomes careless if his plant is working under the compensation law and carrying insurance." The latter statement was qualified thus: "This does not apply to all employers but will apply to enough to make some material difference in the number of injuries in the United States."

Bearing on this tendency, A. H. Findeisen, mine inspector, Wisconsin industrial commission, said that in his state for every $100 paid through insurance the employer must pay $15 and that the compensation is reduced 15 per cent if the employee is injured because of his own negligence.

"Failure is a good word but there are accidents where the most skilled man could not detect the danger," said Edward Flynn. His employer classifies accidents into one of the following: (1) Trade risk, which cannot be avoided; (2) carelessness on the part of the company's agents, (3) carelessness on the part of the injured and (4) carelessness on the part of a fellow workman.

Falling of a pot from roof that sounded "clear as a bell," at a point between closely set props, and the breaking of a car coupling which contained a flaw not visible from the outside were cited as accident causes that fall in class 1. Speaking of a foreman's responsibility, Mr. Flynn said his company enforces the principle that a foreman should never leave one dangerous condition to seek another.

A paper by H. P. Musser, of the West Virginia Engineering Co., Charleston, enumerated the principal precautions that are necessary in protecting electrical equipment to reduce the chance of shock, gas ignitions and fires. Also there were presented statistics of comparative frequencies of electrical injuries in 250- and 500-volt mines. Open trolley wire, the most common danger, was mildly treated. "The problem is to guard the overhead conductors as far as possible. Guard boards should be installed at junctions of entries, side tracks and crossings to protect workmen from coming in contact with the trolley."

In the discussion Edward Flynn said that the T.C.&I. shields all trolley wire that is less than 6 ft. 2 in. above the rail. The guard consists of two 1x4-in. boards supported by hangers placed 8 ft. apart on straight track and 4 ft. apart on curves. Crossings are shielded even if the wire is more than 6 ft. above the rail. The company has close to 500 miles of shielded trolley wire.

In a paper, "Basic Causes of Coal-Mine Accidents," Richard E. Simpson, of the Travelers Insurance Co., detailed an accident classification which in each case brings out the primary cause instead of the nature of the accident. "Travelers engineers made a searching investigation of more than 75,000 accidents, and from this survey arrived at the conclusion that 2 per cent of accidents are unpreventable while 98 are preventable; and of this 98 per cent, 88 per cent may be charged to supervisory failures and 10 per cent to physical failures."

Keep Out Fires

(*Continued from page 352*)

the prevailing winds blow toward the track the strip on that side of the roadway can be narrowed, for the sparks will rarely travel far in that direction.

The strips are made by constructing a "fire lane," a plowed area 6 to 8 ft. wide, 100 to 150 ft. distant from the track on the side opposite the quarter from which the wind blows and 75 ft. distant on the windward side. The grass and rubbish is burned on this area between the track and the fire lane. Last year about 20 miles of such fire lanes and safety strips were thus constructed along the narrow-gage roads and 5 miles along the highway.

Besides this, 29 miles of strips, 30 to 40 ft. wide, were cut for the protection of power and telephone lines. These help in fighting fire. A strip like this, 30 ft. wide and between 110 to 140 yd. long, can be cut in a day with a brush scythe and piled with a forked stick ready for burning. The adept cutters clip off the brush both on the forward and return strokes. These power-line and telephone-line strips are not outlined by fire lanes. The railroads cooperate in the program by creating fire strips along their rights of way.

Fires on Lands Controlled by Lehigh Coal & Navigation Co.'s Department of Forestry by Causes

Caused by	1926	1927	1928
Company's locomotives	5	4	0
Locomotives of others	1	2	0
Transients	5	8	14
Total number of fires	12	22	14
Area burned in acres	65.32	173.45	859.05
Net cost of extinction	$195.62	$152.07	$249.71
Average area per fire in acres	5.4	7.54	61.36
Average cost per fire	$16.30	$6.61	$17.83
Average cost per acre burned	$2.99	$0.88	$0.29
Percentage of lands burned	0.25	0.65	3.20
Acres untouched by fire	26,565	26,457	25,771

This intensive work in education and in the construction of safety strips has resulted in a marked decrease in the number of fires, only 14 being recorded in 1928.

The company has 26,000 acres of forest land. On this it has built one fire tower 40 ft. high, but it relies largely on the state towers, which are more numerous and built to a height of 60 to 80 ft. The company has direct telephone communication with all these towers. Last year it had 14 forestry employees, excluding the chief forester. There were four rangers, eight laborers, one teamster and one truck driver. The state designates the fire employees as state rangers, giving them the authority that goes with the office.

The company is using much gangway timber treated by zinc chloride and silicon fluoride and is about to test the Curtin-Howe process. Creosote-treated timber is used on the surface.

Improvements

Shown at CINCINNATI

What's *NEW* in Mechanical Mining Aids

NOTABLE advances in the loading of coal by machinery were recorded at the Sixth Annual Exposition of the American Mining Congress, held in the Music Hall, Cincinnati, Ohio, May 13-17. Within the short period of a year pit-car loaders, used to a limited extent before that time, have advanced into the limelight as never before. Simple in construction, they offer a means of taking off the shoveler the burden of lifting the coal, though they do not perform the whole of the loading operation.

Ten manufacturers of this type of equipment exhibited, some displaying as many as four models. Coupled with this advance in pit-car loaders were improvements in the heavier type of machine which performs the whole of the loading operation. Higher tramming speeds cut down the moving time, single conveyors (employed in one type shown) simplify construction, and swinging or swivel-type loading conveyors enable them to discharge coal into the car from all positions.

The efficient use and proper control of power has been the object of the manufacturers of electrical equipment and supplies. Major advances in the automatic control of substations and power circuits were demonstrated and explained by practically all of the firms specializing in electrical equipment for coal-mine use.

Safety and improved working conditions have not been neglected, as was evidenced by the increased number of machines on display which can be obtained with permissible equipment and controls, improved electrical safeguards, new designs in miners' lamps featuring greater emission of light, permissible explosives and exhibits of first-aid and safety material.

One hundred and ten exhibitors had space at the exposition, each of them featuring some product for the improvement of coal mining. Many of them, in addition, offered other items of equipment besides the one which they selected for special attention.

Machines Reduce Labor in Mining

Pit-car loaders held the stage among the machinery for the loading of coal exhibited at the exposition, ten companies showing this type of equipment. The Brown-Fayro Co., Johnstown, Pa., displayed the new "Brownie" permissible mine-car loader, model LC-10 (Fig. 1), which, it is claimed, is a readily portable machine. The construction embodies a double chain-flight conveyor with self-contained power unit, self-cleaning hopper, high-carbon pan bottom and totally enclosed working parts. It is said that two men can load 40 to 60 tons of coal a day using this machine.

All-steel construction is one of the features of the pit-car loader exhibited by the Jeffrey Manufacturing Co., Columbus, Ohio. This is a self-propelling machine and is equipped with steel chain with cross flights for conveying the coal. The conveyor boom is provided with adjusting screws to permit the height to be adjusted to accommodate the pit car or rolls in the track The conveyor is supported in a balanced position so that the loading end may be easily raised into the tramming position by pulling down on the conveyor boom. The conveyor is pivoted so that it may be swung in any direction for loading; also the drive is so arranged that it may be swung while tramming to permit it to negotiate curves easily. The manufacturer asserts that this machine has sufficient capacity to accommodate several loaders and may easily be moved. Independent jaw clutches permit propelling the loader without operating the conveyor or of moving the machine while loading coal.

Two types of pit-car loaders were offered for inspection by the Duncan Foundry & Machine Works, Inc., Alton, Ill. The plain type is a two-wheeled machine which may be operated on the track or pushed off for greater convenience. In the turntable type, Fig. 2, complete maneuverability is obtained by means

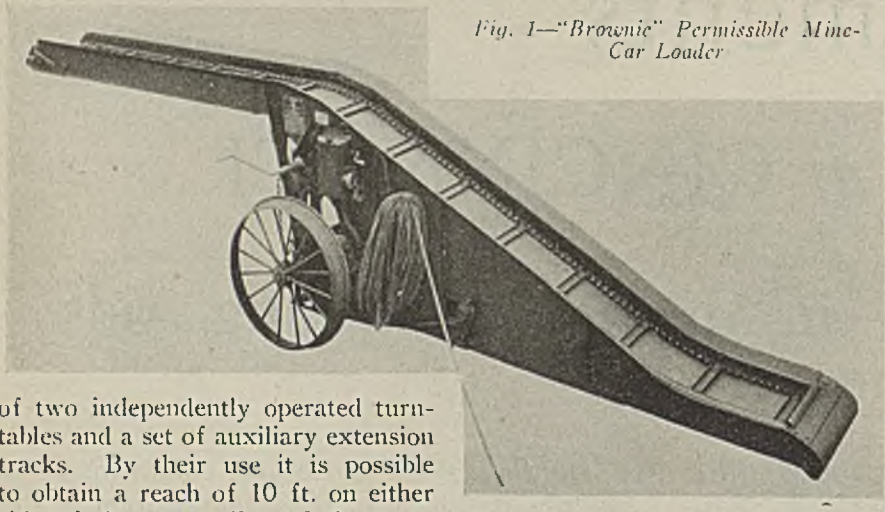


Fig. 1—"Brownie" Permissible Mine-Car Loader

of two independently operated turntables and a set of auxiliary extension tracks. By their use it is possible to obtain a reach of 10 ft. on either side of the center line of the room track. According to the manufacturer, Duncan conveyors will operate in 36 in. of coal and have a capacity of 60 tons per hour.

Light weight, flexibility, strength and durability are features claimed for the Tracy pit-car loader, built by the Bertrand P. Tracy Co., Pittsburgh, Pa. The height of the loading boom may quickly be varied from 30 to 52 in. by a simple raising and lowering device attached to the axle of the machine. It is powered with a 1-hp. motor and weighs 968 lb. Complete permissible equipment may be obtained if desired.

One pit-car loader — Style B, Model 45B—fully equipped with approved permissible electric motor and controls for use in gaseous mines and a second fitted with open-type motor and controls were exhibited by the Northern Conveyor & Mfg. Co., Janesville, Wis. The loading boom is adjustable to the height of the mine car in all models and the company features sturdy construction, long life and economical power requirements.

A flat bill which permits the loading end to be shoved under the loose coal and a bumper which affords protection while the machine is in motion and also is used in shoving the bill under the coal are features of the pit-car loader displayed by the Mt. Vernon Car Mfg. Co., Mt. Vernon, Ill. It is equipped with small trail wheels to facilitate movement and a hand wheel with two tension screws make adjustments in height easy. Lubricated bearings are reduced in number by use of a diamond roller chain without idlers or rollers except at the drive sprocket. Ball-bearing motors are used to reduce maintenance costs.

Roller bearings throughout is a feature of the Utility "Swivel-Type" pit-car loader displayed by the Egyptian Iron Works, Murphysboro, Ill. This machine is shown in Fig. 3. Its construction is such that it can be swung through a radius of 180 deg., making it possible to have the loading end where the work is to be done. At the same time it remains on the track at all times and loads directly into the center of the mine car. It may be moved by the men, pulled by a mule or locomotive or mechanically propelled as desired. The weight of the machine is 2,400 lb. and the manufacturer states that it will load a ton a minute.

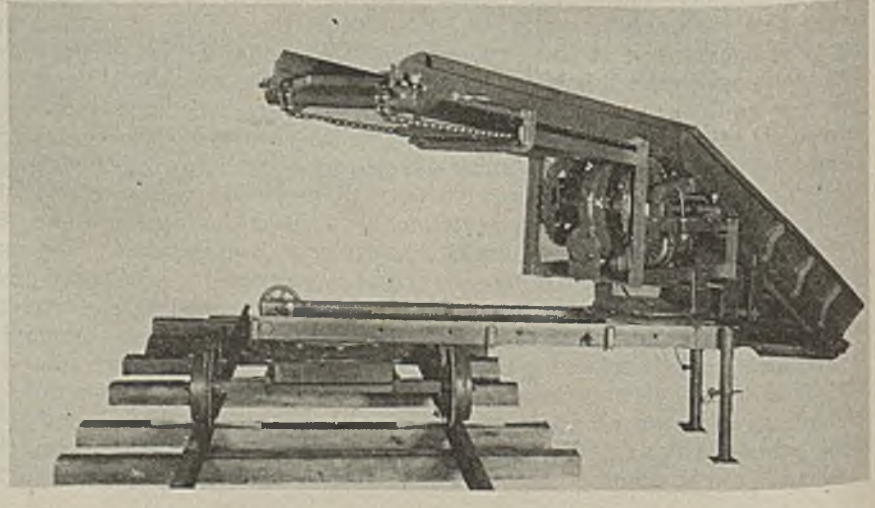
The Chicago Automatic Conveyor Co., Cicero, Ill., exhibited models 28 and 30 "Red Devil" pit-car loaders. The former is for low and the latter for high seams. Each is said to have a capacity of 30 tons per hour and to be easily adjusted for seam height, within a range of 15 in., by a self-locking rack and pinion operated by a hand ratchet lever. These machines may be obtained with permissible motors and controls as approved by the Bureau of Mines.

Fig. 2—Duncan Turn-Table Type Pit-Car Loader

The Mancha Storage Battery Locomotive Co., St. Louis, Mo., displayed its Type A and Type B "Coalgetters," one being a pit-car loader and the other a small motor-operated conveyor which is set along the face and discharges into the pit-car loader. A swing-type pit-car loader of the self-propelling type, the carriage of which is equipped with a pair of telescopic rails, was shown by the National Conveying Equipment Corporation, Chicago. The rails can be run out on either side of the carriage and carry a small truck on which the conveyor is mounted, thus allowing the conveyor to be moved about to facilitate loading.

The Myers-Whaley Co., Knoxville, Tenn., exhibited a special No. 3 shovel, shown in Fig. 4. This machine is equipped with a new high-speed tramming mechanism, increasing the traveling speed from 70 to 350 ft. per minute. This, it is asserted, makes it possible to cover a much wider territory than before and increases the efficiency where many moves must be made. Lubrication is now by the Alemite system, direct connections being made to each bearing. This system allows the machine to be oiled very rapidly and the visible spring cups assure proper lubrication.

Permissible equipment only is one of the principal features of the improved type 7BU Joy loading machine, shown in Fig. 5, made by the Joy Manufacturing Co., Franklin, Pa. The same patented gathering head is



employed as on the other units of this machine but the over-all height is only 40 in., permitting it to operate in seams 40 to 60 in. thick. A special feature is the single-strand discharge conveyor which moves through an arc of 45 deg. on each side of the center line for discharging into pit cars or conveyors. The loader is supplied only in permissible equipment for 220 and 440 volts a.-c. and 230 or 500 volts d.-c. According to the manufacturer, the guaranteed loading capacity is two tons per minute.

The Covington Machine Co., Covington, Va., exhibited their new Covington low-type loading machine with reciprocating loading head and swinging conveyor. This machine was described in *Coal Age*, May, 1929, issue, page 327.

The Conveyor Sales Co., New York, displayed the new "Cosco" shaker conveyor drive with Goodman permissible motor and control. Motor

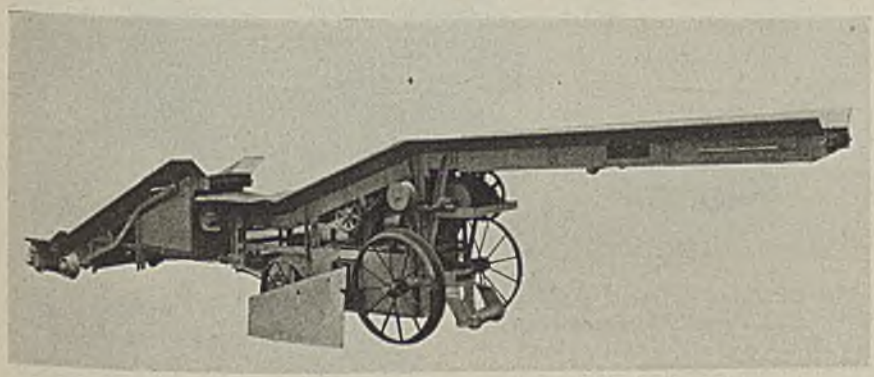


Fig. 3—Standard Swivel-Type Pit-Car Loader

and control, it is asserted, can instantly be reached and the working parts withdrawn for inspection and adjustment if necessary. The casing and working parts are ruggedly constructed and it is said that the compactness of the unit make it ideal for low seams. The Ironton Engine Co., Ironton, Ohio, showed a shaker-conveyor driving engine, and the Traylor Vibrator Co., Denver, Colo., had a short vibrating conveyor in action. The Lorain Steel Co., Johnstown, Pa., presented low-type face and main conveyors for inspection. Another contribution to conveying machinery was the E22 shaker-conveyor driving gear of Meco, Inc., Baltimore, Md., opened to show its operation. The Link-Belt Co., Chicago, displayed pictures of conveyor installations in various coal mines.

Considerable attention was attracted by a new development in the

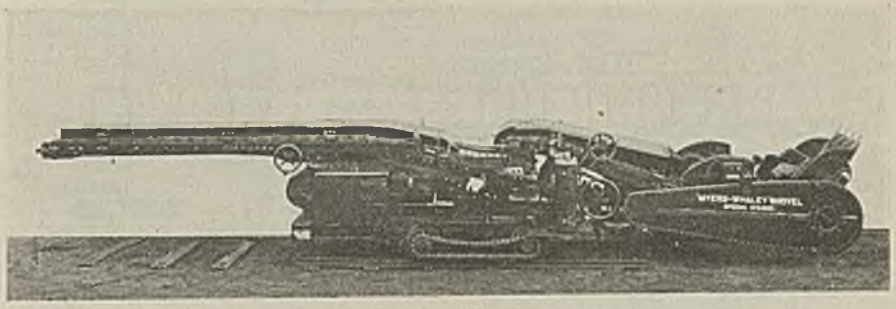


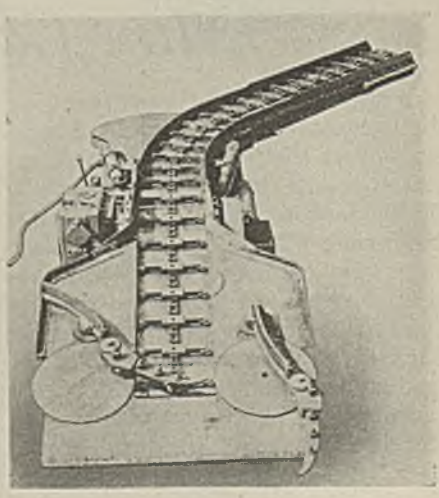
Fig. 4—Myers-Whaley Shovel, No. 3 Special

loading of pit cars exhibited by the Valley Camp Coal Co., Cleveland, Ohio. This equipment, shown in Fig. 6, consists of a Valley Camp buggy—or pit-car loader—and the Paisley conveyor. The latter consists of a flat belt conveyor supported on a steel frame which is attached to the buggy. A plow operated by a steel rope moves back and forth along the conveyor and discharges the coal into the cars. The conveyor is supported on jacks which run on pipes to facilitate movement. It may be obtained in 20-, 30- or 40-ft. lengths and the maximum weight is 800 lb. The height is readily adjustable from 2½ to 5½ ft. and the machine, it is claimed, is easily moved by two men. Its design incorporates an endeavor to allow the loading of a full trip of cars at a time, thus eliminating the usual loss of time where each car must be changed when loaded.

Among the mining machines on display was the new 35-L shortwall coal cutter of the Jeffrey Manufacturing Co., Columbus, Ohio. This is a low-vein machine with an over-all height of 18 in. and a 50-hp. motor. Two live-rope drums are provided, each with a low speed for sumping up and a high for handling the machine. They are independently operated and may be used separately or both at the same time. The manufacturer states that a minimum of gears have been incorporated in the design, making the construction exceptionally rugged. Control may be of either the standard or contactor type and either a standard "Handitruck" with a swiveled and tilting platform or a low-vein truck with a tilting, non-pivoting platform can be obtained.

The Sullivan Machinery Co., Chicago, displayed a "CLU" track cutting machine equipped with a Sullivan universal drill. Its adaptability to shearing, cutting and drilling was demonstrated. This company also exhibited the "CLE-2" undercutting machine. The Goodman Manufacturing Co., Chicago, Ill., displayed the 324-AA slabbing machine, arranged to meet the special requirements of cutting below the rail. Bits and equipment were shown by the Pittsburgh Knife & Forge Co., Pittsburgh, Pa.; Templeton, Kenly & Co., Ltd., Chicago, and the Bertrand P. Tracy Co., Pittsburgh, Pa. The latter organization displayed something new in the line of a cutter

Fig. 5—Permissible Joy Loading Machine



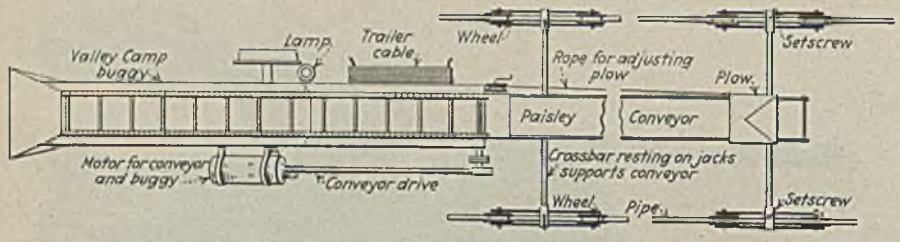


Fig. 6—Diagrammatic Drawing Showing Operation of the Paisley Conveyor

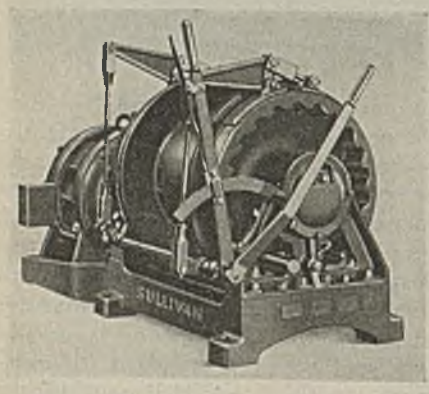


Fig. 7—Sullivan 25-Hp. Single-Drum Motor-Driven Hoist for Car Pulling

chain without side straps and with guide flanges on the bit block. Longer life and greater strength are claimed. This company also featured an improved cutter bar adaptable for use on the Goodman shortwall cutting machines.

Room hoists were shown by a number of manufacturers. The Sullivan Machinery Co., Chicago, featured the HE-4 25-hp. single-drum motor-driven type for car pulling. Side-operating levers are provided, as shown in Fig. 7. Two models were displayed by the Brown-Fayro Co., Johnstown Pa. The first is the "Brownie" permissible hoist, model HG, with Crocker-Wheeler motor and switch. Sometimes known as a room hoist, this machine may be used inside the mine or out where the maximum rope pull does not exceed 1,500 lb. The second, or "Brownie" hoist, model HI, features an electrically-operated remote-control brake to be used where it is desired to hold the load on a grade any length of time. At speeds of 20 to 50 ft. per minute, the draw-bar pull is 5,000 lb. According to the manufacturers, it may be used to pull a trip of cars past the loading head of a conveyor or scraper loader.

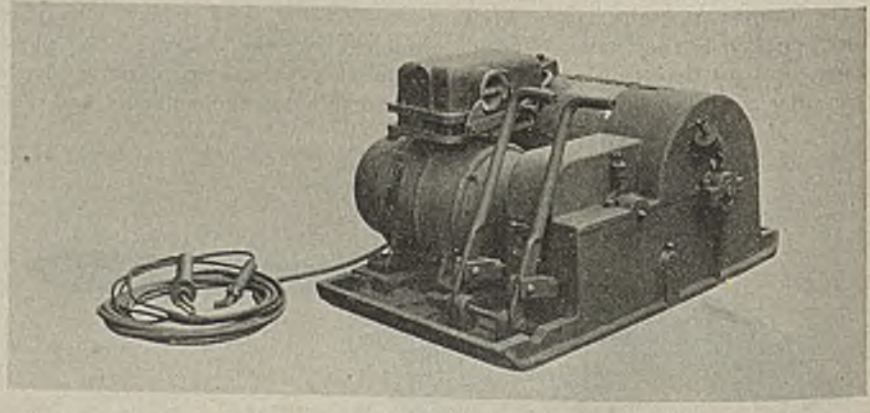


Fig. 8—"Brownie" Room Hoist, Model HG, Permissible Equipment

A retarder provided with a hand crank for rewinding the rope on the drum, designed for lowering trips of cars past the loading heads of conveyors or scraper loaders, was exhibited by the Brown-Fayro Co., Johnstown, Pa. It is known as the "Brownie" car retarder, model RB (see Fig. 10), and has a braking effort of 8,400 lb.

The Chicago Pneumatic Tool Co., New York, displayed the new 472 Little Giant 700 type mounted coal drill and also the 474, 900 type, both of which are of the newest design. The No. 472 drill, shown in Fig. 11, is equipped with an improved post mechanism making it one-man in operation. The improvements consist of a notched post and a ratchet on a turntable with a ratchet dog to engage notches in the post, making it unnecessary for the operator to support the drill when adjusting it to drilling position. According to the company, the operator places the drill on the turntable, lifts it to the drilling height and tightens a hand set screw when the ratchet engages the notch in the post. Other types of coal and rock drills also were on display.

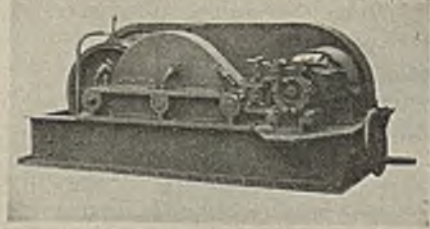
Detachable blades for coal augers were exhibited by the S. & S. Manufacturing Co., Centralia, Ill., and the McLaughlin Mfg. Co., Joliet, Ill.

Mine Cars Are Bigger and Better

Improved types of cars featuring high capacity and minimum dimensions were the leading objects of interest in the line of rolling stock. The Sanford-Day Iron Works, Knoxville, Tenn., featured their new large-capacity S & D bottom-dumping cars, such as were recently built for the Central Indiana Coal Co. This car, shown in Fig. 12, is for loading by steam shovel and has a capacity of 571 cu.ft. The over-all length is 24 ft., 10 in., height 6 ft., 8½ in. and the weight is 17,520 lb.

Carrying out the idea of high capacity, the Enterprise Wheel & Car Corporation, Bristol, Tenn.-Va., has constructed the mine car shown in Fig. 13. As may be seen, the first upright plank present in the usual design has been eliminated, the flare plates coming directly off the bottom plank. Greater capacity is therefore possible without changing the over-all dimensions or the same capacity may be secured with a decrease in height of 3 to 8 in. There is no change in bumper height or couplings and these cars will work in with the regular size. Actual installations, according to the company, show an increase in

Fig. 9—"Brownie" Hoist, Model HI



capacity varying from 10 to 25 cu.ft.

P. W. Holstein, Columbus, Ohio, displayed a model of the bottom-dumping car developed by his organization. Its construction is shown in Fig. 14, the bottom being held to the body by hinges at one end which allow the bottom to drop and discharge the coal. It is used with a dump of Holstein construction which allows continuous dumping. The American Car & Foundry Co., New York, featured in its display a new any-capacity automatic drop-bottom hopper car for stripping operations. An automatic control opens the doors and locks them again as they pass over the dump. The company also showed a new low-type large-capacity drop-bottom mine car which it is now prepared to supply to the operator. The Lorain Steel Co., Johnstown, Pa., offered several types of steel mine cars of its own manufacture for inspection, and the Bonney-Floyd Co., Columbus, Ohio, displayed a high-capacity, high-live-load-ratio, roller-bearing mine car with spring draw bar, spring bumper and alloy

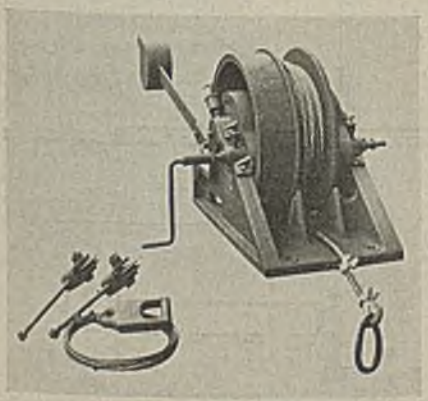


Fig. 10—"Brownie" Mine-Car Retarder

steel wheels. This company also had on display cast-steel bumpers, cast-steel wheels and cast alloy-steel heat-treated mine-car couplings. Models of the latest type mine cars were exhibited by the Watt Car & Wheel Co., Barnesville, Ohio.

Three manufacturers offered complete locomotives for inspection by delegates attending the exposition. The Baldwin-Westinghouse permissible mine locomotive was a feature of the joint display of the Baldwin Locomotive Works, Philadelphia, Pa., and the Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa. A 20-ton mine-haulage locomotive equipped with two 125-hp. motors,

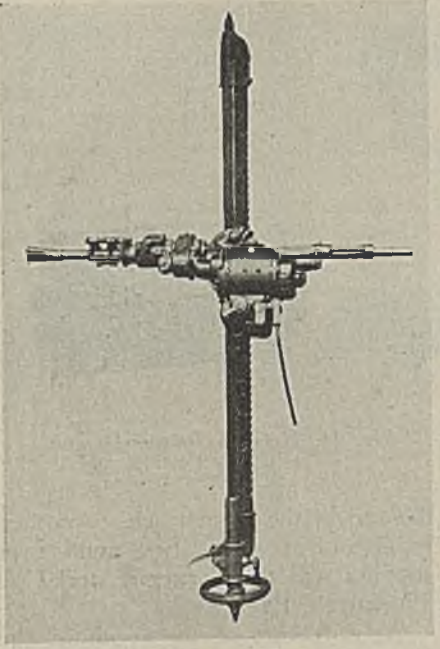


Fig. 11—No. 472 "Little Giant" One-Man Drill

contactor control, air brakes and air sanders was shown by the General Electric Co., Schenectady, N. Y. The Goodman Manufacturing Co., Chicago, Ill., exhibited an 8-ton combination trolley and double conductor, cable-reel, slow-speed gathering locomotive with explosion-proof compartments and Goodman tongue and groove construction.

A gasoline locomotive designed for stripping and car-shifting work was shown by the Cincinnati Car Corporation, Cincinnati, Ohio. It is known as the Model 1202 and is illustrated in Fig. 15. The equipment includes a Hercules engine, either straight or automatic air brakes and a device allowing the operator to couple or uncouple cars without leaving his seat in the cab. According to the manufacturer, it can be built for any gage, will operate at one-half the cost of a steam locomotive, and will handle 5 or 6 loaded railroad cars or 12 to 15 average strip cars, fully loaded.

For controlling the operation of

Fig. 12—S & D Large-Capacity Bottom Dumping Car for Stripping

trips the Mines Equipment Co., St. Louis, Mo., offered the "Electric Switchman." This is a magnetic device for throwing a switch while the motor or trip is in motion and is actuated by the motorman making an instantaneous contact with a contact strip or ground section of trolley wire. Connections to signal lights are provided to tell the motorman which position the switch is in.

A number of models of hoists and dumps were set up at the exposition. Of these, the Mining Safety Device Co., Bowerston, Ohio, showed the Nolan power-driven rotary dump, consisting of a structural steel cage with rings at each end resting on and rotated by steel rollers. The driving rollers are direct-connected through a reduction unit to an electric motor or other source of power. It is said that the power requirements are less, there is no jar in dumping, positive starting is obtained and slippage prevented. These dumps are equipped with automatic car stops in dump and with car feeders of the automatic or gravity type. The Sanford-Day Iron Works, Knoxville, Tenn., showed the operation of the drop-bottom car over the dump. Other manufacturers having models on the floor were the Phillips Mine & Mill Supply Co., Pittsburgh, Pa., and the Roberts & Schaefer Co., Chicago.

The Allen & Garcia Co., Chicago, had on display a model of a skip hoist, showing the construction and

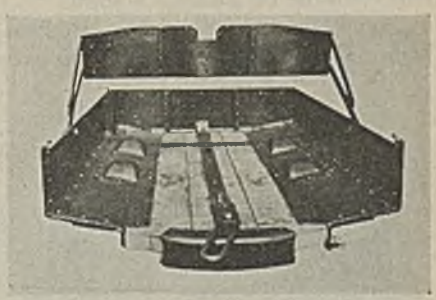


Fig. 13—New Construction for Lowness and Large Capacity

operation. The new OC-6 Olson self-dumping cage was displayed by the Eagle Iron Works, Des Moines, Iowa. This cage is equipped with the automatic car stop and release mechanism developed by this company and the claim is made that fewer parts and greater strength have been incorporated into the design.

New types of track equipment and supplies were exhibited by several manufactures. The West Virginia

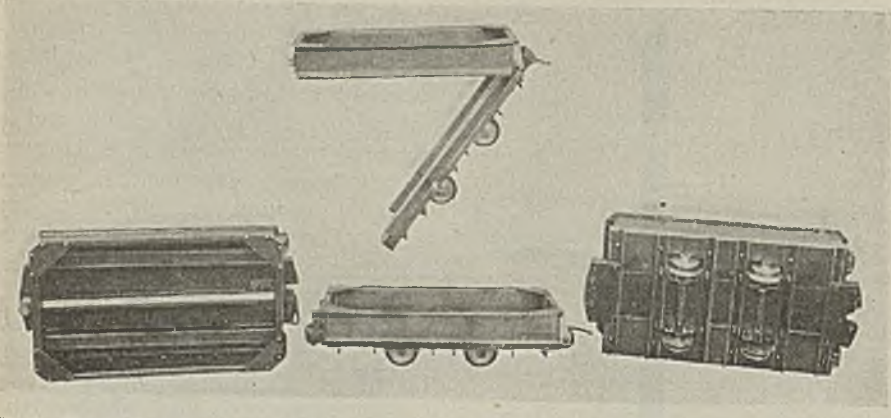


Fig. 14—Holstein Bottom-Dumping Mine Car

Rail Co., Huntington, W. Va., displayed its newly improved joint and main-line ties, a new permanent rerailer and the Hunt balling tie (Fig. 16). The latter, according to the manufacturer, furnishes a quick, economical and satisfactory method of advancing a room track to the face of the coal. In the figure the main track rail is indicated by *B*, the balled rails by *A* and the special ties by *C*. Suitable clips hold the main rail alone in place, the main rail and the balled rail or the balled rail only. As the face moves from *D* to *E*, the rails *A* are slid forward at will until the ends of *A* are opposite the ends of *B*. Additional lengths of main rails can then be laid and rails *A* ballad in these. As the track progresses, standard steel ties can be substituted for ties *H* or the special ties can be left in place. Two ties and a short piece of rail offer a ready means of making a joint.

The Bethlehem Steel Co., Bethelehem, Pa., had a new jump-over

Fig. 15—Cincinnati Car Corporation Stripping Locomotive

turnout and a new 5 ft. switch and turnout on display. The latter is illustrated in Fig. 17, and the construction is readily apparent. The ties are so constructed at the ends that movement of the turnout on the mine floor is prevented. The jump-over turnout allows cars to be switched temporarily without cutting the rail in the main track. Another exhibitor of rails, ties and track supplies was the Carnegie Steel Co., Pittsburgh, Pa.

As a feature at the booth of the Watt Car & Wheel Co., Barnesville, Ohio, this company offered a new power-driven rail straightener. Its appearance and construction is shown in Fig. 18. A 1-hp. motor supplies the necessary power for operation and tension is applied to the rail to be straightened or bent by a tension screw operated by a large handwheel. The machine displayed will handle rails from 20 to 40 lb. and is said to be readily portable and adapted to use either inside or outside the mine.

In addition to the manufactures and products mentioned above links, hitchings, couplings, frogs, car wheels and other haulage equipment and supplies were displayed by the Duff-Norton Mfg. Co., Pittsburgh, Pa.; Egyptian Iron Works, Murphysboro, Ill.; Hockensmith Wheel & Mine Car Co., Penn, Pa.; Ironton Engine Co., Ironton, Ohio; Mancha Storage Battery Locomotive Co., St. Louis Mo.; Mt. Vernon Car Mfg. Co., Mt. Vernon, Ill.; National Malleable & Steel Castings Co., Cleveland, Ohio; Ohio Brass Co., Mansfield, Ohio; Pittsburgh Knife & Forge Co., Pittsburgh, Pa.; Bertrand P. Tracy Co.,

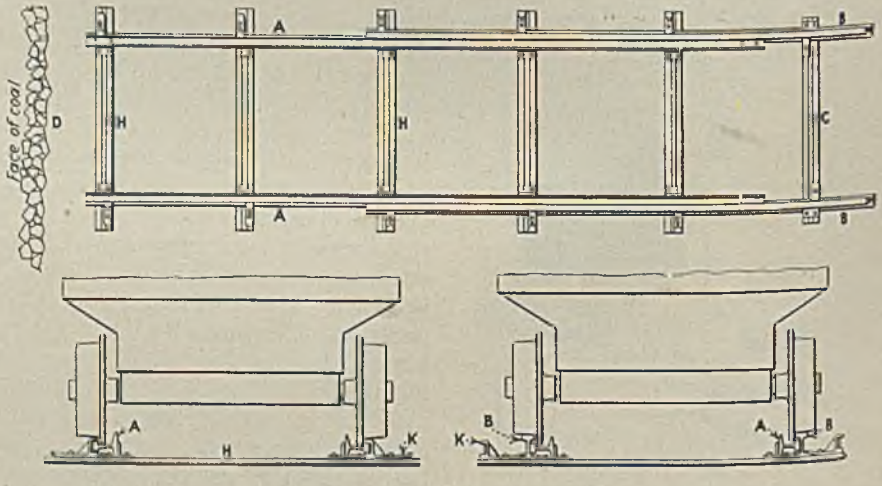
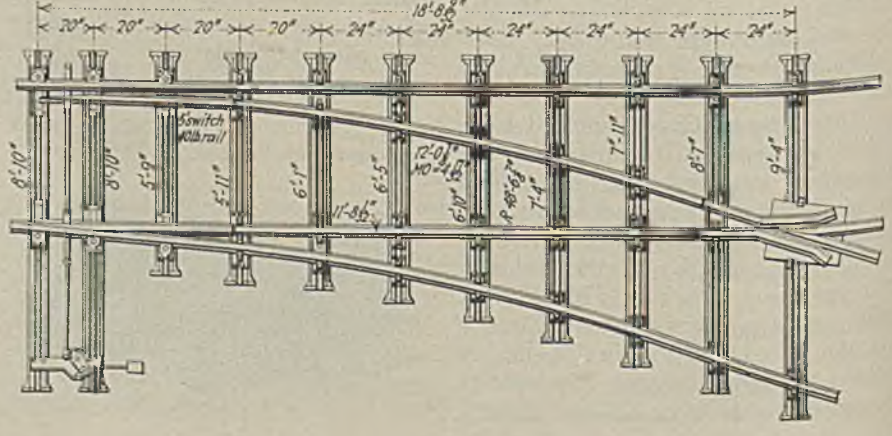


Fig. 16—Hunt Balling Tie in Use

* * *

Fig. 17—Five-Foot Switch and Turn-out Assembled on Bethlehem Keystone Metal Ties



Pittsburgh, Pa.; Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.; Tool Steel Gear & Pinion Co., Cincinnati, Ohio, and the Flood City Brass & Electric Co., Johnstown, Pa.

To facilitate the weighing of pit cars and coal, Fairbanks, Morse & Co., Chicago, offered a new mine-car dial scale. This is of the suspension-bearing type and readings of the net weight of each load can be taken from the full-capacity direct-reading chart in a minimum of time, according to the company. Liability of error is practically eliminated, it is claimed. Levers can be mounted on the corner stands supported directly on the foundation piers or can be suspended from the corner irons, depending upon the requirements of the installation. The dial is graduated for a capacity of 10,000x50 lb. The Streeter-Amet Weighing & Recording Co., Chicago, Ill., exhibited an automatic weight-recording attachment for mine scales which gives a printed record of the weights.

Preparation Stepped Up to Meet Demands

Pictures, models and the printed word were relied on to present the message of the manufacturers of preparation machinery and equipment in the several cases where space did not permit the actual equipment to be shown. The Chance Coal Cleaner, Scranton, Pa., was represented by a model plant showing the installation and operation of the Chance separator. A working model of a Rhéolaveur free-discharge plant, operated by a 1½-hp. centrifugal pump, demonstrated the cleaning of the finer sizes of coal in the exhibit of the Koppers-Rhéolaveur Co., Pittsburgh, Pa. This organization also showed a scene-in-action diagrammatic picture of a complete Rhéolaveur plant operating on minus 4-in. coal.

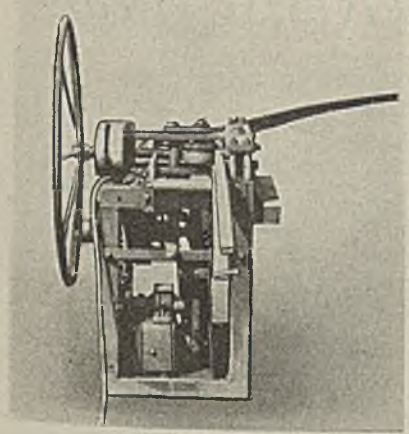


Fig. 18—Power-Driven Rail Straightener

A model tipple showing the operation of horizontal and inclined screens and the loading of coal over loading booms was the contribution of the Morrow Mfg. Co., Wellston, Ohio. Roberts & Schaefer, Chicago, urged the installation of combined wet and dry preportion plants and showed drawings and photographs of the Arms screen, air vibrating screens, air concentrators and the Menzies Hydroseparator. The principal feature of the exhibit of the Pennsylvania Mining Machinery Corporation, St. Benedict, Pa., was a model of the Peale-Davis air table in operation, showing its construction and the method of separating the impurities from the coal.

Screen and perforated plates were exhibited by the Hendrick Mfg. Co., Carbondale, Pa., and the Phillips Mine & Mill Supply Co., Pittsburgh, Pa. The Egyptian Iron Works, Murphysboro, Ill., had its ball-face, self-oiling, self-aligning shaker screen eccentric on display. The Bradford breaker and the results it achieves were features of the exhibit of the Pennsylvania Crusher Co., Philadelphia, Pa.

Vibrating screens are coming in for no little attention if the number exhibited is any criterion. The Roberts & Schaefer Co., Chicago, offered for those seeking this type of equipment air vibrating screens. Leahy No-Blind screens were incorporated into a model preparation plant containing a Deister-Overstrom diagonal-deck concentrating table for coal washing in the exhibit of the Deister Concentrator Co., Ft. Wayne, Ind. The Traylor Vibrator Co., Denver, Colo., displayed the type FB2 vibrating screen. "Pittsburgh" double-deck, tandem-type vibrating screens were submitted for inspection by the Pittsburgh Coal Washer Co., Pittsburgh, Pa.

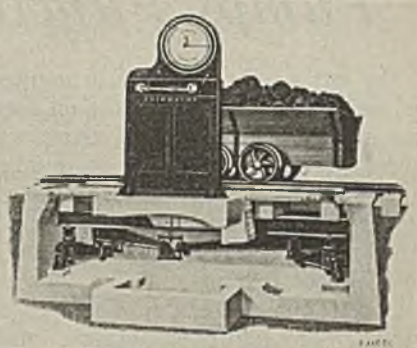
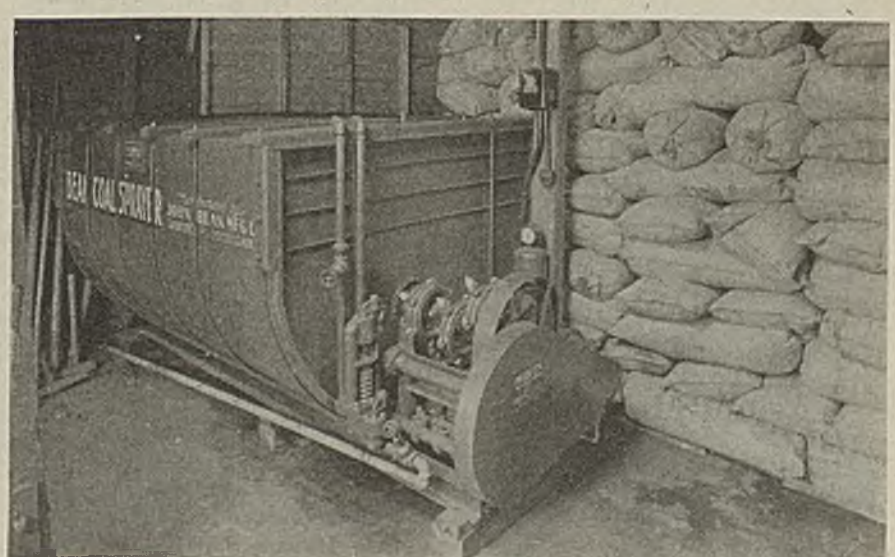


Fig. 19—Construction Details; Fairbanks Dial-Type Mine-Car Scales

Full-floating screen cloth giving vibration even to the hook strips of

Fig. 20—Coal-Yard Installation for Rendering Coal Dustless



the screen cloth, is a feature of the new Type 60 "Hum-Mer" electric screen developed by the W. S. Tyler Co., Cleveland, Ohio. The improved Model 3 Niagara counterflow vibrating screen was exhibited by the Niagara Concrete Mixer Co., Buffalo, N. Y. The particular screen on display was of the two-deck variety, though single- and triple-deck models can be obtained. The screen is operated by an eccentric arrangement which imparts a rotary motion, the screen being vibrated both horizontally and vertically. This motion is against the flow of the material and is said to better clean the screen cloth.

The Deister Machine Co., Ft. Wayne, Ind., featured the new "Plat-O" vibrating screen, which, it is said, is primarily a heavy-duty, large-tonnage type. The vibrating mechanism imparts a differential motion to the machine which accelerates the motion of the material across the screen cloth and enables it to be placed at a comparatively flat angle. In all-steel welded construction, these tables may be obtained in a wide range of sizes from 2½x4 ft. to 4x8 ft.

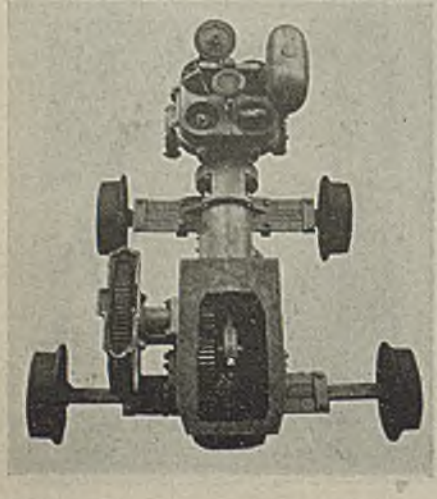
Equipment for testing and specific-gravity control was displayed by the W. S. Tyler Co., Cleveland, Ohio. Included in this material were the "Ro-Tap" testing sieve shaker, a "Delatester" and samples of wire screen cloth. The Traylor Vibrator Co., Denver, Colo., had as a part of its exhibit a "Vibrote" laboratory screen for laboratory testing.

Marking an advance in the efforts to produce a clean coal and deliver it to the consumer in a dustless condition was the exhibit of the John Bean Mfg. Co., Lansing, Mich. This company displayed a high-pressure pump for spraying coal on the tipple or in the yards to allay the dust. "Koltreat" is the chemical recommended by the manufacturer of this equipment and it is sprayed on at a pressure of 300 lb. per square inch. The chemical is dissolved in water in a tank and led through pipe or hose lines to the discharge point. It is recommended that the coal be sprayed as it is loaded to insure thorough treatment of all the pieces. Fig. 20 is a view of the tank and shows the bags of chemical stacked ready for use.

Pumps Function Efficiently and Resist Wear

The latest improvements in pumps and auxiliary equipment were on display at the booths of three manufacturers. New acid-resisting materials, improved check valves and strainers and a new automatic suction-control valve were among the notable features of the exhibits. Boyts, Porter & Co., Connellsville, Pa., displayed a number of improved pumps and pumping auxiliaries. The 100-gallon "Yough" mine gathering pump, 6,000 series (Fig. 21) probably was of most interest. It is so designed according to the company, that the minimum of attention only is required and it is self-oiling, even including the intermediate gear and motor pinion. It is said that the valves may easily be cleaned in a few minutes with only a wrench. This company also displayed the "Yough" 2½-in. rotary pump and the "Yough" wood- and lead-lined strainer (Fig. 22) with bronze basket screen for use in suction lines of sump pumps where acid water conditions prevail. Wood and lead are used for lining the "Yough Strait-Flo" check valves, for which simplicity, efficient and dependable action and economical life are claimed. Their construction is shown in Fig. 23.

Fig. 21—"Yough" Self-Oiling Mine Gathering Pump



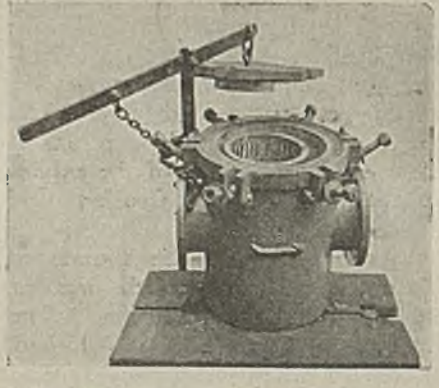
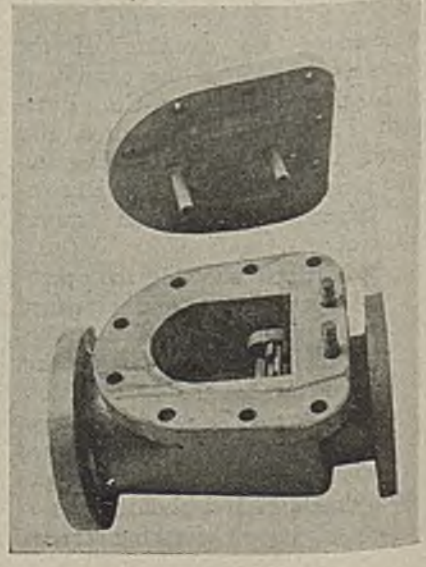


Fig. 22—"Yough" Wood- and Lead-Lined Strainer With Bronze Screen Basket

A new addition to the "Yough" line of pumps and supplies is an automatic suction-control valve which allows efficient operation of a number of suction lines on one gathering pump. Its use, according to the company, completely eliminates the pumping of air, which often will entirely destroy the suction on the other lines as well as the one taking air. The valve is entirely self-contained and can be installed entirely out of water at or near the pump and need not be immersed in the sump. The number of pumping units may be lowered, it is stated, and inspection and repairs facilitated.

The Brown-Fayro Co., Johnstown, Pa., introduced the new Austin-Brownie "Perfect-Oiler" mine gathering pump, shown in Fig. 24. This is a double-acting piston-type pump

Fig. 23—"Yough Strait-Flo" Acid-Resistant Check Valve



with the Austin water end. Special features are the heavy flywheel used in connection with the marine type crank and the method of mounting the bearings. Fairbanks, Morse & Co., Chicago, featured their enclosed-drive self-oiling mine gathering pumps and their 505 and 600 ball-bearing centrifugal pumps of the single-stage side-action types.

"Weinman" standard anti-acid bronze is the material of which the improved No 3 Type "LB" horizontally-split-case, double-suction centrifugal pump with ball-bearing mounted shaft, shown by the Weinman Pump Mfg. Co., Columbus, Ohio, is made. These pumps are arranged for direct drive by electric motor and may be obtained in capacities ranging from 50 to 5,000 gallons per minute. This company also displayed the new Type "P" self-oiling geared mine pumps, with main shaft and pinion cut from a solid steel forging and operating in a heavy bronze pinion shaft bushing. All these parts, it is claimed, may easily be removed without dismantling any other part of the pump. The equipment also includes a new bronze bull-ring type water piston and follower. The elastic ring under the packing compensates for swelling and maintains constant pressure on the packing under the liner. Slippage, it is claimed, is thereby reduced and the life and efficiency of the packing increased. It may be obtained in capacities from 20 to 100 gallons per minute. An additional item of equipment was an 8-in. suction, 6-in. discharge, open-type impeller centrifugal pump, designed especially for service in coal-washing plants.

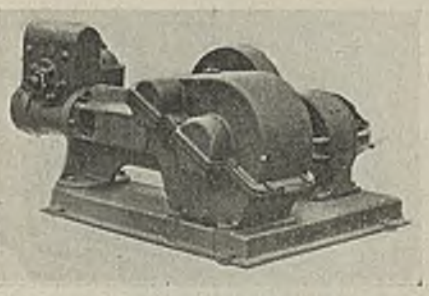


Fig. 24—Austin-Brownie "Perfect-Oiler" Gathering Pump for Coal-Mine Use

Power Can Be Saved as Well as Used

The economical use of power continues to be the goal of the manufacturers of electrical equipment as evidenced by the improved motors, cables, connectors, substations and control equipment on display at the exposition. The American Steel & Wire Co., Chicago, displayed wire rope and rubber-covered cables for mining machines and locomotives, and wire and cable for all purposes was shown by the Simplex Wire & Cable Co., Boston, Mass. The latter company featured "Tirex" cable and cord for portable service in connection with locomotives, undercutters, loaders, drills, shotfiring, arc-welding, motor leads, power lines and borehole and shaft feeders.

The Rome Wire Co., Rome, N. Y., offered a new non-metallic underground cable, known as Trenchlay, for inspection. The construction is shown in Fig. 25, a view of the power-type Trenchlay. This type, it is asserted, is impervious to the attack of moisture, earth acids, earth alkalies and likewise free of other forms of disintegration. In addition, it is not subject to electrolytic corrosion or induced armor and sheath losses. Lightness, flexibility and ease of installation without the help of skilled mechanics are features of this cable. It also is supplied in additional types, one for the control of substations, traffic and similar circuits, and the other, or signal type, for use where large combinations of conductors are required.

"Miller" molded-rubber cable connectors were featured in the exhibit of the Mines Equipment Co., St. Louis, Mo. The plugs and sockets are molded into the rubber and fastened to the cable so as to make them practically one piece. An added feature is the use of solid plugs and a special device in the socket which, according to the makers, gives a hard firm grip that cannot easily be broken in ordinary service. Old connectors are said to retain their grip even after long use. "Miller" cable connectors can be had in single-, double- or three-conductor types and, in addition, the two-conductor type for direct-current use can be furnished with non-reversible features.

An additional item of equipment displayed by this company was its No. 3 electric cable vulcanizer for repairing and vulcanizing broken rubber cables. Heat is supplied by electricity and is transmitted to the rubber in the vulcanizer by steam. In this way the heat can easily be controlled by controlling the steam pressure. Two types of rubber are supplied for vulcanizing purposes. The white or inside variety combines high dielectric qualities with great strength, according to the makers, and the black or outside has great strength, resistance to wear and a low degree of deterioration.

The Electric Railway Improvement Co., Cleveland, Ohio, had on display steel and copper arc-weld rail bonds, welding rods, portable welding outfits and accessories. A complete line of overhead mine equipment was displayed by the Electric Railway Equipment Co., Cincinnati, Ohio. New features of this exhibit included combination clamps for both trolley and feeder wire; section insulating switch for 6/0 or Roebling No. 9 wire; extensible roof bracket for pipe support of trolley wire; extension adapter for ¾-in. pipe, allowing pipe to be lengthened or shortened without the necessity of threading, and a new hanger insulation. The latter is said to have high dielectric strength, high heat value, mechanical strength, smooth appearance and to be acid and water resisting.

The Ohio Brass Co., Mansfield, Ohio, presented a number of new items for inspection by convention delegates in addition to its usual line of trolley, feeder and control equipment. Included in the new equipment was an insulated I-beam hanger; the universal G-5 guard-board hanger which both supports and insulates the trolley wire and provides a convenient means for hanging guard boards; an automatic circuit breaker switch which combines a switch for sectionalizing mine power circuits and an overload circuit breaker for protecting mining-machine and locomotive motors in non-gaseous mines; the Form 3 fused trolley tap which serves as a fused junction box when hooked over the

trolley line; the turret-type harp; the MCM "straight-through" trolley splicer and the O-B automatic motor starters. The latter equipment is intended for any direct-current service using shunt or compound-wound motors. The length of the starting time is controlled by a thermal element connected in the shunt field coil circuit. It is claimed that it will operate as low as one-third and hold in running position as low as one-quarter normal voltage.

Included in the exhibit of the Automatic Reclosing Circuit Breaker Co., Columbus, Ohio, were 2,000-amp., 250-volt, type "KSA" automatic reclosing feeder circuit breaker and automatic reclosing feeder-generator panels for station use, a 1,000-amp., 250-volt, type "KSC" enclosed automatic reclosing sectionalizing circuit breaker for distribution systems and miscellaneous relays. Cut-out switches, trolley-line material and bronze mining-machine and locomotive parts were on display at the booth of the Flood City Brass & Electric Co., Johnstown, Pa. The Post-Glover Electric Co., Cincinnati, Ohio, exhibited the P.G. Hohmanite steel grid resistances and W. W. direct-current motor starters.

The Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., featured new steel-enclosed automatic direct-current feeder equipment for outdoor or underground service. This equipment comprises an automatic reclosing feeder of the multiple and stub-end type mounted in a weather proof sheet-steel housing. The application of this feeder equipment is in the sectionalizing of mine feeder circuits to insure their best performance and to reduce labor charges and loss of time. These equipments are to serve definite sections or loads and may, therefore, completely isolate trouble on any particular section in the mine.

A second major development shown

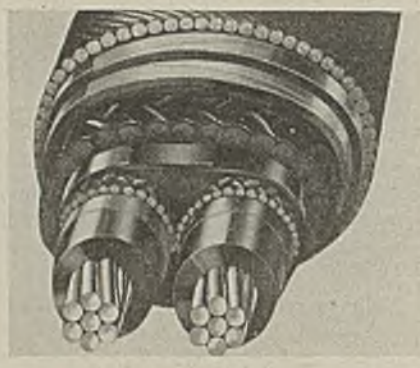


Fig. 25—Power-Type "Trenchlay"

at the Westinghouse booths was a scheme for opening a manual feeder breaker upon failure of the air in a mine, thus preventing danger of short-circuits, fires or explosions of gas. An air vane relay embodying a mercury toggle switch designed through the co-operation of the Albert & J. M. Anderson Mfg. Co., operates the shunt trip on the circuit breaker through a timing relay. With the fan in operation the vane will be maintained in its normal position with the contacts open. Stopping the fan allows the contact to be closed and actuates the timing relay, which may be set for any desired interval up to 30 minutes. Resumption of air flow stops the timing relay.

The General Electric Co., Schenectady, N. Y., displayed a new complete automatic equipment in operation, consisting of a 200-kw. synchronous motor-generator with switchboard and control. The switching equipment, which is responsible for the automatic operation of the set, is of a new design and, according to the manufacturers, occupies only half the floor space previously required. It is for use with synchronous motor-generator sets rated from 50 to 300 kw., 2,300 volts a.c. and 275 volts d.-c., the standard mine voltages. Like the older forms, it automatically controls the starting and stopping sequences and at the same time affords full protection for the machine and equipment while starting and during operation. A stub-multiple reclosing feeder connects the generator to its load and likewise protects the machine against abnormal d.-c. overloads.

According to the manufacturer, protection against the following abnormal conditions of operation is afforded at all times: a.-c. overcurrent and undervoltage; single- or reverse-phase voltage; d.-c. overcurrent, reverse polarity, reverse power and undervoltage; incomplete start; loss of generator excitation; overheated bearings or windings; phase unbalance; overspeed and underspeed and high d.-c. bus voltage. In addition, the manufacturer asserts that the saving in space is 40 per cent, that the reduction in wiring and connecting saves time and expense in installation, that moving is easy because of compactness and that the placing of all high-voltage equipment in a separate framework increases the safety of the operator.

The General Electric Co. also showed totally-inclosed fan-cooled ball-bearing motors for a.-c. and d.-c. service and a 3-hp. permissible-type direct-current motor. Fairbanks, Morse & Co., Chicago, exhibited sectionalized 25-hp. ball-bearing and sectionalized ball-bearing clean-air-jacketed motors as well as a d.-c. ball-bearing motor.

The Electric Storage Battery Co., Philadelphia, Pa., displayed the "Exide-Ironclad" exhibition board, a mine-locomotive battery tray, a cell filler, an "Ironclad" cutaway cell and the FL cell. The construction and use of Edison storage batteries were explained at the booth of the Edison Storage Battery Co., Orange, N. J., and the Ideal Commutator Dresser Co., Sycamore, Ill., presented a full line of commutator maintenance equipment for the inspection of delegates attending the convention.

Safety Aids Offered the Careful Operator

Safety and improved working conditions still keep their place in the sun at the exposition as well as elsewhere. The U. S. Bureau of Mines led off by exhibiting approved methane detectors and the new McCaa gallery for testing flame safety lamps, which also can be used for showing the cap on a flame at various gas mixtures. In addition, the explosibility of coal dust was demonstrated and photographs and posters were relied on to present the scope of the work being done.

The Mine Safety Appliances Co., Pittsburgh, Pa., also showed the testing gallery mentioned above as well as a very complete line of safety and first-aid material. The company featured the new Edison Model F safety electric cap lamp, which is now

equipped with a 25-beam-candlepower reflector. Among the other equipment shown was a new fireproof charging rack for charging batteries of the Edison lamp. It is constructed with molded glass trays, an ebony asbestos top to which the charging clips are connected and a steel framework. Interpolated resistances are arranged on top, and the charging clips are stainless steel. The racks are furnished in units for multiple construction.

The new Wheat "Superex" electric cap lamp was on display at the booth of the Portable Lamp & Equipment Co., Pittsburgh, Pa. This lamp is unique in design in that the charging terminals have been placed in the headpiece, thus eliminating the battery terminals which formerly were subject to corrosion. The charging contact is controlled by the same switch that lights the bulbs, an aluminum dog which can be operated only by a magnet in the lamp house, preventing the miner from turning the switch over to the charging circuit after the lamp has once been lit. The lamp, it is claimed, will burn in any position, is waterproof, and will continue to give light even if accident causes the electrolyte to be lost and will stand severe usage without damage. A further feature is the use of a special cord-retaining plate inside the battery top which prevents the cable from pulling out of the battery top. Thirty-beam candlepower is claimed for the new-type reflector which is part of the regular equipment of the new "Superex" lamp.

A further exhibitor of lamps was the National Carbon Co., Cleveland, Ohio, which displayed portable flashers, permissible and other types of flashlights, permissible shotfiring units and shotfiring batteries. This company also demonstrated the new Eveready "Sunshine" lamp for mine dispensaries. The Max Wocher & Son Co., Cincinnati, Ohio, presented health appliances and surgical and first-aid supplies.

Explosives and blasting material were featured by the Atlas Powder Co.; E. I. du Pont de Nemours & Co., Inc.; and the Hercules Powder Co., all of Wilmington, Del., and the Safety Mining Co., Chicago. The Hercules company drew attention to the new Hercoal-F, while the Safety Mining Co. demonstrated the use of the Cardox cartridge in blasting. The cartridge has been modified by the use of a flat shoulder bearing on the shearing disk with a fiber gasket to hold the gases in until pressure is built up to rupture the disk. This method of construction supplants that of using a beveled face which cut into the shearing disk when the discharge cap was screwed on, and eliminates the danger of gases cutting the beveled edge and destroying the joint.

The Graybar Electric Co., New York, demonstrated the new 1536-E mine telephone set, which has been approved as permissible for use in gaseous mines by the Bureau of Mines. A sloping roof and a hood extending out above the door protect the working parts against falling débris and aid in the shedding of water. The design of the set is such that sparking from the working parts or loose connections has been eliminated and complete protection against dampness has been insured.

Several types of fan equipment were on display at the booth of the Robinson Ventilating Co., Zelienople, Pa. Model fans and several full-size small fans also were exhibited. The Jeffrey Manufacturing Co., Columbus, Ohio, showed a stepped multiblade fan running slowly to call attention to the action of the double-ring oiling system, a part of the new-type bearing used in Jeffrey fan construction.

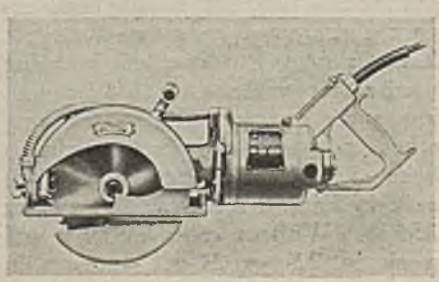
"Paulin System" altimeters were displayed and demonstrated by the Mine Safety Appliances Co., Pittsburgh, Pa. These instruments are said to measure differences in elevation with more speed and greater accuracy. The maker claims that their accuracy is exceeded only by the transit and the level, that they are extremely sensitive and that they will record differences in level of one foot.

Other Industries Contribute to Coal Mining

Aids for the efficient operation of mining equipment and the performance of tasks not directly related to the mining of coal were offered by a number of manufacturers. Several makers of wire rope displayed their products, one company featured the preservation of wood and timber, and lubrication also received its fair share of attention. Ball bearings were shown by a number of exhibitors, including the Norma-Hoffman Bearings Corporation, Stamford, Conn.; the Bertrand P. Tracy Co., Pittsburgh, Pa., and the Ahlberg Bearing Co., Chicago. The latter company stressed the economies of the reground bearing service in which it specializes. Roller bearings were exhibited by the Hyatt Roller Bearing Co., Harrison, N. J., and the Timken Roller Bearing Co., Canton, Ohio.

Wire rope for mine use was shown by the American Steel & Wire Co., Chicago; Hazard Wire Rope Co., Wilkes-Barre, Pa.; A. Leschen & Sons Rope Co., St. Louis, Mo.; John A. Roebling's Sons Co., Trenton, N. J.; Rome Wire Co., Rome, N. Y., and the MacWhyte Co., Kenosha, Wis. Something new in the lubrication of wire ropes was offered by the last named. A high-grade grease is made liquid with heat and applied to the individual wires during fabrication, hardens upon contact with the cold metal and is spun into the strand. Very little gets on the outside and the rope is not objectionable to handle.

Fig. 26—Super-Porto Saw With Universal Motor



General-purpose jacks with automatic lowering features were exhibited by the Duff-Norton Mfg. Co., Pittsburgh, Pa. Hinged or rigid bases may be obtained in the new types, which are adaptable to straight lifting, lifting with chain, lifting with claw or lifting with foot lift. The capacity of the rigid-base type is 10 tons and the hinged-base 15 tons and

the weights are 62 and 70 lb. respectively. Other new equipment shown included the Duff traversing bases for any type of jack; the Duff genuine Barrett automatic lowering jacks of five tons capacity and the Duff pinion puller, which, it is asserted, can also be adapted to the removal of pulleys, small flywheels and other appurtenances from a shaft. Templeton, Kenly & Co., Ltd., Chicago, featured their No. 325 "Simplex" timber jack with a capacity of 5 tons. In addition they presented their regular line of 5- to 35-ton jacks for various uses.

The exhibit of the United Wood Treating Corporation, Chicago, was devoted to presenting the advantages of wood preservation by the use of Wolman salts—a mixture of sodium fluoride and dinitrophenol. Both are non-hygroscopic and the fungicide rating of the fluoride and dinitrophenol are 100 and 2,000, respectively. These salts are moderately fire-resistant and have a low solubility—just enough to allow them to supply proper concentration without undue difficulty. The treated material is said to be clean and odorless.

Lubricants and lubricating machines were to be found at a number of booths on the exposition floor. Oils and greases were displayed by the Pure Oil Co., Columbus, Ohio; the Waverly Oil Works Co., Pittsburgh, Pa., and the Keystone Lubricating Co., Philadelphia, Pa. The latter company featured a new penetrating oil for general use and also displayed the new Keystone automatic safety lubricator with a special hookup for greasing mine-car wheels. However, the latter can be used for any purpose where grease is to be fed through a header to a number of nozzles. Sizes of 150 and 450 lb. may be obtained with automatic pressure control.

The Lincoln Steel & Forge Co., St. Louis, Mo., offered a new electrically operated greasing machine to be used in connection with its coupler and hard-head types of grease plugs fitted with special nozzles, both of which were on display. This machine, which is used for greasing mine-car trucks, has a grease displacement of 5 lb. per minute at a pressure of 1,000 lb. per square inch, is automatic in control and is equipped with a switch which stops the motor when the machine is not in operation.

In the line of mechanical power transmission apparatus, the Morse Chain Co., Ithaca, N. Y., showed a silent-chain speed reducer with Morse flexible coupling, Morse chain drives with disk and ring oilers and other applications of the Morse silent chain in power transmission. Gears were exhibited by the Tool Steel Gear & Pinion Co., Cincinnati, Ohio, and the Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.

Steel timber sets for mine use were shown by the Carnegie Steel Co., Pittsburgh, Pa., who also had on hand a number of photographs of installations already made. The American Rolling Mills Co., Middletown, Ohio, featured "Armco" rust-resisting iron. The Osborne Register Co., Cincinnati, Ohio, demonstrated three types of scrip-issuing machines and had on display some metal scrip.

Saws for the working up of lumber were shown by a number of exhibitors. Among the number was the new Super-Porto saw, Fig. 26, made by the Portable Power Tool Corporation, Cincinnati, Ohio, and the "Wonder-Worker" saw of the De-Walt Products Co., Leola, Pa., shown in Fig. 27. The former is equipped with a universal motor and a positive safety guard which protects the operative at all times. Its weight is 22 lb. and it is equipped with ball bearings throughout. The "Wonder-Worker," according to the maker, is a direct-drive portable unit designed to meet the needs of the mining industry. The company states, further, that it is a heavy-duty machine that will cut costs on all types of rough and finished wood work and that upkeep is inexpensive because of lack of belts, pulleys and gears. It will rip, crosscut, miter and bevel cut and may be quickly changed from one to the other. It is available in sizes from 1 to 5 hp., fitted to a compact table. The weight is less than 300 lb.

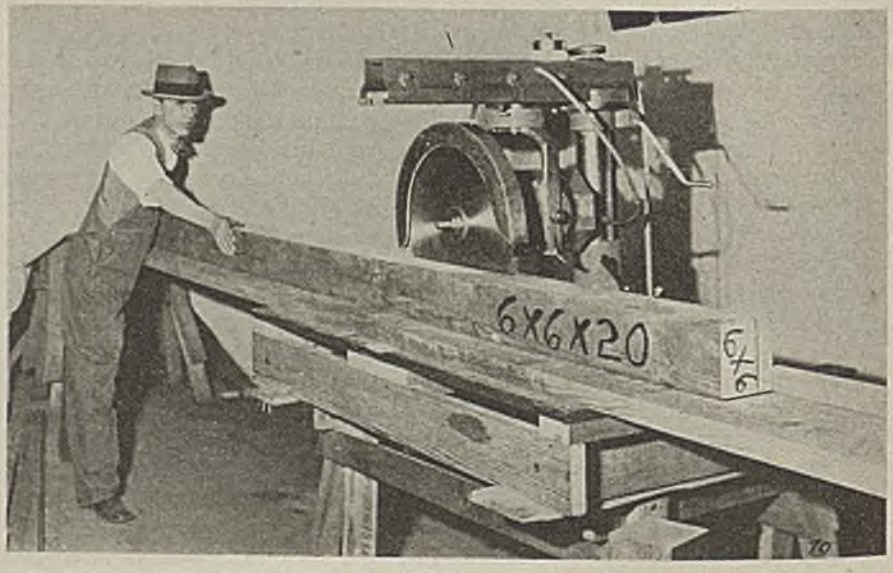


Fig. 27—"Wonder-Worker" Saw for Mine Use

Duckbilling Coal in Southern Wyoming

(Continued from page 334)

At Winton No. 1 mine the duckbill is being used for driving headings on the strike and rooms up the pitch. Here a new low duckbill is being used rather with the idea of developing such equipment than for any other purpose, the coal thickness being 12 ft. This new duckbill is only 19.5 in. in the clear and weighs 250 lb. Without cross-levers it will work in 22- or 24-in. seams. Its development is due to the originality of George H. Ernsbarger, who had much to do with the design of both the McCarty and Universal machines.

Here a shovel end is being tried which is much narrower than is standard. It is found that the coal does not choke in it as it is prone to do in a duckbill with a generous flare. Thus it feeds the conveyor

(Turn to page 368)

Air Capacity of Mine Limits What Fan Can Deliver

THAT the resistance which a mine registers against receiving any given volume of air is a characteristic of the mine itself and has nothing to do with the fan, was the declaration of A. E. Condon, of the Jeffrey Manufacturing Co., at the meeting of the Anthracite-Lehigh Valley Section of the American Society of Mechanical Engineers on April 26 in Pottsville, Pa., at which meeting W. H. Lesser, mechanical engineer, Madeira, Hill & Co., Frackville, Pa., presided.

The owner or engineer of the mine can choose the quantity of air he will circulate or the water gage he will provide, but when he has chosen either one of the two factors he must be content with the result they give him unless he is ready to make a change in the mine itself. He cannot say arbitrarily, for instance: "I want 200,000 cu.ft. of air at a 2½-in. water gage," because the condition of the mine, the size and length of its airways, the degree of splitting and the leakage will determine for him whether he can get 200,000 cu.ft. of air with a 2½-in. water gage, just as the length of wire and its diameter and the bonding on the return will determine whether a generator will deliver the needed voltage to the machinery.

No manufacturer of electric equipmen can produce a motor that will generate a form of electricity capable of passing along a wire a volume greater than is normal for a given voltage drop nor can any maker of fans produce ventilating equipment that, with a given pressure drop, will pass along an airway a volume of air greater than is normal for that entry. Mining men seem to understand that no pump or motor can deliver enough water or electricity to satisfy demands if it does not have adequate pipe or electric-conductor diameter, but they frequently fail utterly to realize that the fan has the same inherent limitations as either of the two former.

Mr. Condon did not, of course, deny that there might be fans that were incapable of delivering the rated volume at the rated water gage. It was easy, however, he said, to prove whether the fan really was at fault. When the gage is correct short-circuit a sufficient quantity of air to enable the fan to give the rated volume. Note the speed of the fan and then see if the pressure and volume specified by the manufacturer are obtained, and if they are the fan is not at fault but the mine. Perhaps the airways need cleaning. In many instances nothing is less true than the familiar remark: "It's cheaper to buy a new fan than to clean up airways."

Of great importance, declared Mr. Condon, is the condition of the airways in the first 2,500 ft. of a big mine. Air will find its way without excessive resistance when traveling at a slow speed, but when the speed is great, as it must be within the first half mile from the fan in a big mine, there is excessive turbulence with loss of power.

Fans often are too large. They try to draw more, or drive more, air through the mine than it will take at the water gage for which the fan was designed. Some fans are too small and will not handle the volume of air desired or give the water gage needed. Others are housed in combustible material and are a menace to life, because if they should catch fire they might drive smoke and irrespirable gases into the mine. In other places disk fans are used in series.

A disk fan giving a ½-in. water gage will do good work if, because of the frequent outcropping of the seam, that pressure is all that is needed, but frequently more pressure is necessary and then disk fans are put in series, which is giving them a job which could be far more efficiently performed by a centrifugal fan. A disk fan will have an efficiency ranging from 30 to 50 per cent whereas a centrifugal fan will give an efficiency of 70 per cent or more.

It was Mr. Condon's opinion there should be at every gassy mine two separate fans, not necessarily of equal capacity, thus eliminating all clutches, cut-off couplings and complications.

Mr. Condon showed lantern slides, one of which contained two tables. The first was based on the assumption that part of the airway, like the shaft or certain main headings, had to pass air at excessive velocities. The question was, what is the practicable length of such airways for any given velocity?

The other table showed the relative powers and costs needed to ventilate a mine with different sizes of airways assuming the power required with 14x7-ft. airways as unity. Mr. Condon's address embodied part of an article by W. J. Montgomery in the *Mining Congress Journal*.

In the discussion which followed C. D. Ruppert, Lehigh Coal & Navigation Co., stated that at one of the

Fig. 1—Full-Quadrant Concentric Vanes in Full-Quadrant Elbow. Note Even Distribution of the Effluent When Leaving Elbow.

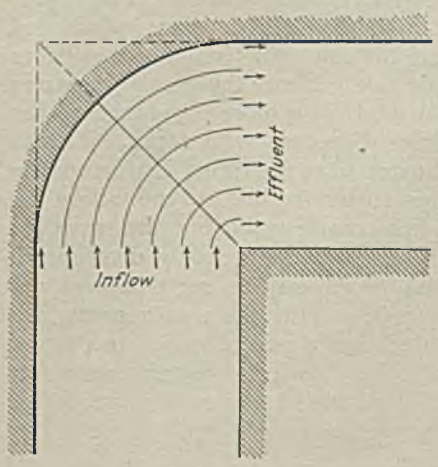
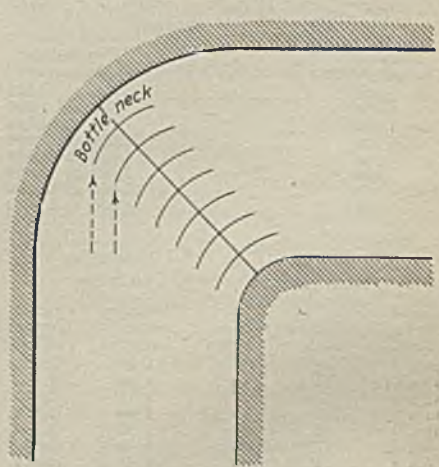


Fig. 2—Full-Quadrant Non-Concentric Short Vanes in Rounded Elbow. Note How Much Air Travels Between Outer Blank and Outer Vane.



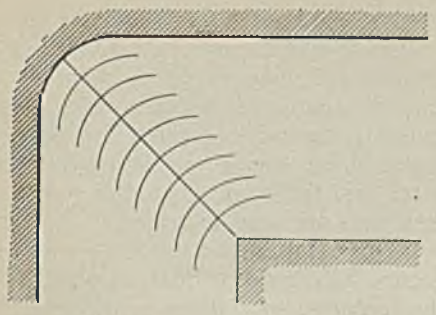


Fig. 3—Full-Quadrant Non-Concentric Short Vanes with Squared Elbow. Note Greater Width at Center of Vanes Than at Their Edges.

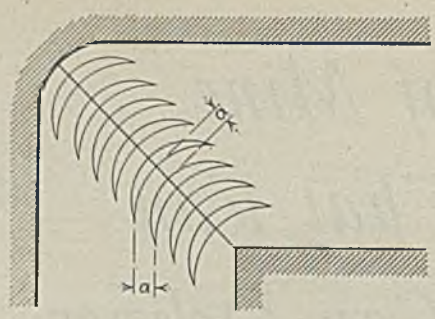


Fig. 4—Full-Quadrant Non-Concentric Vanes with Uniform Passages. Note Absence of Air Construction but Increased Perimetric Area.

mines of his company 2-in. plank had been placed between timbers in a ventilating shaft which was about 750 ft. deep and carried 250,000 cu.ft. of air per minute, so that the air could not impinge on the underside of the timbers and thus become turbulent. As a result the resistance of the air had been decreased ½ in. In future, probably, concrete will be used instead of plank, the installation having been made to ascertain whether the practice would give the returns expected.

R. D. Hall, engineering editor, *Coal Age,* remarked that where easy curves were made at sharp angles, air traveling at high velocity banked against the outer wall of the curve and a partial vacuum was created near the inner wall. Some of the air would revolve back on this inner wall, thus creating great uncertainty, turbulence and much resistance.

He advocated making square or sharp turns connecting the inner angle with the outer angle with a framework on which would be set curved vanes that would turn the air in place. Thus it would be as well distributed after turning as before turning and would turn with minimum resistance.

This idea of making turns with vanes is being used by a large coal company. Mr. Hall said he believed the vanes were being used in a curved passageway having a rounded corner. In a right-angle turn with full-quadrant concentric vanes the air would be properly distributed with this arrangement, but with vanes not so long as to occupy the full quadrant too much of the air would strike the outer full-quadrant wall without striking the vanes and, in consequence, would bank on that wall.

The toastmaster was introduced by Walter M. Haggerty. The first address of the evening was delivered by Calvin W. Rice, secretary, American Society of Mechanical Engineers, who urged the members to contribute their services to the society, thereby aiding in the advance of modern civilization. Success in life was measured rather by what we put into it than by what we got out of it. He referred to the activities of the society in formulating tables for steam at 1,200 lb. pressure, the steam-boiler and the power-test codes.

Distances Over Which Certain Velocities May Be Permitted

Velocity Feet per Minute	Permissible Distances
2,000	100 to 500
1,400	500 to 1,000
1,000	1,000 to 2,000
500	2,000 to 4,000
700	4,000 to 8,000
400	8,000 to 12,000
350	12,000 to 16,000
300	16,000 to 22,000

Power and Cost of Ventilation With Airways of Given Size

Size of Airway Feet	Perimeter Feet	Area Sq.Ft.	Relative Power Required	Cost of Power per Year
14 x 7	42	98	1.00	$980
13 x 6½	39	84.5	1.46	1,430
12 x 6	36	72	2.16	2,120
11 x 5½	33	60.5	3.33	3,260
10 x 5	30	50	5.37	5,260
9 x 4½	27	40.5	9.10	8,920
8 x 4	24	32	16.40	16,100

Duckbilling Coal in Southern Wyoming

(*Continued from page 366*)

more successfully. Being narrow the whole force of the drive is concentrated on a width about equal to that of the conveyor or pan and the edge of the shovel accordingly bites off the "lips" or "riffles" left by undercutting machines instead of catching on them and making trouble or riding over the top of them, thus failing to get neatly under the coal pile. Whether this change will prove popular is not yet clear.

The machine is working under difficulties at Winton despite the thickness of the coal, for the pitch is 14 to 16 deg. Working on the strike the heading is severely warped and the duckbill has to be moved by a ratchet. The headings would be of little practical use if tilted over to one side with the full inclination of the bed, so 2 to 3 ft. of coal is left on the lower side.

In order to work two conveyors at right angles many devices have been tried. One is as on left of Fig. 2. But the tensions here are unbalanced and the conveyor tends to be pulled to one side. Hence the system shown in the next cut is more popular. Another drive dispenses with ropes. This is illustrated to the right. Unfortunately this stiffer method of connection requires more room, but the travel of the parts can be closely determined, and props can be set that will not interfere with their movements, so this is not a real objection to the use of the device. Furthermore at Winton No. 1 the roof is good, for the measures are well above water level.

For working up the heavy pitches means must be provided to relieve the driving mechanism of some of the weight of the pans. For this purpose braces can be taken with springs against two props as shown. It has been found desirable to use a ¾-in. spring in compression. The compressed spring assists the drive in lifting the pans uphill and in pushing them under the coal. When the drive has reversed the springs resist the forceful gravity movement downhill and store up the energy ready for the next upward movement.

The methods at the Premier mine of the Ideal Coal Co. were described by Frank N. Bletcher in *Coal Age* in September, 1928, pp. 528-529, but it may be well to say that though the conveyors transporting the coal from the faces of pitching rooms deliver it into a shaking conveyor on a level road, elevating booms do not have to be used. The Eickhoff or Cosco equipment suffices to lift the coal up high enough for loading into cars without undue loss of capacity.

The cars are not low like those in West Virginia but, like all Western cars, are built clear of the wheels. They pass obliquely under the conveyor, which for a long distance is supported on heavy stationary rollers. At this mine no water is being used at the face, but the loading of the dry coal by the duckbill raises little appreciable dust; its transportation by the conveyor makes little or none and even the discharge into the car is not accompanied by a dust cloud.

(*Turn to page 371*)

How Are Your *Mining-Machine Armatures?*

Rewinding a Real Job if Long Life Is Desired

By A. C. Roe
Renewal Parts Engineering Department
Westinghouse Electric & Mfg. Co.

THE proper maintenance of mining-motor armatures requires close attention to details, in order that rewound armatures may have a long, useful rewind life. The subject of rewinding armatures may be divided into eight heads, viz.: (1) Stripping the armature and preparing the core; (2) recording rewinding data; (3) armature coils; (4) winding material and its application; (5) winding the armature; (6) banding; (7) dipping and baking; (8) testing.

In stripping armatures that are new to the shop an experienced armature winder should be on hand to note all details and record the rewinding data and the stripping itself should be done in a section of the shop set aside for this purpose. Auxiliary equipment should include a blower system for carrying off the dust, etc., and a compressed-air line. The compressed air may be used to drive air hammers equipped with special lead lifting gouges, chisels, drifts for lifting coils out of the slots, blowing out dirt and dust and spraying the cleaned core with a high-grade black air-drying varnish.

Other important time-saving equipment for the stripping section is a motor with a flexible shaft, on which can be mounted a grindstone, wire brush, etc. A gas and air torch will be found handy to heat cores and for burning off oil insulation in sections not accessible to the grindstone.

Removing the coils from an armature should be done in a manner that inflicts the least damage to the core or commutator. When cutting core bands the operator should not cut into the core iron; likewise in drifting leads out of the commutator necks he should keep in mind the strength of the neck, so that the copper part of the neck is not broken off in the drifting process. In prying coils out of the slots the teeth or the bottom of the slot should not be gouged with the drift.

When cleaning up the core the slots should be inspected to see that they are true and free from burrs or lumps of old insulation and, if necessary, trued up with steel drifts. Spread cores should be straightened as much as possible, the core band grooves trued up and burned holes in the slot section cleaned to keep fused iron from causing hot spots and burning out the new winding. Only a restricted amount of filing should be done in the core. In brief, the core is to be put in a condition closely resembling a new one, which means that the finished core ready for winding must be free from defects that would tend to increase the core losses or eddy currents.

The record of the rewinding data on an armature new to the shop should be based on a thorough analysis of the complete armature, including all insulating items applied during the installation of the coils and the insulation on the coils themselves. Manufacturing and testing methods employed at the factory determine that certain parts in different designs should be reinforced or strengthened in various ways and if these items are not checked and incorporated in the rewound armature it may prove detrimental to the useful rewind life.

ASIDE from the armature connecting data, there are numerous other items that should be checked. These are: size of banding wire used, width of end bands and material used under core bands. If tie clips are used, the number and spacing should be noted. A complete list of the material necessary to wind an armature can be obtained from the manufacturer, as will be explained later. The most important rewinding data are the coil pitch, lead pitch and lead throw. This last term locates the bottom leads in reference to the center line of the armature coil.

The table and Figs. 1 to 7 give the connecting data for the 900 line of Westinghouse commutating pole motors. The table indicates the number of slots and bars, whether a dead coil is used, number of poles, coil pitch, etc. Letters are used in the table to record the data. For example, the top line of Table 1 gives the data for a 25-slot 75-bar armature.

Referring to Fig. 1, slot *A*, or No. 1, indicates the location of the bottom half of the coil; *B* then locates the slot in which the top half of the coil is placed—slot No. 7 in this case. Bar *D* locates the bottom lead of the single coil to the right. Bar *F* locates the top lead of the single coil whose bottom lead is connected to bar *D;* thus the first single coil to the right is used as the data coil.

The coil and lead pitch have been

recorded but the location of the bottom lead in reference to either slot *A* or the center line of the coil must be determined as the brush position in reference to the center line of the poles determines the lead throw. And in commutating pole motors the lead throw must be 100 per cent correct for satisfactory operation. In the figures given here the lead throw is located in reference to the center line of the coil.

Due to certain combinations of slots, bars, coil pitch, etc., there are four different lineouts: (1) Where the center line of the coil falls on a slot and the center line of this slot lines out on the center line of a bar, as in Fig. 1; (2) where the center line of coil falls on a tooth and the center line of this tooth lines out on the center line of a bar, as in Fig. 2; (3) where the center line of the coil falls on a solt and the center line of this slot lines out on the mica between two adjacent bars, as in Fig. 3; (4) where the center line of the coil falls on a tooth and the center line of this tooth lines out on the mica between two adjacent bars, as in Fig. 7.

Then to cover the combinations of single coils, which are equal to the number of bars divided by the number of volts, and dead coils, three more sketches are necessary.

In all cases *C* locates the slot on the center line of the coil and the center line of this slot lines out on the mica between bars 20 and 21, bar *E* in all cases being the lower numbered bar of the two. Thus Figs. 1 to 7 can be used to make up a table for all makes and types of armatures and the following rules pertaining to wave windings can be used in checking the tabulated data. These rules are based on the number of active single coils in the bottom of slot *A*. For the case listed in the top line of Table 1 there are 25 slots and 75 bars or 3 single coils in the bottom of slot *A*.

Armature Connecting Data for Westinghouse 900 Line of Mining Motors

No. of Slots	No. of Bars	No. of Single Coils	Dead Coil	No. of Poles	Coil Pitch A–B	Lead Pitch D–F	Bottom Lead Throw D–E	Center Line of Coil—On Tooth Between Slot C	Between Slots Bar	Figure No.
25	75	3	No	4	1–7	1–38	1–20–21	C-4	20–21	1
25	99	4	Yes	4	1–7	1–50	1–26–27	C-4	26–27	3
25	125	5	No	4	1–7	1–63	1–34	C-4	34	6
26	103	4	Yes	4	1–7	1–52	1–27–28	C-4	27–28	3
29	57	2	Yes	4	1–8	1–29	1–15	4–5	15	5
29	115	4	Yes	4	1–8	1–58	1–30–31	4–5	30–31	7
33	131	4	Yes	4	1–9	1–66	1–34–35	C-5	34–35	3
35	105	3	No	4	1–9	1–53	1–28	C-5	28	1
35	175	5	No	4	1–9	1–88	1–46–47	C-5	46–47	6
37	185	5	No	4	1–10	1–93	1–49	5–6	49	6
41	122	3	Yes	6	1–8	1–42	1–22	4–5	22	2
43	128	3	Yes	6	1–8	1–44	1–23	4–5	23	2
43	172	4	No	6	1–8	1–58	1–31	4–5	31	4

1. Then for an odd number of single coils in slot *A* the following relations govern the location of the center line of the data coil:

(a) When the coil pitch is one and an even number, as 1 and 8, and the lead pitch is one and an even number, as 1 and 30, the center line of the coil is on the center line of a tooth and on the center line of the mica.

(b) When the coil pitch is one and an odd number, as 1 and 7, and the lead pitch is one and an even number, as 1 and 30, the center line of the coil is on the center line of slot *C* and on the center line of the mica.

(c) When the coil pitch is one and an even number, as 1 and 8, and lead pitch one and an odd number, as 1 and 31, the center line of the coil is on the center line of a tooth and on the center line of bar *E*.

(d) When coil pitch is one and an odd number, as 1 and 7, and the lead pitch one and an odd number, as 1 and 31, then the center line of the coil is on the center line of slot *C* and on the center line of bar *E*.

2. If there are an even number of active single coils in slot *A*, the following rules govern the location of the center line of the data coil:

(a) When the coil pitch is one and an even number, as 1 and 8, and the lead pitch one and an odd number, as 1 and 31, the center line of the coil is on the center line of the mica.

(b) When the coil pitch is one and an odd number, as 1 and 7, and the lead pitch one and an odd number, as 1 and 31, the center line of the coil is on the center line of slot *C* and on the center line of the mica.

(c) When the coil pitch is one and an even number, as 1 and 8, and the lead pitch one and an even number, as 1 and 30, the center line of coil is on the center line of a tooth and on the center line of bar *E*.

(d) When the coil pitch is one and an odd number, as 1 and 7, and the lead pitch one and an even number, the center line of the coil is on the center line of slot *C* and on the center line of bar *E*.

In conjunction with these rules there are center punch markings on the front of the commutator bars, placed there at the factory by the layout man to insure correct coil and lead pitch and lead throw. Referring to Figs. 1 and 7, there will be found dots on some commutator bars. On certain bars containing top leads there are two dots. In conformity with the rules governing the location of these dots one is placed at the end of each bar containing a bottom lead from the data coil; next a dot is placed at the end of each bar containing a top lead from the data coil. To distinguish the top lead marking from that of the bottom leads, two dots are placed in the center bars of the top lead group (see Figs. 2, 4 and 5).

Fig. 1—Center Line of Coil on Slot C and Bar E

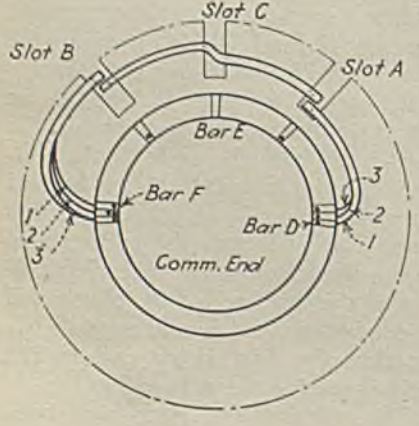


Fig. 2—Center Line of Coil Between Slots C^1 and C^2 and on Bar E

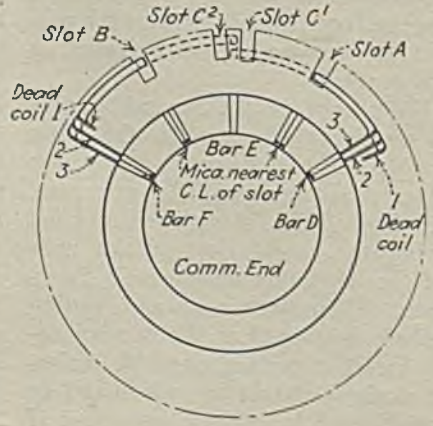
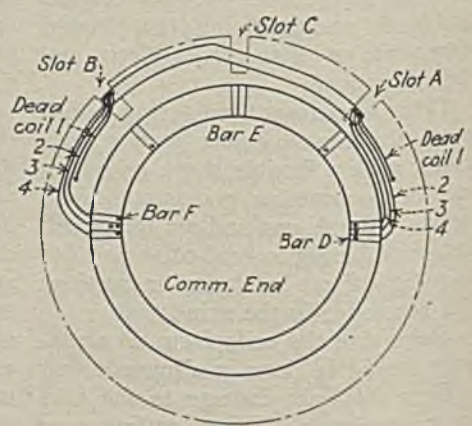


Fig. 3—Center Line of Coil on Slot C and Mica Between Bars



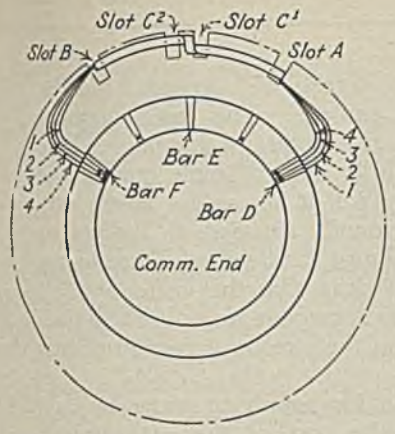


Fig. 4—Center Line of Coil Between Slots C^1 and C^2 and on Bar E.

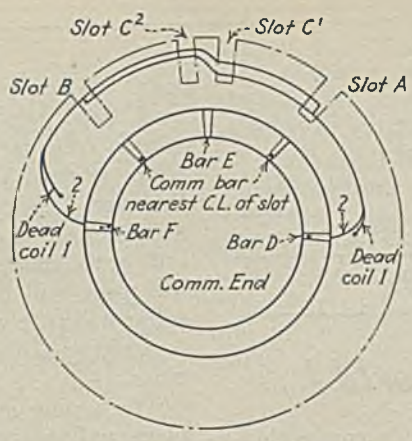


Fig. 5—Center Line of Coil Between Slots C^1 and C^2 and on Bar E

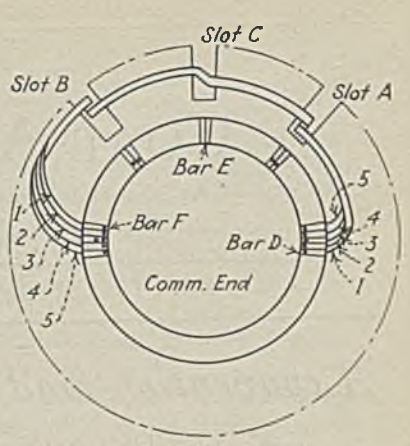


Fig. 6—Center line of Coil on Slot C and Mica Between Bars

Then to locate the slots in which the data coil lies with reference to the marked bars, the bars on the center line of slots *A* and *B* also are marked with one dot as shown in the figures.

This system of marking indicates on which side of the armature the top leads connect and tells at a glance whether the armature coils are right or left hand. Marking the bars opposite the center lines of the slots containing the data coil also gives a positive check on the correct lead pitch. This is important as in any four-pole machine employing a single wave winding there are two possible lead pitches with any given number of commutator bars.

For example, with 75 bars there may be a lead pitch of 1 and 39, which results in a progressive winding or a pitch of 1 and 38, which is a retrogressive winding. If a winding originally used the 1 and 39, or long, pitch, and in rewinding the armature it was changed to 1 and 38, or short, pitch, the direction of rotation would be changed in a motor or the polarity of the brushes changed in a generator.

These markings can be utilized to good advantage by the armature winders when rewinding as follows: First, the bottom lead markings are located and then those that locate the slots in which the coil is placed. Then the number of bars marked for bottom leads are checked and if the number marked agrees with the number of bottom leads in the coil it indicates that the winding does not have a dead coil (see Figs. 1, 4 and 6). On the other hand, if the number of bars marked is one less than the number of bottom leads in the coil—as Figs. 2, 3, 5 and 7—this indicates that a dead coil must be used. Next, slot *A*, which contains the bottom half of the first coil to be placed on the armature, is located

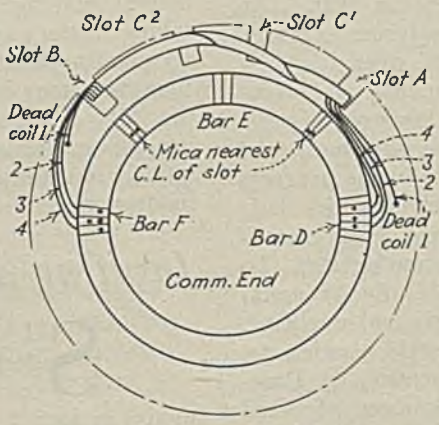


Fig. 7—Center Line of Coil Between Slots C^1 and C^2 and on Mica Between Bars

and marked by lining out with a piece of string held parallel to the center line of the shaft and until it lines up on the center line of a slot directly in front of the marked bar or bars. The teeth each side of this slot are marked with chalk and the top of slot *B* located in the same manner. When the center line of slots *A* and *B* line out on the mica, two bars are marked as shown in Figs. 2, 6 and 7.

It should be noted that the bars or bar located on the center line of the coil are not marked and in all cases, after locating the data coil slots as above, the lead throw should be checked from the center line of the coil. When a commutator is taken apart and new mica segments installed, or any repairs made, care should be taken to preserve the proper bar spacing between marked bars.

After one becomes familiar with this method of locating, recording and laying off connecting data, it will be found to have great merit and to be a time saver.

Duckbilling Coal in Southern Wyoming

(Continued from page 368)

The precaution is taken, however, of shoveling the bugdust into the conveyor and transporting it to the car before the face is shot.

The gist of the loading problem is in the number of men employed. In the longwall duckbill workings at Rock Springs twelve men are assigned to each unit of operation. Each unit will load 240 tons in 8 hours.

In addition every group of three units is supervised by a foreman. At C. Superior three men, including the trimmer and haulagemen, are used on narrow or heading work. On wide work five men are required to shoot, timber and load the coal, and this figure, as in the other estimate, includes the trimmer and haulagemen.

When driving headings five cuts are made in two shifts. For room work two cuts are made in eight hours. The rooms are worked in pairs, each room having its own conveyor. By this means the number of men per place is reduced.

Where the mines of the Union Pacific Coal Co. are mechanized all the men are on a day wage, thus eliminating all charges for yardage and room turning. Sixty per cent of the coal in the mines of the company is loaded mechanically. It is expected that this year the output of mechanically loaded coal in these mines will total 1,000,000 tons. When the duckbills are used in room-and-pillar workings three or four men are required and the output is about 50 tons per crew in driving entries and rooms and in drawing pillars.

COAL AGE

Published by McGraw-Hill Publishing Company, Inc.

SYDNEY A. HALE, *Managing Editor*

NEW YORK, JUNE, 1929

A convention-mad world?

CYNICS say the world is convention-mad, and certainly the number of conferences and congresses has greatly increased, especially since the war. No distance seems too great for the conferees to travel. Meetings are being held the world over.

The value of such publicity on mental and scientific progress is well illustrated, however, by the fact that of all the ages prior to the introduction of the printing art none was so prolific in the progress of science as that during which scholars met daily in the marketplaces of Athens and other Greek cities to hold informal conferences and debates. To these we owe the beginnings not only of metaphysics but of mathematics, biology and medicine, and perhaps also of architecture and the plastic arts.

The recent Sixth Annual Convention of Practical Mining Officials and Exposition of Coal Mining Machinery, held under the auspices of the Manufacturers' Division of the American Mining Congress, is an example of the many conferences and shows that they have accelerated the progress of industry. The old pageants that glorified the crafts but did so little to stimulate their progress have passed with the years. The convention and exposition do all that the pageant tried to do and more.

Must keep down dust

"BEFORE our big locomotive was installed we seemed to have much less impalpable coal dust on our roof and timbers than we have today. The new locomotive is so high and wide that it almost fills the heading and creates such a suction that the dust is raised from the cars." This comment by a mine superintendent supplements that of F. C. Miller at the Rocky Mountain Coal Mining Institute as to the dangers of such dust which may be slightly explosive, even when 84.5 per cent of it is inert.

Larger and faster haulage equipment aids in the dissemination of fine coal dust, and the best way in which it can be kept out of the air is by using water on the cutter bar and by sprinkling at the face.

The air-borne dust of mining is carried into the return and does not appear in the intake airways, but the intake is not immune, for unless the dust in the mine cars is well laid with water the air currents in the haulageway will lift it from the lump coal on which it rests and deposit it on the roof, floor, ribs and timbers. This can be demonstrated conclusively in a naturally dry mine where water is used faithfully and in ample quantity at the face. Especially will it be evident where cars are dumped underground. Instead of a cloud of dust at the dump and dust "ankle deep" thereabouts, the place will be so clean that the visitor's white collar will receive less damage in his entire trip than in walking a block on the streets of certain of our cities.

The piping system for supplying water to each place will increase the cost of the coal—unless, indeed, it prevents a disaster. But with concentrated mining that cost can be held within modest bounds and against that cost may be credited a saving in the expense of rock-dusting, for with infrequent applications of rock dust and water at the face there may be 100-per cent protection, but with the "dry process" and almost continual rock-dusting the protection may be of doubtful value, so quickly is the percentage of inert dust rendered inadequate.

Inviting disaster

SHALL the electric safety lamp be declared outlaw equipment in gassy mines? Such a question seems ridiculous; in fact, it ought to be ridiculous. Nevertheless, a proposal to return an affirmative answer to this question received the unanimous vote of the upper branch of the General Assembly of the State of Illinois and was finally killed in the lower house a few days ago on a motion to reconsider by a margin of only eighteen votes!

The proposition, it is true, was not put so baldly as here phrased; the end was sought by an amendment to section 13 of the Act of 1911 which would have prohibited the use of "lamps of the battery type requiring said battery to be worn upon the body." As far as intent was concerned, however, the amendment might just as well have declared the use of electric safety lamps unlawful, for that would have been the practical effect of the change if it had been enacted by the Springfield lawmakers.

The measure apparently was the inspiration of a group of discontented miners who appeared without the indorsement of their state organization. Illinois operators were united in their opposition to the bill. The State Mining Investigation Commission, to which all proposals affecting the mining industry of Illinois are submitted, was against it. The argument that wearing the battery on the body endangers the health of the miner found little support outside of the particular group back of the bill. A few minor cases of burns from defective equipment were admitted, but the claim that wearing the battery brings on disease was not substantiated, in the opinion of those who have looked into the subject.

In the face of this failure to establish a case and in the face of a compelling record of approval of

these lamps as a safety device by federal and state authorities, just how and why the State Senate passed the bill is a mystery. The most reasonable explanation offered is that no one except its proponents took it seriously enough until that group had sold the idea to the upper house solons. Therein lies a lesson which industry dare not ignore. Foolish legislative proposals backed by a noisy minority are always dangerous proposals. To treat them other than seriously is to invite disaster. Particularly must this rule hold when such proposals jeopardize the physical welfare of the workers or the freedom of the industry. Eternal vigilance is still the price of safety.

The retailer is alert

NOT SO MANY years ago discussion of routine systems formed the backbone of many trade convention programs. As leaven to the drab these meetings were enlivened with speeches by convention spellbinders whose oratory sounded wonderful as it rolled from their lips but assayed only glittering generalities and flat platitudes when reduced to the cold type of the printed page. Today, however, the alert association is giving over its programs to a consideration of the major economic problems of the industry which it serves. Broad principles are considered ahead of methods.

The program of the recent annual convention of the National Retail Coal Merchants' Association at Chicago was distinctly of the modern type. How to render better service to the consumer and meet the competition of other forms of fuel with superior merchandising were the underlying themes. One session was practically given over to to the question of dustless coal. Spokesmen for the producing end of the industry were invited in, not just as good fellows but to contribute something to a better understanding of problems of mutual interest.

That the retail coal merchant is so alert to his responsibilities and to his opportunities is one of the most hopeful signs on the horizon of better days for the coal industry. To the public at large he is the coal industry and public attitude toward the industry will be colored largely by the public's reactions to him and to the service he renders.

Radios for coal miners

RADIO generally is regarded as an important influence in promoting culture, making better citizens and reducing the objection to living in remote localities. In view of these advantages, coal companies, especially those operating in the mountainous regions, would do well to foster the sale of this new commodity.

Difficulties in servicing, the reluctance of certain manufacturers to allow agencies to company stores, and the necessity for selling the sets on credit because they run into considerable money, have constituted the principal reasons that so few coal company stores have gone into the radio business. But the advent of alternating-current sets, devoid of batteries, has changed the situation.

Sales of alternating-current sets at the rate of $800 to $1,200 per month have been averaged by certain producers ranging in the two- to five-million tons per year class. Many sets have been sold for cash, but the usual practice is $25 down and $10 per pay, and only preferred risks solicited.

Apparently the company store located in an isolated community that is supplied with 110-volt alternating-current power for lighting is overlooking a profitable line by not selling alternating-current radios, and the company is not taking full advantage of an opportunity to promote conditions in the home life of its employees that would have far-reaching benefits.

Why write?

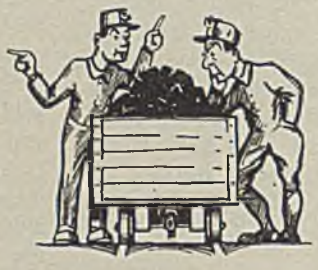
MENTAL thinking, like mental arithmetic, is a somewhat loose, uncertain instrument. How much better it is to put the figures down in serried rows, or in some symbolic arrangement, and then manipulate them than to try to juggle them in one's mind! Every once in a while a figure will get hung up on the convolutions of a disorderly brain and be forgotten, but once written down they all can be kept in reach while the mind scurries around to entrap the rest.

In the study of things, Monday brings one idea, Tuesday another and other days other ideas, yet before the week is over the idea of Monday may be dead and forgotten. It must be hunted again unless it is set down in black and white. Only by looking at articles and notes written ten or twenty years back can one recall the many thoughts and ideas which once were one's own imaginings and have since been entirely forgotten.

Therefore, write. It will give definiteness and accuracy to one's ideas. It will give a sound basis for the next leap forward to new conceptions. It will afford a record to which reference may be made. It will enable the writer to pass categorically and critically over the full range of his premises and conclusions, correcting and revising them. Does an author think a book through and then write it? Does he not rather start with an imperfect idea or a rough plot and let the book write itself around that nucleus, develop it, change it, even reverse it if need be?

The engineer rarely talks without a pencil in his hand. Out of the pencil his mind often speaks. The ideas range themselves in order with the lines he traces. To those who write, the pencil serves similarly to assist concentration and imagination. With many a man it seems as productive as his brain; he does not think readily without it. A sort of magic Ouija board is the pen which spells out its story almost without the conscious effort of its operative.

The BOSSES *Talk It Over*



Systematizing Company Work

"MAC, we've been neglecting one highly important item and that's the cost of work done by our day men. It seems to me we should be able to get some system in handling track work, timbering and other jobs done by company men. Many of those jobs are standard so far as method is concerned and should be completed in a given time. Our job will be to get the 'low down' on each task and set the time for doing it."

"But Jim," interrupted Mac, "we're already doing that. Every good foreman knows how long it takes to do a job. That's what makes him good."

"I know," answered Jim, "but that second nature of yours only helps you in picking out men who lay down on the job altogether. It doesn't keep every one of your men busy every hour of the day. It's just as important to keep close tab on time as on money."

"How would you do it?" asked Mac.

"Set your time on every job that is regular. When your assistants give out work have them tell the men how much time they can have on it. Have them enter the time in their books and make an inspection of the work immediately after it is completed."

"That means discharging those men who don't meet the schedule, Jim."

"Exactly. The good men won't kick. They will feel more content knowing that the fellow who used to loaf is doing as much as they are. We'll make good men out of the easy-goers. It's harder to kill time than to work."

HOW DO YOU DO IT?

1. *How do you keep tab on your company men?*
2. *Do you know the time and material cost on each job?*
3. *How do you make work assignments?*
4. *What instructions do you give?*

All foremen, superintendents, electrical and mechanical men are urged to discuss these questions. Acceptable letters will be paid for

Lubrication or High Maintenance—Which?

Systematic Distribution of Oil Will Save Time and Steps

EACH cutting crew should be provided with a can for oil and one for grease, each stamped with a number, to be used in keeping check on the quantity issued to each machine. Empty oil cans should be carried to the oil house by the cutters and after being filled should be sent back into the mine along with the cutter bits. Don't allow empty cans to be carried out on trips of loads, for they are likely to be broken when thus carried. The filled cans and bits should be stowed in a place prepared especially for that purpose on each section, from which they can be picked up by the cutters on their way to the machine. Cans should be provided for taking care of left-over oil.

The repairman should be provided with a motor for taking him swiftly, with tools and lubricants, to a machine needing attention. Telephone communication should be such that any machine runner or motorman needing the assistance of the repairman can reach him quickly at the motor barn.

A central greasing station is of value only where a number of motors come to one point. A good place for the location of such a station is at the point where sand is stored, for the locomotives all make trips to that point. Further, the sand will take up that grease or oil which is spilled or runs off during the lubrication process, making the job of keeping down large accumulation of spilled oil easy. In the case of shaft mines, oil and grease should be sent down in barrels, enough to last 24 hours. Whether stored inside or out, the station should be kept warm in the cold months. It is important to keep account of how much oil or grease each machine uses.

Skill in the buying and subsequent use of timbers is a factor in economy which often is overlooked. I have seen car after car of posts sent into a section of a mine, set up and broken due to the diameter of the sticks being too small in proportion to their length. If two posts are set skin to skin, greater strength will be procured; but if one is crooked it will tend to push out the straight one. One post of larger diameter would be more effective than the two and would be cheaper.

Men get accustomed to doing things by habit. In the bituminous mines you often see large posts set back in the gob and small ones on the entries, for no reason at all. In the anthracite field the mines have grown so accustomed to using large posts that giant posts often are used for purposes that might be served by small posts, even for the hanging of signs. I have seen 10- and 12-in. timbers set in a breast on the level and 7-in. props set in a breast that pitched. The reason for this discrepancy is obvious. It would be harder to get the big post into the breast. These remarks are not casual observations, as I have certificates in both the anthracite and bituminous fields of Pennsylvania as well as in Ohio and West Virginia.

Washington, Pa. S. C. HELLER.

Control of Operation Is Vital

In days past underground operation was directed but not controlled. To this industry control of operation is a comparatively new management theme. It is particularly applicable to jobs done by company men.

If a contract miner wastes one hour of his working time the coal company suffers only a small portion of the loss actually sustained; the worker is the heavy loser. When a company man loafs for an hour he feels no financial setback; the company loses all. The problem will be worked out satisfactorily only if each man contributes his ideas and experience to this melting pot.

Anti-Friction Bearings Simplify Lubrication Job

I CAN see no good reason for a cutter's report stating "machine burned up because of no oil." Three thousand dollars will buy enough oil to take care of a good many machines, cars and other equipment for a long time.

A good system of oil distribution cannot be put into effect unless a central storage station is established. Give each motorman a can bearing a check number corresponding with the number of his motor and enough oil to last him through each shift. Then hold him responsible for the condition of his machine. Follow the same system in numbering cans given to the machine runners. Each cutting machine should be provided with three cans so that when one is in the central station being filled the runner will have the contents of the other two for current use. It is a good plan to hold all men who use oil responsible for the cans and compel them to take empty cans to the central station for filling and to call there for the filled cans. These men themselves should be the medium for the delivery of oil.

The dissatisfaction arising from stiff car wheels and the incidental losses in power, worn equipment and strains to men who are compelled to push the cars is sufficient reason for considerable thought in the development of a system for lubricating mine cars. One way out, and a good one, is to equip the mine cars with anti-friction bearings. I found by a check-up of a certain mine where 700 cars were in use, 600 of them being equipped with rolling bearings and 100 with plain bearings, that the plain-bearing cars were a constant source of worry and trouble whereas the cars equipped with roller bearings required little attention. All 600 of the latter can be lubricated by a pressure gun at the rate of two in five minutes, so that the complete job requires only about twelve hours. Three men are used, one man on each side of the car being lubricated and one on a locomotive. The cars are lubricated every six months, using winter oil in the cold months and summer oil in the warm months. JAMES BACON

Dixonville, Pa.

Give Each Machine Man Requisite Oil Supply Daily

LUBRICATION is the introduction of a fluid between two surfaces to lower bearing-surface friction. If the oil used is too light the surfaces will rub and wear and if too heavy a great amount of fluid friction is set up and heat generated, which often is enough to cause a journal to overheat. The oil of lightest consistency that will prevent metallic surfaces from coming in contact with each other is the proper lubricant to use.

When oil is used injudiciously it does not reach the bearings; it is spilled over the journals and most of it drips off without doing useful work. It is no uncommon sight to see a large oil can and a squirt gun used for oiling locomotives and coal-cutting machines. Usually there is a large pool of oil lying on the ground at the point where the machines were lubricated. The pool is due to poor judgment in oiling the machinery, more oil having been wasted than was actually used.

The proper distribution method, to my mind, is to provide every machine man, motorman and pumper with the necessary supply of oil in proper receptacles for the day's run. A central greasing station would be of little value except the one close to the shaft bot-

tom or on the outside, where each man would receive his day's supply. It shouldn't be a difficult problem to determine just how much oil a locomotive or cutting machine should use during a given working period. Do not go to the other extreme, forgetting that in the long run oil is cheaper than machinery. The oil supply can very easily be taken care of by employing a man to fill, number and rack oil cans for particular purposes. Hold the men responsible for the can by making it a part of their equipment.

WM. W. HUNTER.

Mt. Hope, W. Va.

Two Oil Cans Should Be Provided for Each Machine

A HELP-YOURSELF system in the distribution of oil and grease is out of line with good management for many reasons. A man should be put in charge of distribution of these supplies in order to prevent waste and to insure the use of the correct oil or grease for each purpose. The quantity of oil each machine should use cannot be determined by off-hand methods. It depends on the work the machine must do and is best decided by experiments and careful keeping of records.

A good system is to provide each machine operator with an extra oil can of about 2 or 3 gallons capacity, which should be kept in the stall where the machine is stored when not in use. This can will serve as a reservoir for the oil remaining in the can on the machine at the end of the shift. Should it so happen that the machine runner runs short of oil during some shift he could draw a supply from the reservoir can. The best system of machine maintenance will not be in effect unless the machine runner is held accountable for the condition of his machine.

VICTOR G. GANDY.

Hepzibah, W. Va.

Let the Expert Decide

IN order to get the best results at least cost in the lubrication of machinery at mines an expert should be engaged to choose and apply oils and greases. This having been done, the job rests with the mine officials to see that the expert's instructions are carried out. Not a single gallon or pound of lubricant should be issued without a requisition stating who is to receive it and the purpose for which it is to be used. However, this strict accounting of lubricant dispensing should not be carried out to the point where an adequate supply is not always immediately available for use on every machine.

Oiling and greasing should be systematized. By that I mean the lubricant should be applied as nearly as possible in exact amounts at regular intervals. Much trouble from machine wear can be eliminated by precise adjustments in keying up journals, setting them that they will not be so loose as to cause undue vibration or so tight as to warm up and cut the bearings. One badly cut or worn journal will require more oil than ten journals in good condition.

Where oil is caught and used over again, a suitable filter should be provided to remove extraneous material. Oil recovered from steam-engine lubrication systems should be used for purposes lower down the list in lubrication requirements. Such oil is suitable for oiling pulleys, ropes and similar equipment. Cylinder oil should be fed in proportion to the temperature and dryness of the steam and in accordance with the work the engine is doing, the condition of the valves, piston rings and cylinder walls.

To avoid waste in the use of oil it is necessary to keep the machines in good repair. Similarly, to keep machines in good repair it is important that sufficient lubricant be applied. Keep all wearing surfaces as smooth as possible. Steam cylinders, journals and in fact any rubbing surface may be kept smooth by occasional applications of graphite. A slightly rough journal can often be smoothed by using white lead mixed with cylinder oil, applying this mixture at intervals between the regular applications of the correct machine oil. However, this practice should not be followed where the oil is applied through a continous-flow circuit, as the lead may block the pipe and stop the flow of oil.

CHARLES W. WATKINS.

Kingston, Pa.

Good Lubrication Methods Compel Stringent Rules

SUPERVISION of oiling and greasing should fall to the mine electrician. He should instruct each machine operator how much lubricant should be used on each machine and he should visit each machine at least once a month to determine whether his orders are being carried out. Any men who disregard his instructions should be reported to the foreman or superintendent. The latter should have no compunction about firing these men if they fail to heed a warning.

In the case of oil intended for lubricating cutting machines, it should be kept in airtight containers from which it can be withdrawn without spillage. The container should hold sufficient oil to last two shifts and should be refilled by the supply crew each night. The supply crew should keep a check on the quantity of oil delivered to each machine by a report system. If the foreman, the electrician and others holding official positions keep an eye on this phase of operation and let the men know that they are doing this, the lubrication problem will be pretty well solved except for details.

WALTER HORNSBY,
Assistant Foreman.

Stickney, W. Va.

A Close Follow-Up System Is Needed in Lubrication

THE idea of being liberal with oil without a proper follow-up system has always proved wasteful and costly. For the sake of safety oil houses should be located outside of the mine. For the sake of efficiency the correct quality, proper quantity and a reliable system should be followed in the application of oil or grease. The same quality should be placed on the cutter chain as on the machine.

A force-system of greasing that puts grease to the right place by pressure has proved its worth and should be installed on all machines. Cutter chains should be treated with a little grease while still warm after cutting each place. Those companies that are most careful naturally get the best results. They make sure that the foreman sees a copy of the lubrication cost per ton at frequent intervals. It is not at all unusual to find oil costing above 1½c. per ton where oil is on the free list. There is a nice saving in the wood where oil is checked by careful inspection.

GEORGE EDWARDS.

Paintsville, Ky.

Threats Are Out of Order

THERE can be no line drawn between the setting or omitting of a timber except in the mind of the foreman. After the roof of a particular mine has been studied and a plan of timbering developed, the problem resolves itself into merely the setting of extra timbers wherever necessary. The setting of regular timbers becomes the duty of the men working at the face and a part of their daily job.

Orders issued by a superior must be carried out in full if there is to be any semblance of organization, and no official is worthy of his position who does not give utmost co-operation. There should be, and usually is, a time for discussion and determination of plans for any decided change in policy or practice. When orders are issued the responsibility rests upon the head issuing them; the execution of the orders rests upon the subordinate.

The moment an official begins to question his superiors and to give them only half-hearted support, he loses his usefulness to the company. If he realizes he cannot carry out the orders issued he must, in justice to himself and his company, resign. He should not threaten to quit, as Mac did. No superior is worthy of his place who is influenced by a threat. I can see where argument may arise over the word "threat" in that all rules and laws are threats of punishment in case of violation; but when it is considered that the authority issuing laws and rules is the superior and not the subordinate, the point of view is changed.

CHARLES BASHORE.

Thornton, W. Va.

Inspection System Governs Lubrication Methods Used

WE have a system at our mines that I think is good and so I am telling about it for the interest and help it may be to others. Oil and grease are issued from a central station which is regularly attended by one man. He keeps a chart showing how much lubricant is drawn by men authorized to receive it, they being machine runners, motormen and greasers.

Our mine cars are of an improved type, equipped with roller bearings, which are lubricated every 90 days by a motor-driven, high-pressure grease gun. Locomotives are equipped with industrial fittings and the axles are drilled up to the journal boxes, for which reason it is an easy matter to get grease to the journal bearings. Likewise all ball bearings on the locomotives are provided with industrial fittings and are greased with the motor-driven gun.

The man who issues the oil is in charge of the job of keeping the locomotives lubricated and is responsible for that phase of the locomotive upkeep. On each locomotive is kept a limited supply of oil which is used in an emergency pending the arrival of the unit at the greasing station at the appointed time. This one practice has saved us many bearings and armatures and has helped to keep down our power costs.

Mining machines are inspected once each day by the machine repairman, who makes a written report to the chief electrician as to the condition of the machines in his territory. The machine runners are required to carry into the mine each morning a supply of grease and oil sufficient for the day's run, the quantity allowed being based on the tonnage the machine will cut. Each machine runner is required to make a daily report to the mine foreman regarding the condition of his machine. The superintendent takes a hand by checking these reports against those turned in by the electricians. A check also is kept of the supplies issued for the repair of each locomotive and cutting machine. These two checks together enable us to pick up the motorman or machine runner who is careless in handling his machine.

Bearings on all pump motors and substation equipment are inspected once each week and their condition reported. All motors are tested for clearance between armature and pole pieces. Alternating-current motors are tested for clearance between rotor and stator. We keep a greaser around the tipple and preparation plant, whose duties are to grease and keep clean all motors. This system of lubrication and inspection has enabled us to make a nice reduction both in power and supplies.

Sipsey, Ala. C. W. JONES,
Superintendent,
De Bardeleben Coal Corporation.

Not How Little, but How Well

IN THE problem of mining-machine lubrication most money is saved not by being thrifty in seeing how little oil or grease is used but more by diligence in making sure that the lubricants are applied generously and when needed. The problem resolves itself into the matter of saving machinery and not oil or grease. Of course, aside from this general assertion to a principle, it is quite necessary to use judgment lest the practice be carried too far in one direction. It should be the duty of the machine boss to watch for these extremes and to place responsibility where too much or too little lubricant is used.

Locomotives in continuous service through the day shift should be oiled morning, noon and night. One man should be delegated to the job of seeing that each machine operative gets what lubricant he will need for the shift and that he understands how to use it. No locomotive should at any time be without a can of oil. C. A. PEAKE,

Kermit, W. Va. Mine Foreman.

Urges Particular Lubricant For Each Individual Purpose

IN A LARGE mine a central oiling station is advisable and one or more local or secondary stations should be provided where machines near by can be serviced without carrying oil long distances. Oil and grease should be stored in these stations in sufficient quantity and variety to meet all requirements. To insure efficiency and avoid waste, the greasing should be put under one man, who should have as many assistants as is necessary to handle the work.

What oils and greases are required for the various machines should first be ascertained. After this has been determined, a rough monthly estimate of consumption should be made and this amount should be stored underground, prorated to each station. The man in charge of lubrication should be given a list showing the grades of oil or grease to be used on each machine and whatever additional instructions are necessary as to the frequency of application or special precautions to be taken. He should be required to gather and make out reports covering the consumption of lubricants and giving details relative to mechanical defects discovered during the oiling and greasing of machines. W. E. WARNER.

Brentford, England.

Publications Received

The Pyrolysis of Carbon Compounds, by Dr. Charles D. Hurd. The Chemical Catalog Co., Inc., New York City. Pp. 807. American Chemical Society, Monograph Series. Price, $12.50.

The Failure of Plain and Spirally Reinforced Concrete in Compression, by Frank E. Richart, Anton Brandtzaeg and Rex L. Brown. Engineering Experiment Station, University of Illinois, Urbana, Ill. Bulletin No. 190. Price 40c. Pp. 74.

Investigation of Warm Air Furnaces and Heating Systems—The Research Residence, by Arthur C. Willard, Alonzo P. Kratz and Vincent S. Day. Part IV. Engineering Experiment Station, University of Illinois, Urbana, Ill. Bulletin No. 189. Price, 60c. Pp. 116; illustrated.

Recent Economic Changes in the United States. U. S. Department of Commerce, Elimination of Waste Series, Washington, D. C. Price, 5c. Pp. 32. Report of the committee on recent economic changes of the President's conference on unemployment.

Proceedings of the Second International Conference on Bituminous Coal, held Nov. 19-24, 1928. Vol. I, 987 pp.; Vol. II, 940 pp. Price, $7.50 each volume. Carnegie Institute of Technology, Pittsburgh, Pa.

The Ventilation of Mines—Generation of the Air Current, by Henry Briggs. Pp. 136; illustrated. Price, 7s. 6d. net. Methuen & Co., Ltd., London, England.

Method and Cost of Mining the Thick Freeport Coal in a Western Pennsylvania Mine, by J. W. Paul and H. Tomlinson. Bureau of Mines, Washington, D. C. Information Circular 6119. Pp. 17.

The National Safety Competition of 1928, by W. W. Adams. Bureau of Mines, Washington, D. C. Reports of Investigations, Serial 2938. Pp. 17; tables.

The Blast Furnace Stock Column, by S. P. Kinney. Bureau of Mines, Washington, D. C. Technical paper 442.

Trade Literature

Small Diameter Cast Iron Pipe. American Cast Iron Pipe Co., Birmingham, Ala. Pp. 36; illustrated. Describes the following types in which this small diameter pipe is furnished: Simplex prepared joint; 2-in. bell-and-spigot; 2-in. prepared joint; threaded-end; doublex simplex; flanged; bronze welded; cement-lined small diameter; cast iron pipe for victualic couplings.

General Electric Co., Schenectady, N. Y., recently issued the following bulletins: Line Material, GEA-1067; 15 pp. of this 56-pp. bulletin are devoted to Direct Suspension for Mines. CR2931 Float Switches, GEA-67A, for use with automatic pumping equipments for water-level control, for either tank or sump operation. Novalux Floodlighting Projectors, GEA-161D, 20 pp. Type FT, Normal Starting Torque, for full-voltage starting general-purpose squirrel-cage motors, GEA-788A. CR0505-A1 and B1 Solenoid Operated Valves, for the remote control of liquids and gases under pressure, GEA-1114. CR70006-D7 and D9 A-c. Enclosed Magnetic Switches, for alternating current motors, GEA-181A.

Wagner Electric Corporation, St. Louis, Mo., has issued Bulletin 164, 12 pp., discussing the losses which occur in distribution and power transformers, the method of making tests on transformers and the calculations of operating characteristics from the test data.

American Paulin System, Inc., Educational Division, Los Angeles, Calif., has compiled a 16-pp. manual on Altimetry, treating the subject as it applies to engineering, mining, geology, topography, construction and science.

Bulletin 160, 11 pp., issued by H. O. Swoboda, Inc., Pittsburgh, Pa., describes the "Falcon" Electrically Heated Large Asphaltum Coating Tanks.

"American" Mine Scraper Hoist is illustrated and described in a folder issued by the American Hoist & Derrick Co., St. Paul, Minn. The ruggedness and strength of the hoist, which is operated by compressed air, are shown.

High Test Welding Rod. Oxweld Acetylene Co., New York City. Pp. 12; illustrated.

Rubber-Mounted Motors. Wagner Electric Corporation, St. Louis, Mo. Bulletin 163; 4-pp. folder illustrating and describing these motors in ratings of 1/6, 1/4 and 1/3 hp.

NOTES

From Across the Sea

BECAUSE of the greater depth of European deposits and the wider spans between pillars, which spans always characterize long-face and long-wall workings, the European mining engineer seems to have a keener sense than most American engineers of the fact that the "main" roof will have its way and cannot be sustained rigidly by anything so weak and incapable of resistance as a prop, a timber or a steel set. The "main" roof must rely on itself for its support between ribs or when projecting from ribs. If it seeks to come down it must be allowed to do so, for what cannot be cured must be endured.

But below the "main," or what the British term the "absolute," roof is some weaker rock that in England is sometimes termed the "nether" or "immediate" roof and sometimes in America is designated the "first fall of rock"—that is, when the rock falls. It might be termed the drawroof because it is rock that has drawn away from the main roof.

The work of the post or timber set as generally understood in Europe is to hold up this immediate roof and to prevent it from falling till the miners are ready to have it fall, and to this end to keep it no tighter against the main roof than can be avoided. The upper part of the roof must support itself and must not be resisted. Hence the posts must yield to extreme pressures and be unyielding to smaller ones.

Many devices have been introduced. The one on the left of Fig. 2, which also is illustrated in Fig. 1, is made by taking two semicircular lengths and embracing these by bands. The pipe thus formed is filled with mine refuse. A sort of plunger rests on the top of the material in the pipe post, and on the top of this is placed a cap-piece. In recent forms of this prop a screw is placed on the top of the plunger part of the prop with a seat for a rail or light I-beam. This beam, resting on the heads of two props, can be carried forward to the face to form an "allonge," as the French would term it—namely, a support beyond the area resting on the props. The American expression might be "stringer" or "boom," but perhaps the French word would be preferable because of more narrow interpretation. The prop just described was devised by Friedrich Nellen and has been used extensively in Europe, especially in the Ruhr. It can readily be released by loosening the top screw.

Another prop is that known as the "Bullough" telescopic steel prop, also shown in Fig. 2, adjacent to the Nellen prop. The larger pipe is filled with sand. As sand is not readily compressible a hole is provided in the piston, to the end that the sand may escape, thus releasing any excessive load. The length of the prop can be regulated by the quantity of sand used; its resistance can be changed, it is claimed, by adjusting the aperture in the piston; and by removing the wire, sand can be withdrawn so that the resistance of the post will decrease enough to permit the latter to be readily removed.

The Saar prop is the next illustrated. Here reliance is placed on friction rather than on the compression of a compressible medium. With such a prop the resistance is the same at the beginning as at the end. It is claimed by some that, as the roof bends more and more, loose rock or "draw roof" is formed and consequently the resistance should increase, for there is more to support. These Saar props have had a large measure of success in England. The first illustration of this prop shows it in place and the second shows it after it has been shortened by pressure and the third shows a prop being tripped by a lever arrangement which lifts the tightening wedge.

The Newsaar prop is operated by a cam, and when tightened up can be loosened by a blow. The next illustration shows how a fall of rock may set the cam so as to release the prop. Where the post is placed with the cam away from the anticipated roof fall in the goaf this difficulty can be corrected. Two other models shown are the Cannock Chase and Blitz props.

Since 1925 the use of timber in

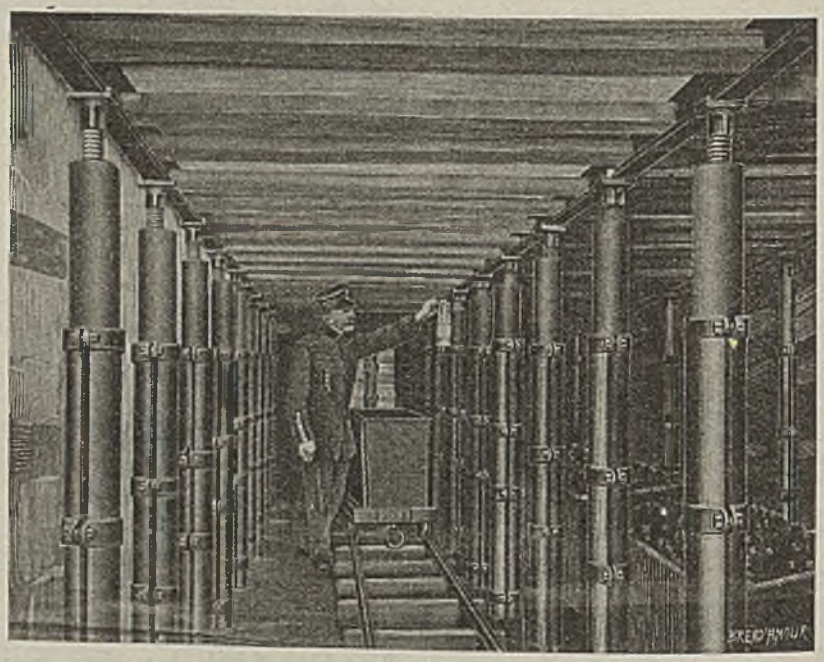


Fig. 1—Steel Timber in German Mine

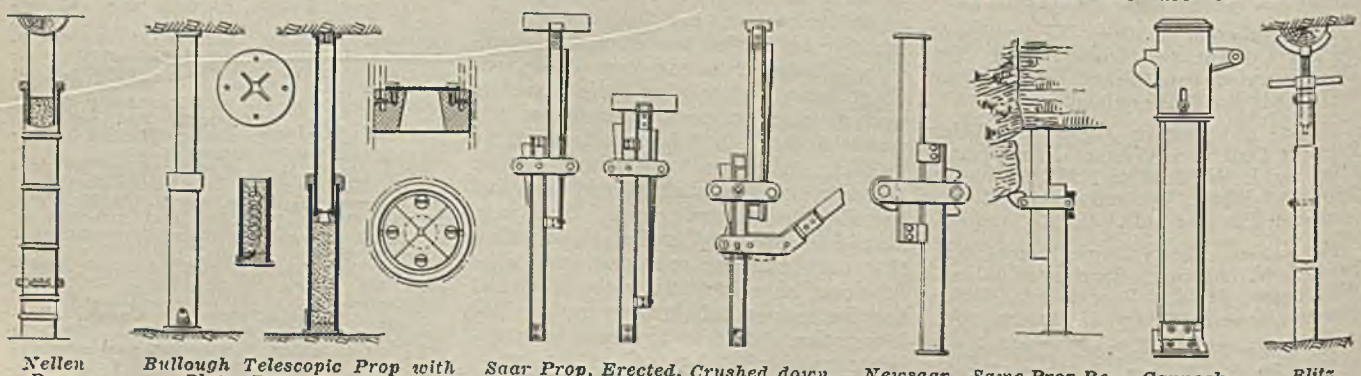


Fig. 2—Some Typical Steel Props

Nellen Prop

Bullough Telescopic Prop with Plate, Base and Piston

Saar Prop, Erected, Crushed down and Being Collapsed

Newsaar Prop

Same Prop Released by Fall

Cannock Chase Prop

Blitz Prop

mines in Germany actually decreased from 5,100,000 pieces to 4,370,000 in 1927. Some of that decrease may have been due to the introduction of strip mining, but it is a significant decline in the use of timber, seeing that production increased 16 per cent.

Iron Age reported on Sept. 13 of last year that it was planned to substitute steel for timber in 75 per cent of the mines in Germany during the next five years. At that time about 9 per cent were using steel exclusively whereas only 5 per cent used it in 1927, 3 per cent in 1926 and 1 per cent in 1925. The correspondent said that it was estimated that 14 per cent would be using it by the end of last year. He also said that the total savings per month in the Ruhr with 75 per cent of the mines using steel instead of wood would be close to $619,000.

It may be added that savings of 50 per cent are quite usually made in the industry by the substitution. The change is generally made slowly, steel replacing wood as the latter plays out. A large difficulty with wood has been the fact that not only does it rot away, especially where fungus is well established, but that when it fails its replacement is always much more expensive than its original placement. The sticks may have to be longer or much wood will have to be used above the timber sets; rock has to be removed, often carloads of it, and then the roof is not settled, and in settling it may break more timber. In any case rot will soon set in and the work has to be done over with constantly increasing costs. With longwall or long-face working, steel timber is better than wood because it is more effective and more easily recovered.

R Dawson Hall

On the ENGINEER'S BOOK SHELF

Investigation of Warm Air Furnaces and Heating Systems. The Research Residence, Part IV, by Arthur C. Willard, Alonzo P. Kratz and Vincent S. Day. Bulletin No. 189, Engineering Experiment Station, University of Illinois, Urbana, Ill.; 116 pp., 6x9-in. Price, 60c.

A modern three-story frame furnace-heated residence was erected by the National Warm-Air Heating and Ventilating Association and equipped for testing at a cost of $25,000. The house was built so that experiments might be made on the heating of this building by the University of Illinois, department of mechanical engineering. As a result of the experiments made in this house this bulletin (the fourth in the series) has been written.

One of the studies is as to the fuel consumption and economy with six varieties of fuel, from which the accompanying table has been made.

"The over-all thermal efficiency," says the report, "should always be given consideration in studies of residence heating, for with coke or anthracite it has been found that the over-all efficiency is approximately 90 per cent, or in other words, the final chimney loss is only 10 per cent of the heat of the fuel. With high-volatile fuels the over-all efficiency may be as low as 65 per cent, with 35 per cent of the heat of the fuel lost from the chimney.

"A seasonal load of 6,160 deg.-days is nearly normal for the locality of the Research Residence, and inasmuch at it was the actual seasonal load experienced with the first winter's fuel, anthracite, the consumption of each of the other fuels was calculated to the same basis. The degree-day unit corresponds to a mean temperature between indoors and outdoors of 1 deg. F. prevailing for one day, and the seasonal load, therefore, corresponds to the summation of the indoor-outdoor differences for all days of the season. This corresponds to the difference between an average indoor temperature of 65 deg. F. and the average outdoor temperature for the heating season multiplied by the number of days in the season."

Of course the cost relationship must always depend on the location of the residence. The test was made in the bituminous coal field where conditions favor certain coals.

The results of many studies are contained in this book, including those comparing six cold-air recirculating systems, determining the effect of sunshine on heating conditions, the relative humidity and evaporation with three types of evaporation pans, effect of cold-air return connections on air temperature at furnace bonnet and pans, warming rate from a cold state with freshly kindled coal, control with single and double thermostat system, relative value of simple and double-wall stacks, the effect of insulating a long leader pipe and the value of ceiling insulation.

Fuel Fired	Volatile Matter Per Cent	Ash Per Cent	Moisture Per Cent	Fixed Carbon Per Cent	Heat Value B.t.u.	Tons Required for Equal Season*	Ash to Handle, Lb.	Cost Per Ton at Urbana	Relative Cost of Heating
Anthracite	5.79	11.75	4.24	78.22	12,618	9.7	2,280	16.50	160
Byproduct Coke	0.77	9.57	1.00	88.66	13,100	9.4	1,800	13.50	127
High-Ash Illinois Bituminous	36.07	12.89	8.86	42.18	11,178	15.4	3,970	6.50	100
Pocahontas	17.84	5.15	1.77	75.24	14,836	8.9	920	9.25	82
Low-Ash Illinois Bituminous	32.00	8.71	8.40	50.89	11,881	13.0	2,270	7.75	101
Eastern Kentucky Bituminous	37.10	7.18	1.76	53.96	13,698	11.3	1,620	8.50	96

*Season tonnage based on a load of 6,160 deg.-days.

* * *

"Power Resources of the World"—An estimate of the total energy available in the world from coal, gas, oil, water power and electric power; compiled by Hugh Quigley, for the International Executive Council, World Power Conference; 7x5 in., pp. 170. The Country Press, Bradford, England. Price, $4.50 if obtained through the American Committee, World Power Conference, Washington, D. C.

One of the greatest weaknesses of the large amount of information on world power resources presented at the First World Power Conference of 1924, held in London, and at the International Economic Conference of 1927, at Geneva, was the fact that no standard method of investigation had been adopted. The task of reconsidering differences of standpoint and of treatment seemed to be insuperable. It was felt by the International Executive Council, however, that until this great initial difficulty was overcome, little real progress could be made in the formation of a reliable estimate of the world's power resources. The results of this survey under the supervision of Hugh Quigley appear in this book on world power.

No attempt is made to estimate the total energy available in the world from all sources other than to quote the estimate of Prof. Svante Arrhenius made in 1922. The present study is confined to the world power derived from rivers, from coal, from oil and from the air. The various estimates of power available through these sources are taken up in comparative detail.

In summarizing the various world resources the world power production in 1927 is given on three bases—Coal, calories, and electrical units. Using coal as a basis the total world power production in 1927 is given as 1,655.8 millions of tons, with the American Continent leading with 822.2 millions of tons. The same world quantity based on calories is given as 9,960 thousands of millions, and in electrical units as 1,655,800 millions of kilowatt-hours.

The Executive Council makes several very constructive suggestions looking to a more comprehensive and exact study of world power resources, emphasizing especially the non-uniformity of basic units such as horsepower, etc. The committee feels that other sources of power of an organic nature, such as timber, vegetable products, and peat should not for the present be surveyed by the World Power Conference, but earnestly recommends the issue of monthly statistics of electrical output.

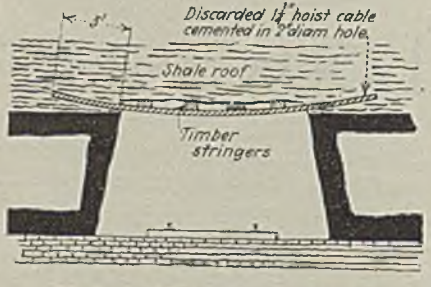
OPERATING IDEAS *from* Production, Electrical *and* Mechanical Men

Discarded Hoist Rope Utilized To Support Bad Roof

A METHOD of holding weak or broken roof over entries through the agency of discarded hoist rope is submitted by John A. Garcia, consulting engineer, of Chicago. It has proved successful in a trial lasting over two years in the mine of the Saxton Coal Mining Co., near Terre Haute, Ind.

As indicated in the accompanying drawing, lengths of 1¼-in. hoist rope on desired centers are swung from rib to rib and hold timber stringers placed between the ropes and roof. The ends of these ropes are anchored with cement grout in 3-ft. holes of 2-in. diameter, which are drilled in the roof rock above the coal. These holes are drilled tangent to the curve which the rope assumes on repose or on taking the roof load.

It is suggested that in placing the cable the drillhole be filled with the cement grout by means of a pipe and a wooden plunger. By this arrangement the cement is pushed in as the pipe is pulled out. To hold the cement in place while the cement is hardening a wooden wedge is driven against the cable at the mouth of the hole. If skillfully done, the cable can be hung quite close against the roof and tightened by cap pieces after the cement has set.



Method of Installing Rope Roof Supports

The cables shown in the accompanying photograph were installed over two years ago in a particularly bad stretch of roof in order to make the test a severe one. Mr. Garcia remarks: "On examining the place the other day I found that the roof had fractured quite high and that the cables were holding the roof satisfactorily.

"As to cost," he continues, "do your own figuring; it is negligible when compared to the cost of a bar and two legs and the labor of installing them. Here also is a chance to get rid of the unsightly, and heretofore useless, discarded hoisting cables at coal mines."

The editor adds a suggestion that where this system is adopted, particularly when applied to wet places, the ropes be carefully examined and lubricated or painted periodically to combat rusting. There is little likelihood of the rope pulling out from the holes when the cement anchoring is properly done.

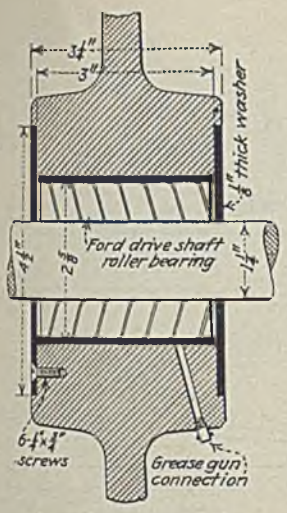
After Two Years These Ropes Continue to Hold Badly Fractured Roof

Roller Bearing Improves Vertical Rope Sheaves

The roller bearing of a Ford drive shaft serves a useful purpose as a support of rope sheaves on a long incline or slope track, writes Charles Larbe in *Engineering and Mining Journal*. It is particularly applicable to sheaves which because of operating conditions are likely to stick and thus be worn through by the rope they carry. Bronze bushings in conjunction with grease-cup lubrication have been tried as a means of assuring positive performance of sheaves in this service, but such installations have been known to bind as the result of grit entering between the shaft and hub.

To utilize the roller bearing, bore the hub to accommodate it and make a shaft of a piece of rolled shafting. Turn down each side of the hub for the reception of sheet-iron washers held in place by ¼-in. flat-head screws in a countersunk fit.

This design was developed at a metal mine where all vertical sheaves have been thus converted. Results have been



Using a Ford Roller Bearing

satisfactory as not one of the sheaves has been found inoperative or worn unevenly. None has been replaced. This sheave bearing requires greasing only twice a month.

Preheating Cast Iron Before Welding

Preheating facilities necessary in any welding shop or department naturally depend upon the run of work handled. The welding of cast iron is an everyday job in the average welding shop and it pays the shop manager to give close study to preheating problems encountered in the various types of castings. Small pieces can be preheated by the oxyacetylene blowpipe and welded without much difficulty. This method, however, is impracticable for larger pieces. A blacksmith's forge sometimes is used for certain pieces, but with this there is the possibility of overheating or burning the metal on one side, if constant care is not exercised.

The most practical and most economical method of preheating large pieces, particularly where the entire casting is to be heated, is the use of the temporary firebrick furnace. This is built of loose firebrick laid without mortar. It is quickly constructed and can be built to any size desired. Asbestos paper, having holes for draft, if necessary, forms the top of the furnace. The spacing of the bricks around the base of the furnace assures sufficient draft to raise the piece to the proper temperature.

In order to keep a desired temperature, the fire must be regulated occasionally while the welding progresses. This is done by opening or closing the draft holes, rearranging the asbestos paper covering, moving hot coals from one place to another, or replenishing the fire whenever necessary. This important detail usually is performed by a helper. When the casting has reached an even, dull red heat, an opening is made in the asbestos paper cover just large enough to uncover the weld area, and welding is done through this hole.

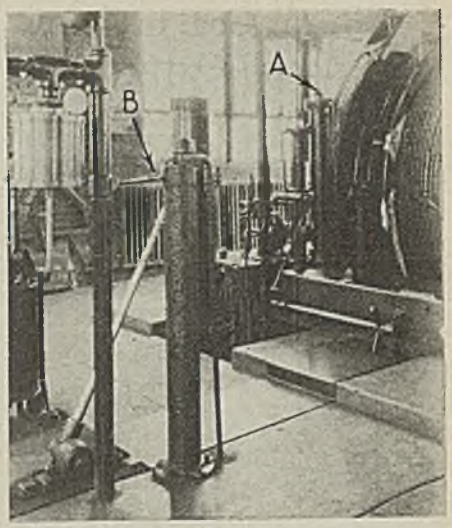
After the weld is completed it is just as important to secure proper cooling. The entire casting or piece should be covered with fresh charcoal and brought up to an even heat. With the asbestos covering intact, the finished work should be allowed to cool and contract evenly in the dying fire. It is important that one part does not cool quicker than any other. If this happens the piece may crack due to an uneven "pull."

Tobacco Money

It pays to read these pages each month, for in them are contained tried and proved ideas which can be applied directly or with slight modification to some of your own problems. If you take advantage of what the other fellow contributes, it is only fair that you in turn tell him the ideas you have developed. Also, it pays to send in your ideas, as you will receive $5 or more for each one accepted — tobacco money for at least one month. You can record the idea in writing in a very few minutes. Tie it in with a sketch or photograph.

Air Brake on Man Hoist

Men are raised and lowered in the man shaft at the Indianola mine of the Inland Collieries Co., Indianola, Pa., by a 500-hp. hoist having a drum 8 ft. in diameter. As originally installed and operated, this hoist was controlled mechanically by only an oil-operated brake. Should this fail, as is altogether possible if a leak develops in the oil line, a stop would have to be made electrically.



Indianola Man Hoist

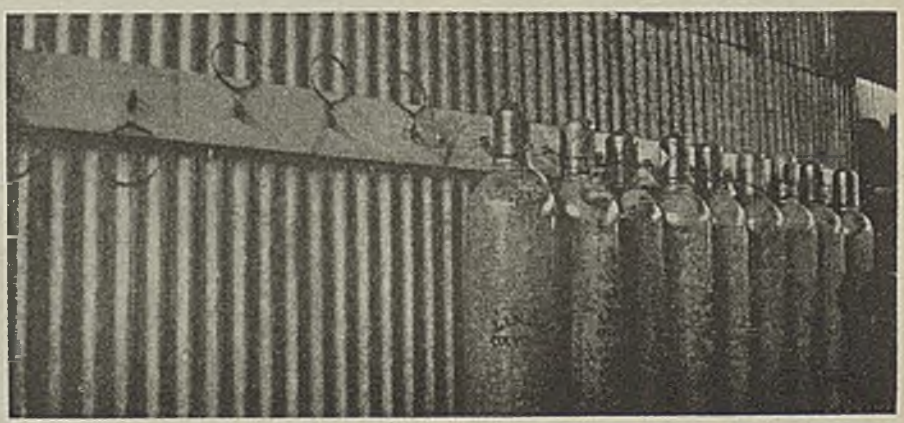
Additional safety has been imparted to this hoist by the addition of an air system to the braking rig.

In the accompanying photograph the air cylinder, connected with the toggle arm of the brake bands, is indicated by *A* and the air-valve control by *B*. This air cylinder has a bore of 4 in., a stroke of 4 ft. and will lift a weight of 2 tons when a pressure of 80 lb. per square inch is applied. As a further precaution the Indianola management plans to add a hand brake to this hoist.

Oxygen Cylinder Storage Easily Provided

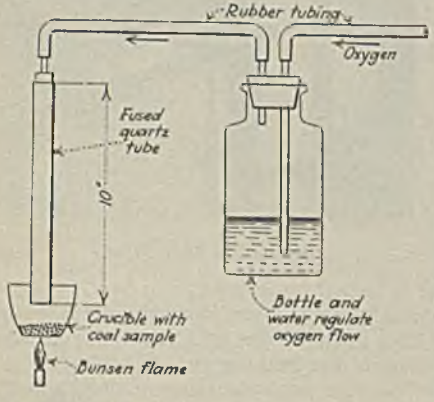
Pictured here is a novel rack, described in *Oxy-Acetylene Tips*, December, 1928, for supporting oxygen cylinders when not in use. Notice that the supporting columns are so arranged that they fit down over the valve cap on the cylinder, preventing it from being knocked over. It would be possible to design such a rack to take two tiers of cylinders by attaching collars with a slightly longer shank between the ones shown.

Solves the Storage Problem



Burns Coal to Ash With Oxygen

Oxygen is employed in a number of laboratories in the anthracite region to reduce the time required for burning down ash samples of coal. The usual form of apparatus and its setup is shown in the accompanying figure. Oxygen is obtained from the ordinary commercial



Apparatus for Burning Coal to Ash

steel tanks and the feed is regulated by allowing it to bubble through the water in the bottle.

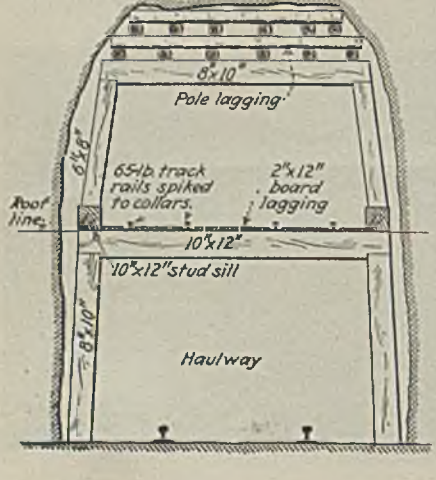
By using oxygen it is claimed that an ordinary sample may be burned down to ash in about 8 minutes. If slate is to be determined, the sample is first preheated and then burned, the time required being about half that for coal samples. In burning down bituminous-coal samples care must be taken to avoid an excess of oxygen. If too much is used the sample is likely to fuse, greatly increasing the time required.

Bind Timber Sets With Scrap Track Rails

In high and wide stretches in haulage entries it is not always feasible to erect timber sets in such a manner that the legs do not obtrude in the entry. Timber legs not set in channels in the entry rib are likely, in the event of rolling-stock derailments, to be kicked out, in which case the timbers above it and the rock they support may fall.

In a stretch of entry 12 ft. high and 100 ft. long in the No. 9 mine of the Greenville Coal Co., Powderly, Ky., this danger was avoided by a type of timber construction detailed in the accompanying sketch, submitted by G. D. Braun. The chief feature of the double-deck timber construction is the tying in of the several sets by sud sills and 65-lb. track rails spiked to the collars.

Stand Firm Against Derailments

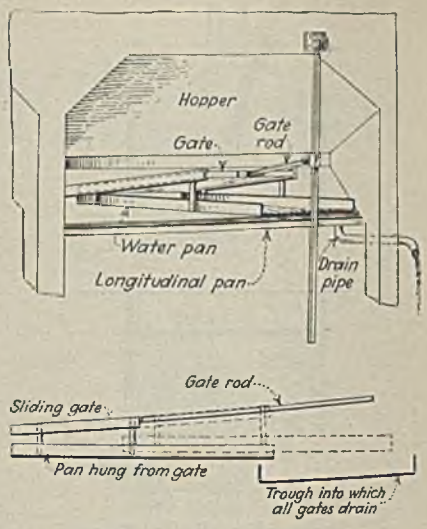


Self-Draining Gates Control Bin Drip

Under the 600-ton washed-coal loading bin at Flat Top mine of the Sloss-Sheffield Steel & Iron Co., Flat Top, Ala., there are ten sliding gates in a row above the loading track. Whenever there is coal in the bin, water drains from it and comes through the gates at the bottom.

Were it not for a draining system that has been applied much of this water would fall onto the coal already loaded into the cars, which would be undesirable because the coal goes to a by-product plant and should arrive there as dry as possible. The remainder of the water would fall to the track and make a bad working condition for the men, especially in cold, windy weather.

The draining system consists of sloping pans attached to each sliding gate and a trough or sluiceway running parallel to the track, into which the gate pans drain. The trough width is a few inches greater than the gate travel, so that the water dripping from the gate pan is caught irrespective of the gate position.



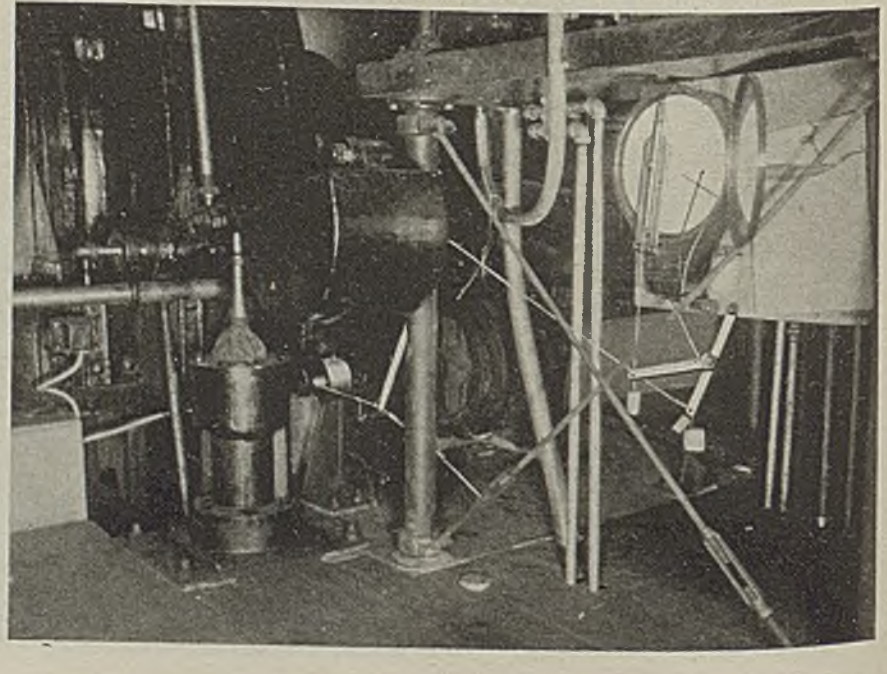
Details of Self-Draining Gate

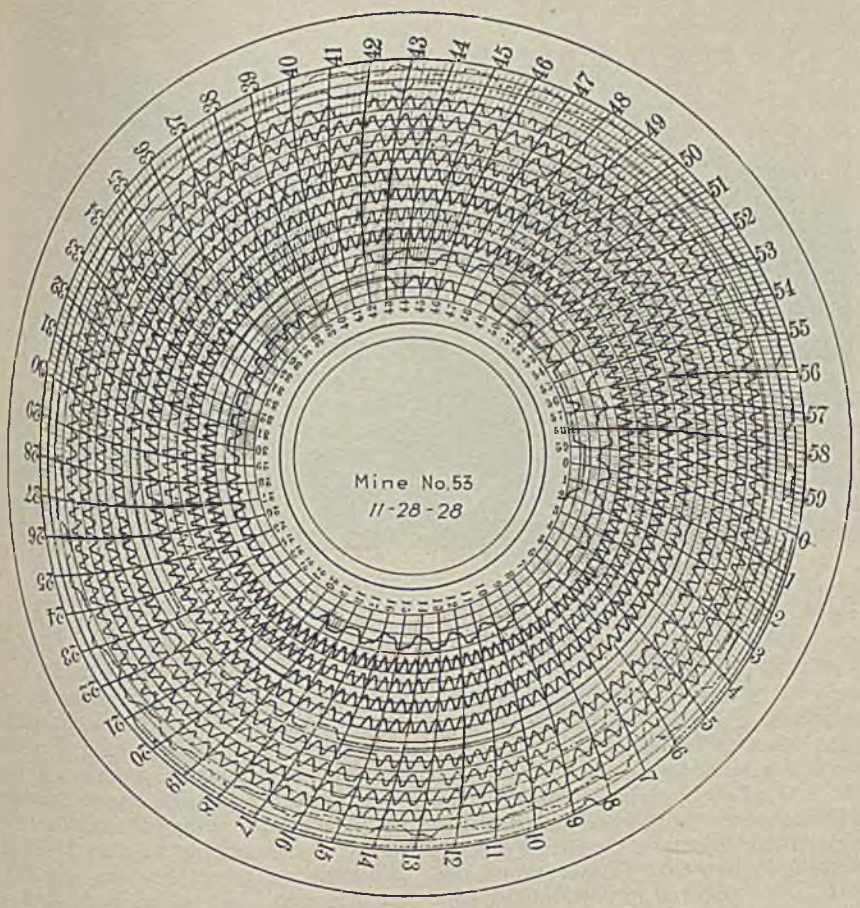
Modified Polar Graph Makes Compact Hoist Record

THE recent installation of an electric hoist which operates at the rapid rate of 250 lifts per hour from a depth of 238 ft. was the occasion for the development of an unusual type of hoist recorder by Carl Lee, electrical engineer of the Peabody Coal Co. This hoist is operating at Woodside No. 53 mine, Springfield, Ill.

Mr. Lee wanted a chart which could be filed in a small space without fold-

Meter Working With the Experimental Wire and Lever Attachments





1,890 Hoists Are Recorded on This Chart of Nov. 28

ing and yet on which the graph would be sufficiently elongated to indicate plainly the extent of delays at the starts and finishes, at which points the avoidable delays occur. He started with a Bristol Model 911 recording time meter which inks the record on a 10-in. circular chart. In this instrument movement is transmitted to the pen by means of a lever extending through the lower end of the case.

The instrument would fulfill the requirement if the pen movement per hoist were cut to a small range and some means provided for gradually changing the neutral point of the pen so that the graph would not overlap itself but instead would form a flat spiral.

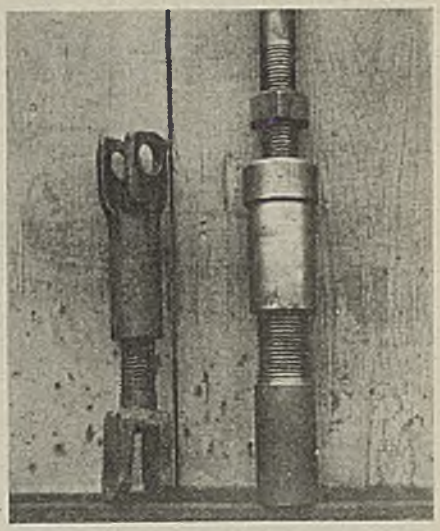
This gradual shifting of the neutral point was accomplished by adding to the face of the meter a rack geared to the chart driving shaft. The lower end of the rack is attached by a wire to a lever, the movement of which causes a change of length in the connection between the pen lever and an arm which in turn is moved by the hoisting action. This latter movement is transmitted by a wire which wraps and unwraps on a small fiber cam that has been added to the end of the regular hoisting-control camshaft. This special cam is shaped so that the pen movement is very slight during the high-speed portion of the hoist but is magnified as the cage nears the dump.

As the instrument is arranged, each chart accommodates 12 revolutions, or approximately 22 ft. of graph. The eight-hour hoisting shift is extended to about 15 ft. This great length and the magnifying of the terminal movements make it possible to analyze the shortest delays, and yet the record of the 1,800 to 1,900 hoists made during a day is concentrated on a 10-in. circular sheet.

An Adjustable Brake Rod For Mine Locomotives

A brake rod for mine locomotives which does not require detachment by the removal of pins when adjustments are made is a product of the machine shop at the Nemacolin mine of the Buckeye Coal Co., Nemacolin, Pa. The very fact that the rod can be lengthened or shortened while in normal position on the locomotive enables fine adjustment to any fraction of a turn. Adjustment of the usual type of rod is limited to a half turn as a minimum. By use of this new rod ten or fifteen minutes may be saved in each adjustment.

In the upper accompanying illustration is shown the old type rod along with the new type, the ends of which have not been clevised. The assembly of the improved type (see lower illustration) is made by a threaded shank rod and a screw rod, which are joined together by a sleeve. The sleeve is held fast after adjustment by a lock nut. The shank threads into the sleeve and has a plain bore for the reception of the screw rod which also screws into the sleeve.

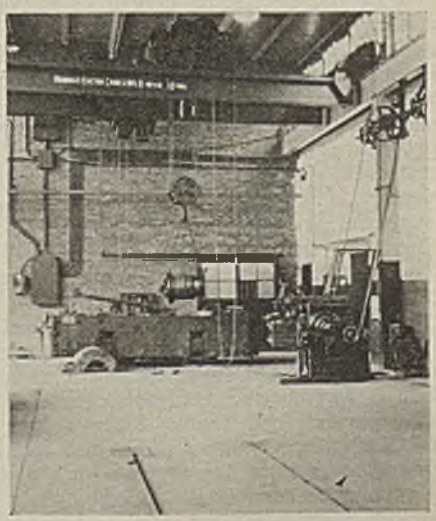


Brake-Rod Assembly—Upper Left, Usual Type; Upper Right, New Type

Shop Layout Features Speed Up Repairs

The Springdale mine shop of the Allegheny-Pittsburgh Coal Co., Logans Ferry, Pa., is notable for features of

One End of the Shop



design—several of which are shown in the accompanying photograph—that provide convenience in the handling of machine parts and accessibility to the machine during repairing. In the upper photograph, showing one end of the repair shop, are seen the means by which this convenience is realized. Note that the overhead electric crane is accessible to any point on the floor of the shop. Through the door to the right is the electrical repair shop and through the door in the facing wall is the supply room. Incidentally, it will be of interest to observe the means taken to prevent the breaking of the concrete floor by locomotive wheels at

Springdale Repair Pit

the end of the central track. Replaceable wooden blocks are set in recesses in the concrete at the track ends.

In the lower photograph is seen the arrangement by which the feature of accessibility is imparted to the repair pit. In the span of track over the pit sufficient clearance is left on the sides of the track so that the sides as well as the under portion of a locomotive may be reached from the pit.

Lead-Bath Treatment for Uniformly Hard Bits

Cutting-machine bits, writes W. W. Hunter, of Mt. Hope, W. Va., are the root of many evils and difficulties in the mining of coal. In the first place the method by which the bits are treated in the forging-sharpening process are antiquated, so much so that each blacksmith has his own notions as to correct procedure. Bits poorly hardened and tempered dull quickly and break frequently, and the machine men, in consequence, are tempted to continue cutting with them because their removal involves deadwork. The result is abuse of the cutting machine.

Mr. Hunter suggests the use of a lead bath for hardening the bits. After they have been forged, immerse them in a bath of molten lead until the lead readily separates from them. Then quench the bits in cold water. The lead bath controls the temperature at which the quenching is conducted.

The Dummy Factory

Fill Tamping Bags Where Material Occurs

Sand is one of the best tamping materials excepting for "uppers" or other holes drilled at such an angle that there is a tendency for the sand to run out. A little clay mixed with the sand and moistened slightly eliminates this one possible objection. Operating officials of the Old Ben Coal Corporation found just such a material in a high bank conveniently located along the state road at a point nearly central to its group of southern Illinois mines.

Last winter the company here installed a loading station for dummies. The building, which is 10x12 ft., is located up against the bank so that the operative can shovel the sand through an opening in the back wall and directly into the bag-filling machine. The brass tubes, which are connected to the bottom of the hopper, are square at the bottom end instead of being cut off at an angle. This arrangement together with a paper tamping bag which at the open end has one side longer than the other facilitates pulling the bag over the tube. These tamping bags are 1¼x16 in. While being filled they are supported on a hinged shelf which is dropped at the finish.

The dummies are packed in special wooden carrying cases which have handle slots in the sides. Each case holds 70 dummies, making a total weight of 105 lb., not including the case.

Space is provided in the building for another bag-filling machine of the same size.

Stirring the Sand Into the Loading Tubes

Among the Manufacturers

MARCUS T. LOTHROP was elected president of the Timken Roller Bearing Co. at a meeting held May 7, succeeding H. H. Timken, who becomes chairman of the board. W. R. Timken, J. G. Obermier, J. W. Spray, T. V. Buckwalter and H. J. Porter were elected vice-presidents and J. F. Strough, secretary-treasurer. Judd W. Spray, vice-president and general manager, was made a director at a recent stockholders' meeting and all the previous members of the board were re-elected, including H. H. Timken, W. R. Timken, J. G. Obermier, M. T. Lothrop and J. F. Strough. Another newly elected director is A. C. Ernst, Cleveland, Ohio.

* * *

THE E. D. BULLARD CO., manufacturer of the hard-boiled hat and industrial safety equipment, changed its corporate name to Bullard-Davis, Inc. (of California), on May 1. E. W. Bullard, president, states that the Salt Lake City office will be managed by J. F. Coombs, while the Los Angeles office will continue under the direction of K. S. Butler and A. A. Castle.

* * *

THE QUIGLEY FURNACE SPECIALTIES CO., INC., has moved its offices from 26 Cortlandt St., to the eighth floor of the Lakner Building, 56 West 45th St., New York City.

* * *

THE JEFFREY MANUFACTURING CO. announces the incorporation of the Jeffrey Manufacturing Co., Ltd., with main office and works at Montreal, Quebec; a branch office in Toronto and a supply warehouse at Calgary, Alberta. The Jeffrey company recently acquired also the Galion Iron Works & Manufacturing Co., Galion, Ohio, manufacturers of road machinery, and this also will be marketed from its Canadian plant in addition to the Jeffrey line.

* * *

FACTORY EMPLOYEES of the General Electric Company with a record of three years or more of continuous service will receive one week's vacation with pay, and employees with ten years or more, two weeks' vacation with pay, according to a recent statement of C. C. Chesney, vice-president and chairman of the manufacturing committee.

R. S. ARTHUR, formerly in charge of the Chicago office of the Dravo Equipment Company, has been appointed manager of the Midwestern branch office at 176 N. Wacker Drive, Chicago, recently opened by the Aeroil Burner Company, West New York, N. J.

* * *

ON MAY 1 the Chicago district and the Central division offices of the various units of the Union Carbide & Carbon Corporation moved to the new Carbide & Carbon Building, Michigan Ave. and South Water St., Chicago. Units of the Union Carbide & Carbon Corporation which will make this new building their Chicago home are: Linde Air Products Co.; Prest-O-Lite Co., Inc.; Oxweld Acetylene Co.; Oxweld Railroad Service Co.; Union Carbide Sales Co.; Carbide & Carbon Chemicals Corporation; National Carbon Co., Inc.; Haynes Stellite Co.; J. B. Colt Co. and Acheson Graphite Co.

* * *

THE ALEMITE MANUFACTURING CORPORATION, Chicago, has purchased the line of industrial lubricating equipment bearing the Dot name and will continue its manufacture and sale. The Carr Fastener Co., Cambridge, Mass., which formerly manufactured the system, is now concentrating on the manufacture and sale of the Dot line of fasteners.

* * *

H. W. YOUNG, president of the Delta-Star Electric Co., Chicago, announces that the following expansion of manufacturing and distributing facilities has been made: purchase of the Champion Switch Co., whose Kenova (W. Va.) plant will continue on its present line of equipment in addition to several new designs; manufacturing arrangements with the Société d'Installations et de Constructions Electriques et Mecaniques, Boulogne-sur-Seine, which will distribute Delta-Star equipment in France and her colonies; acquisition of an interest in the Monarch Electric, Ltd., St. Johns, Quebec, which will be operated as the Monarch Delta-Star Co. and will handle all Canadian business. Delta-Star equipment will be handled by its established sales organization while the Kenova Champion works will be operated as a separate unit, both it and the French factory having their own sales organizations.

THE JOHNS-MANVILLE CORPORATION, New York City, has removed its Western division headquarters from South Michigan Avenue and 18th Street to the Carbide & Carbon Building, 230 North Michigan Ave., Chicago.

* * *

THROUGH THE PURCHASE of adjoining property the Leeds & Northrup Co., Philadelphia, Pa., has just secured 190,000 additional square feet of property, including 85,000 sq.ft. of floor space.

* * *

THE WAGNER ELECTRIC CORPORATION, St. Louis, Mo., has appointed L. G. Tandberg as branch manager of the Los Angeles sales office, effective May 1.

* * *

FREDERICK A. STEVENSON, formerly assistant vice-president, American Car & Foundry Co., has been elected director and vice-president in charge of operations. He succeeds William C. Dickerman, who recently was chosen head of the American Locomotive Co.

* * *

IDEAL COMMUTATOR DRESSER CO. has removed its Eastern office and warehouse to 18 Warren St., New York. R. W. Becker, Eastern division manager, and F. J. Dreyfuss, New York district manager, will be in charge.

* * *

NEIL CURRIE, JR., managing engineer of the Pittsfield works of the General Electric Co., has been named manager of the Philadelphia works. Robert V. Good, section superintendent in the Schenectady works, has been named assistant to the manager at Philadelphia.

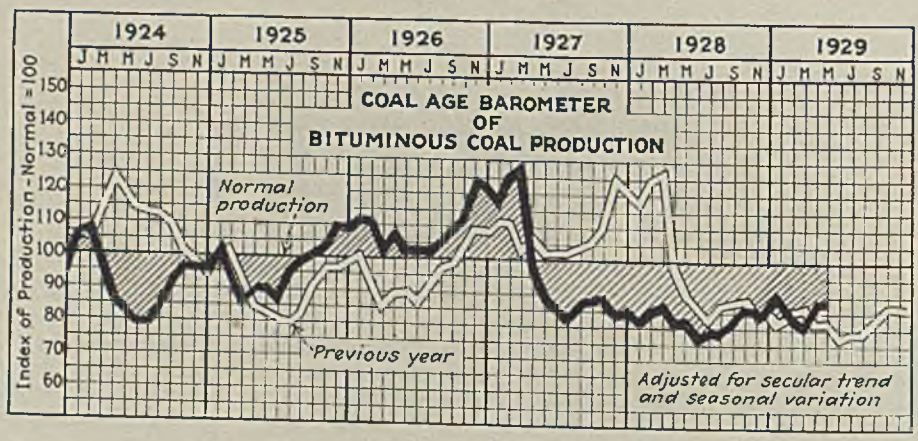
* * *

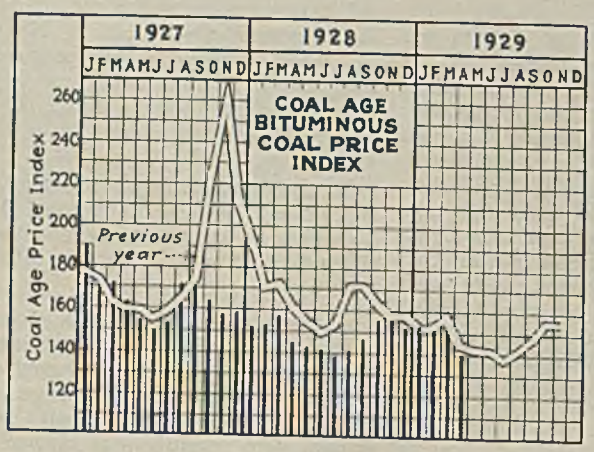
A. D. LIERMAN, formerly assistant advertising manager of Mack Trucks, Inc., has been appointed advertising manager and editor of the *Mack Bull Dog*, with offices at the Long Island City (N. Y.) plant of the company.

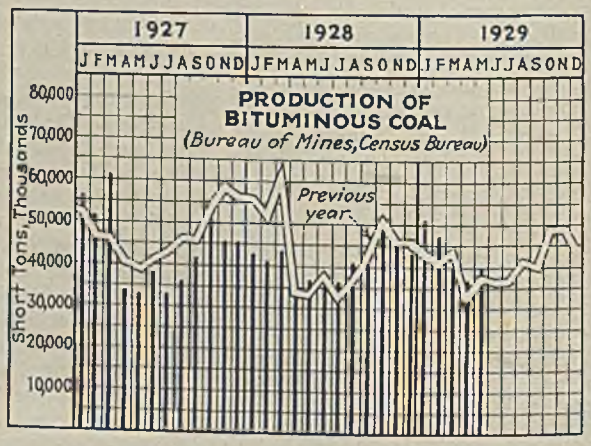
* * *

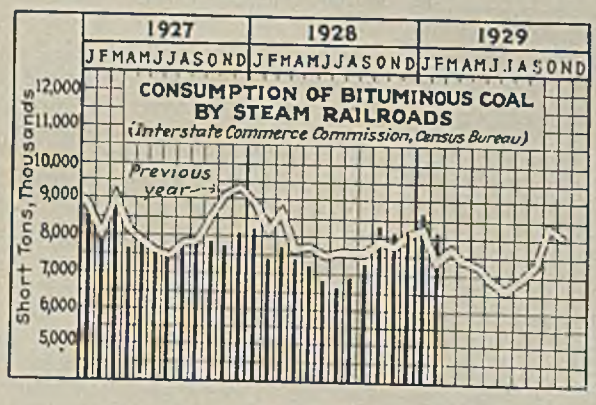
B. E. SCHONTHAL & CO., INC., Chicago agents for the Carroll Chain Co., Conveyor Sales Co., West Virginia Rail Co., Watt Car & Wheel Co., Mines Equipment Co., and the Chicago Automatic Conveyor Co., have removed their office to suite 844, Railway Exchange Bldg., 224 South Michigan Ave., Chicago.

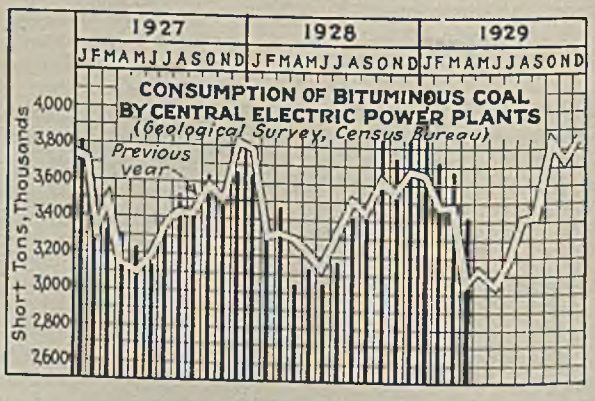
Indicators of Activities in the Coal Industry

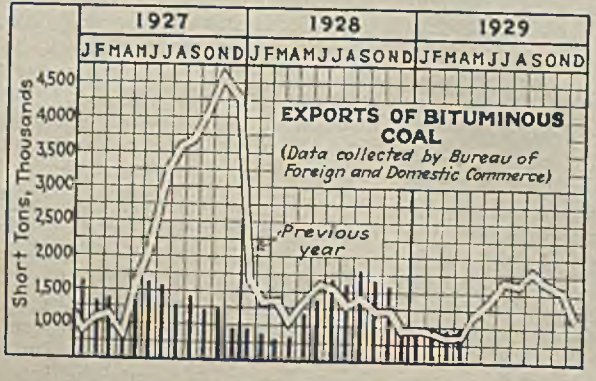


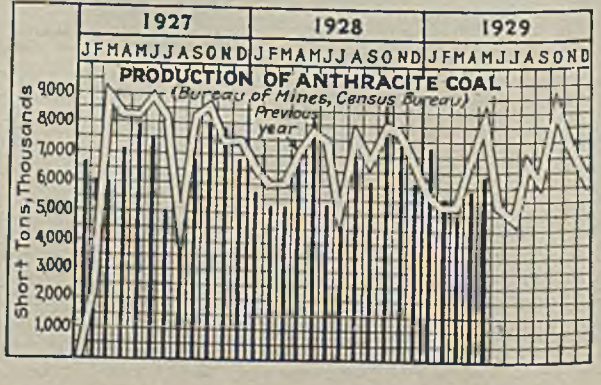












MARKETS *in Review*

MARKET conditions in the bituminous coal trade in May were a study in contrasts. In the main, however, prices held firm though local recessions and advances were recorded, largely in those regions where fights for the lake business are going on. Screenings in general enjoyed a boom as the result of curtailment in prepared sizes in the most of the fields. Contracting and sales for stock proved disappointing, as most of the railroads, industrial users and retailers showed a disposition to defer buying until later in the year.

May output is estimated by the U. S. Bureau of Mines at 40,090,000 net tons. This was an increase of 3,202,000 tons over the April production and 3,466,000 over May of last year. Increased industrial activity accounts for this in part, though the additional tonnage has for the most part been absorbed by the lake trade.

In spite of the increased production prices have remained substantially at their former level. *Coal Age* Index of spot bituminous prices was 139 on May 4, and 138 on May 11, 18 and 25. The corresponding weighted average prices were $1.68 and $1.67. These are preliminary figures. Revised figures for April were 141, April 6; 140, April 13 and 20, and 138, April 27. The corresponding weighted average prices were $1.71, April 6; $1.69, April 13 and 20, and $1.68, April 27. The monthly Index for April was 139¾ as compared to May unrevised Index of 138¼.

Due principally to the early opening of the season, dumpings at the lower lake ports to May 27 were 2,613,135 tons over the totals for the corresponding period last year. Cargo dumpings to May 27 were 6,935,784 tons and bunker fuel loadings were 264,873 tons. Movement to the lakes has assumed a steady tone after the initial opening rush.

A listless tone prevailed in the anthracite market during the month of May. Consumer indifference resulted in a restriction of the volume moved and even price concessions failed to interest buyers to the extent of placing orders. No one particular size was marked by demand or lack of demand, as all moved fairly uniformly.

Unseasonably low temperatures kept up a fair demand in the Chicago market. Buying, however, was confined principally to the best grades from all fields while coal of secondary quality dragged. Demand also was stimulated by early announcements of price advances for June. Though orders were barely sufficient to increase running time, May business was considerably better than most operators expected.

THE market for steam coals from Illinois, Indiana and western Kentucky was very disappointing. With screenings slow and weak at the same time domestic sizes were sluggish, a conflict among the Indiana operators shipping steam lump to the railroads on mine-run contracts was advanced as the explanation for the anomalous situation. The resultant screenings were sold for what they would bring, usually $1.10@$1.25 f.o.b. mines.

Western Kentucky operators also were shipping prepared sizes on mine-run contracts and screenings were dumped at 80@90c. Mine-run from Indiana, western Kentucky and the Belleville district could be had at practically the same price as screenings and several Chicago industries equipped with crushers took advantage of this situation. Unified selling kept the southern Illinois operators out of the slow screenings market. By making a determined effort, these producers have recaptured a substantial amount of the contract tonnage lost to other fields. Some Indiana operators have been similarly successful.

The demand for Illinois coals in the St. Louis market was fairly good the first half of May and the operators controlled the price situation by curtailing production and reducing fluctuations. Domestic sizes were fairly active in response to early buying for the anticipated June demand. Screenings and steam sizes were slow and the Mt. Olive and Standard fields operated only one and two days a week.

THE volume of coal moved from the Duluth and Superior docks was lighter during May, as the large buyers covered their requirements in the rush immediately following the opening of navigation. Shipments for the month are estimated at 13,000 cars as compared with 12,825 in April. June shipments are expected to aggregate 15,000 cars, or slightly more than for the same month last year. Dock interests are not discouraged over the slight decrease in volume as salesmen have been meeting with unprecedented success in closing with their regular customers. This movement has been aided by discounts up to 50c. per ton, effective May 1, offered for the first time this year. Shipments from the Lake Erie ports, though somewhat lighter than at the beginning of the season, were in good volume, averaging 42 to 49 cargoes weekly during May.

The May 1 price schedules were as

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

		Week Ended							
		May 4, 1929		May 11, 1929		May 18, 1929		May 25, 1929	
	Market Quoted	Independent	Company	Independent	Company	Independent	Company	Independent	Company
Broken	New York	.....	$8.00@$8.10	.....	$8.00@$8.10	.....	$8.00@$8.10	.....	$8.00@$8.10
Broken	Philadelphia	$8.00@$8.10	8.00	$8.00@$8.10	8.00	$8.00@$8.10	8.00	$8.00@$8.10	8.00
Egg	New York	8.05@ 8.25	8.25	8.05@ 8.25	8.25	8.15@ 8.25	8.25	8.10@ 8.25	8.25
Egg	Philadelphia	8.25@ 8.50	8.25	8.25@ 8.50	8.25	8.25@ 8.50	8.25	8.25@ 8.50	8.25
Egg	Chicago*	7.37	7.37	7.37	7.37	7.37	7.37	7.37	7.37
Stove	New York	8.60@ 8.75	8.75	8.60@ 8.75	8.75	8.65@ 8.75	8.75	8.60@ 8.75	8.75
Stove	Philadelphia	8.75@ 9.00	8.75	8.75@ 9.00	8.75	8.75@ 9.00	8.75	8.75@ 9.00	8.75
Stove	Chicago*	7.81	7.81	7.81	7.81	7.81	7.81	7.81	7.81
Chestnut	New York	8.05@ 8.25	8.25	8.05@ 8.25	8.25	8.15@ 8.25	8.25	8.10@ 8.25	8.25
Chestnut	Philadelphia	8.25@ 8.50	8.25	8.25@ 8.50	8.25	8.25@ 8.50	8.25	8.25@ 8.50	8.25
Chestnut	Chicago*	7.37	7.37	7.37	7.37	7.37	7.37	7.37	7.37
Pea	New York	4.25@ 4.50	4.50	4.25@ 4.50	4.50	4.35@ 4.50	4.50	4.30@ 4.50	4.50
Pea	Philadelphia	4.50@ 4.75	4.50	4.50@ 4.75	4.50	4.50@ 4.75	4.50	4.50@ 4.75	4.50
Pea	Chicago*	4.02	4.02	4.02	4.02	4.02	4.02	4.02	4.02
Buckwheat	New York	2.60@ 2.75	†2.75	2.60@ 2.75	†2.75	2.65@ 2.75	†2.75	2.35@ 2.75	†2.75
Buckwheat	Philadelphia	2.75@ 3.00	2.75	2.75@ 3.00	2.75	2.75@ 3.00	2.75	2.75@ 3.00	2.75
Rice	New York	1.85@ 2.00	2.00	1.85@ 2.00	2.00	1.85@ 2.00	2.00	1.75@ 2.00	2.00
Rice	Philadelphia	2.00@ 2.25	2.00	2.00@ 2.25	2.00	2.00@ 2.25	2.00	2.00@ 2.25	2.00
Barley	New York	1.35@ 1.50	1.50	1.35@ 1.50	1.50	1.35@ 1.50	1.50	1.35@ 1.50	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, $3.25 (D., L. & W.)

follows: Pocahontas lump, egg and stove, $7.40; nut, $7.15; mine-run, $5.10; screenings, $4.10; Kentucky block, $6.40; lump, $6.10; egg and dock-run, $5.20; egg and stove, $5.35; stove, $5.20; screenings, $4.10; splint block, $5.25; lump and egg, $5; stove, $4.75; dock-run, $4.75; screenings, $3.85; Youghiogheny block, $5.10; lump and egg, $4.85; stove, $4.60; dock-run, $4.50; screenings, $3.85; Hocking block, $5; lump, $4.75; stove, $4.45; dock-run, $4.50; screenings, $3.60.

LIGHT seasonal demand was the feature of the Southwestern markets in May. Prices on domestic sizes were nominally unchanged. Kansas crushed mine-run, the summer substitute for screenings, ranged from $2@$2.25 per ton, selling mostly at $2.25 at the beginning of the month and $2 at the end. Little contracting is being done by steam plants.

May storage prices for Southwestern coals are as follows: McAlester (Okla.) lump, $5.75; Wilburton (Okla.) lump, $5; Henryetta (Okla.) lump, $3.25@$3.50; Sebastian County (Ark.) and LeFlore County (Okla.) semi-anthracite lump, $4; Paris (Ark.) lump, $4.75; Spadra (Ark.) anthracite, grate, egg, range and furnace, $5.25; No. 4, $4.75; Bernice (Ark.) grate and nut, $6.25; egg, $6.50; No. 4, $7.50.

As a result of seasonal conditions the Colorado market has continued to be sluggish. "No bills" are being kept within reasonable bounds and the demand for steam sizes is good. However, the latter feature is causing the operators considerable difficulty in disposing of the larger sizes. New prices, effective June 1, are as follows: Walsenberg-Canon City lump, $4.55; nut, $4.30; washed chestnut, $3.25; Trinidad coking lump, nut and chestnut, $2.95; Crested Butte bituminous lump, $4.55; nut, $4.30; Crested Butte anthracite furnace and egg, $7.75; Rock Springs-Kemmerer lump, $4; nut, $3.75; steam, $1.50; Colorado steam sizes, $1.40.

ACTIVE storage on the part of small consumers and chilly weather resulted in a steady demand throughout the month in the Louisville market and kept prices at their previous level, though no improvement was noted. Retailers were in the market to replenish their supplies with the result that production of prepared sizes supplied more screenings and held down the market on steam sizes. Western Kentucky mines are averaging a little better than two days a week and the production in the eastern part is again increasing. There is little movement of eastern Kentucky coal to the lakes, most of the tonnage being scattered throughout the Middle West and South. Coal from western Kentucky now is being shipped into Indiana, Illinois, Iowa and the Mississippi Valley, including the lower river and west. Kentucky producers charge decreased lake business to extremely low quotations from Ohio and West Virginia.

Nut and block were selling in western Kentucky at $1.25@$1.50, with some premium block up to $1.65 or better; mine-run and screenings, 85c.@$1.25 or better for top grades. Eastern Kentucky is pricing block at $1.75@$2.10, with some premium coal higher; lump, egg and nut at $1.50@$1.85; mine-run, $1.25@$1.60, and screenings, 75c.@$1.25.

Lake cargo coal was the dominant factor in the Cincinnati market in May, though somewhat handicapped by discriminatory rates. The movement through the Cincinnati gateways has been topping other records of coal lakeward bound, though high-volatile prices—$1.35@$1.40, based on mine-run—are the lowest operators have received in years. Smokeless coals took the price dips which can usually be expected in May, but in the main prepared sizes held firm, with better buying at the close. Mine-run business was spotty and stove and nut were neglected. Screenings probably were in better shape than for several years, as a large number of mines have contracted for the year's supply. Block, lump and egg have been having a hard struggle in the high-volatile market.

SOUTHERN operators found May to be an unfavorable month for storage buying and wet weather held down dealer purchases. Shipping on consignment worked havoc with prices for a time but reduction in the "no-bill" surplus resulted in a better situation. Mine-run was almost at a standstill with the exception of the gas and byproduct demand but slack prices, in contrast to the rest of the list, rose as those on prepared sizes went down. The fact that householders have felt no particular urge to put in their cellar coal resulted in a backward retail season and the merchants figure that only one-half of the normal deliveries have been made. May prices were continued into June as follows: smokeless lump, $7.50; mine-run, $5.75; bituminous lump, $5.50; slack, $4.

With the domestic trade at a low ebb and the steam business quiet, the Columbus coal trade marked time during May. Retailers showed little disposition to lay in stocks, preferring to wait on demand, though householders bought smokeless coal in small quantities. A good volume of inquiries from the railroads was the only bright spot in the steam trade. Utilities were slow about buying, though quite a few renewed contracts at last year's prices. Several large users of steam sizes are buying a part of their requirements on the open market to take advantage of bargain prices.

Considerable tonnage is being shipped to the lower lake ports from West Virginia and Kentucky. Operators in the Hocking and Pomeroy fields of Ohio hope to get a share of the lake business and some tonnage is moving in that direction from the Cambridge field. Otherwise, southern Ohio production is below normal. Ohio prices were fairly steady with lump $1.75@$2; mine-run, $1.25@$1.50; screenings, $1.10@$1.30. Splints and smokeless coals were weak and domestic lump dropped to new low levels.

The key to the market situation in Pittsburgh lies in the statement by J. D. A. Morrow, president, Pittsburgh Coal Co., who, commenting on the wage situation, said that Pittsburgh companies are selling coal at the lowest prices since the spring of 1916. Prices, he stated, are 15@25c. lower than a year ago. Pittsburgh operators in general place the responsibility for low prices

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

LOW-VOLATILE, EASTERN	Market Quoted	Week Ended May 4, 1929	May 11, 1929	May 18, 1929	May 25, 1929
Smokeless lump	Columbus	$2.50@$2.75	$2.35@$2.60	$2.35@$2.60	$2.35@$2.60
Smokeless mine-run	Columbus	1.75@ 1.95	1.75@ 2.00	1.75@ 2.00	1.75@ 2.00
Smokeless screenings	Columbus	1.10@ 1.25	1.10@ 1.25	1.10@ 1.30	1.15@ 1.35
Smokeless lump	Chicago	2.50@ 2.75	2.50@ 3.00	2.50@ 3.00	2.50@ 3.00
Smokeless mine-run	Chicago	1.85@ 2.00	1.85@ 2.00	1.85@ 2.00	1.85@ 2.00
Smokeless lump	Cincinnati	2.50@ 2.75	2.50@ 2.75	2.50@ 2.75	2.50@ 2.75
Smokeless mine-run	Cincinnati	1.75@ 2.00	1.75@ 2.00	1.85@ 2.00	1.75@ 2.00
Smokeless screenings	Cincinnati	1.15@ 1.35	1.10@ 1.35	1.15@ 1.35	1.00@ 1.35
*Smokeless mine-run	Boston	4.00@ 4.20	4.00@ 4.20	4.10@ 4.20	4.10@ 4.35
Clearfield mine-run	Boston	1.50@ 1.75	1.50@ 1.75	1.50@ 1.70	1.50@ 1.70
Cambria mine-run	Boston	1.75@ 2.00	1.75@ 2.00	1.75@ 2.00	1.75@ 2.00
Somerset mine-run	Boston	1.60@ 2.00	1.60@ 1.90	1.60@ 1.90	1.60@ 1.90
Pool 1 (Navy Standard)	New York	2.20@ 2.30	2.20@ 2.40	2.10@ 2.40	2.20@ 2.40
Pool 1 (Navy Standard)	Philadelphia	2.20@ 2.40	2.20@ 2.40	2.20@ 2.40	2.20@ 2.40
Pool 9 (super. low vol.)	New York	1.70@ 1.95	1.70@ 1.95	1.70@ 1.90	1.75@ 1.90
Pool 9 (super. low vol.)	Baltimore	1.75@ 2.00	1.75@ 2.00	1.75@ 2.00	1.75@ 2.00
Pool 10 (h. gr. low vol.)	New York	1.50@ 1.75	1.50@ 1.75	1.50@ 1.75	1.50@ 1.75
Pool 10 (h. gr. low vol.)	Philadelphia	1.55@ 1.75	1.55@ 1.75	1.55@ 1.75	1.55@ 1.75
Pool 11 (low vol.)	New York	1.25@ 1.50	1.30@ 1.50	1.30@ 1.50	1.30@ 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	$1.25@$1.40	$1.25@$1.40	$1.25@$1.40	$1.25@$1.40
Pool 54-64 (gas and st.)	Philadelphia	1.20@ 1.40	1.20@ 1.40	1.20@ 1.40	1.20@ 1.40
Pittsburgh sc'd gas	Pittsburgh	1.80@ 2.00	1.80@ 2.00	1.80@ 2.00	1.85@ 2.00
Pittsburgh gas mine-run	Pittsburgh	1.65@ 1.75	1.65@ 1.75	1.65@ 1.75	1.65@ 1.80
Pittsburgh mine-run	Pittsburgh	1.40@ 1.75	1.40@ 1.70	1.40@ 1.70	1.40@ 1.75
Pittsburgh slack	Pittsburgh	.95@ 1.10	.90@ 1.00	1.00@ 1.15	1.00@ 1.15
Kanawha lump	Columbus	1.65@ 2.00	1.65@ 2.00	1.65@ 2.00	1.65@ 2.00
Kanawha mine-run	Columbus	1.25@ 1.45	1.25@ 1.45	1.25@ 1.45	1.25@ 1.50
Kanawha screenings	Columbus	1.00@ 1.25	1.00@ 1.25	1.00@ 1.25	1.00@ 1.25
W. Va. lump	Cincinnati	1.65@ 2.00	1.65@ 2.00	1.65@ 2.00	1.50@ 1.75
W. Va. gas mine-run	Cincinnati	1.35@ 1.50	1.35@ 1.50	1.35@ 1.50	1.35@ 1.50
W. Va. steam mine-run	Cincinnati	1.10@ 1.35	1.10@ 1.35	1.15@ 1.35	1.10@ 1.35
W. Va. screenings	Cincinnati	1.00@ 1.25	.85@ 1.10	.85@ 1.00	.85@ 1.15
Hocking lump	Columbus	1.75@ 2.00	1.75@ 2.00	1.75@ 2.00	1.75@ 2.00
Hocking mine-run	Columbus	1.25@ 1.50	1.25@ 1.50	1.25@ 1.50	1.25@ 1.50
Hocking screenings	Columbus	1.10@ 1.30	1.10@ 1.30	1.10@ 1.30	1.15@ 1.30

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

on the desperate competition of the West Virginia fields and it is said that a new policy and a new alignment of producers may be expected in the Pittsburgh district.

THE situation proved rather distressing to the sellers, as prices in some instances dropped below those of April. However, a slight gain was noted at the last of the month. Demand showed no increase and no commercial buying for the lakes was reported in the district. The Pittsburgh Coal Co., Pittsburgh Terminal Coal Corporation and the Carnegie Coal Co. are the only ones, apparently, shipping in that direction. Steam slack sold at 75c. the first of May but at the end rose to 90c.@$1. Gas slack moved downward in sympathy and even mine-run prices showed some recession. Production in the Connellsville region rose in response to a coke demand which reached a high level for the past two years.

Central Pennsylvania production continues on the spring level, May loadings being just a little below those of April. Prices show little variation. There was, however, a slight increase in the number of "no-bills."

No improvement was noted in the current demand in New England though prices are on a better basis than a month ago. Operating curtailments have decreased the selling pressure. Fancy grades of Pocahontas brought $4.40 f.o.b. vessel, Hampton Roads. Navy Standard smokeless ranged from $4.10 @$4.25. The increased use of bituminous coal as a substitute for anthracite in New England supplied an optimistic note. Though the tonnage is not large, it is fast becoming a factor.

Dullness in the prepared sizes placed nut and slack on the preferred list. May quotations, f.o.b. Virginia terminals, were $3.80@$3.92. Nut and slack for inland delivery ranged from $5.15@ $5.20 on cars at Boston, while mine-run could be had at $5.40@$5.50. Accumulations were less than in March or April, fewer cargoes were sent forward on consignment and the absorption of tonnage was steady.

A steady but not heavy movement of coal featured the New York market. Spot coal buyers continued to remain in the background and refrained from increasing the tonnages held for immediate use and from buying to add to reserves. Contract coal moved regularly with few requests for slower shipments. Quotations showed no material change over the month.

The seasonal decline in tonnage movement was checked in the Philadelphia market in May and indications are that the volume will be maintained during the summer. Price, however, continues to be the drawback. Considerable faith is placed in the satisfactory industrial situation by the trade, though users are displaying the utmost caution in placing orders. Railroads display practically no interest in accumulating reserves. Less contract coal is being closed than last year, as most of the users prefer to resort to the spot market for their needs.

Renewed interest was manifested in fuel for public buildings and other institutions but the desirability of the business has resulted in competition robbing it of most of its advantages.

Domestic business was unusually slow in the Birmingham district in May, sometimes delaying the delivery of commercial coal at mines which ordinarily produce a large proportion of domestic sizes. Sales to date are materially lower than last year and deliveries scheduled for June will show little or no improvement over May. A poor credit situation was responsible in a large measure for the sluggish market and it is expected that retailers will carry only small stocks even after the market opens up. Prices for May are as follows: Big Seam lump, $1.95; nut, $1.85; Carbon Hill lump and egg, $2.45; nut, $2@$2.20; Cahaba lump, $3.40@$3.50; egg, $3.40@$4.15; nut, $2.80@$3.15; Black Creek lump, $3.75 @$4; egg, $3.65@$3.75; nut, $3.05; Corona lump, $2.80; egg, $2.65; nut, $2.45; Montevallo lump, $4.40@$5.15; egg, $4.15@$5.15; nut, $2.80@$3.25.

All the carriers except the Southern Ry., which gets its fuel from a subsidiary, have renewed fuel contracts for the next twelve months on practically the same terms as the expiring ones. The commercial market showed no improvement in May, though screenings were scarce on account of the slow domestic movement. Medium- and low-quality coals were not plentiful enough to seriously hurt prices. Prices were as follows: Big Seam and Carbon Hill mine-run and washed, $1.50@$1.75; Cahaba mine-run and washed, $1.75@ $2; Black Creek washed, $2; Corona mine-run, $1.90; washed, $2.15.

The volume of anthracite moved in the New York market in May was disappointing to both the producers and retail dealers. Consumers are not buying for the coming winter and most of the tonnage moved was for immediate consumption. Restricted production aided in keeping quotations on independent coals up to their previous level. Most producing companies reduced the price of No. 1 buckwheat to $2.50 at the last of the month. This, it was stated, was only temporary, the former price again becoming effective on June 1.

NEW ENGLAND reported an extremely dull anthracite market as a result of sparse buying on the part of the public and the competition of substitutes. No hope is held out until in September. The demand for anthracite on the docks of Duluth and Superior was very light. Only a small number of buyers showed any interest in the 50c. cut in list prices effective May 1.

The Philadelphia coal trade still is experiencing difficulty in getting under way. Consumer indifference has resulted in a curtailment of dealers' orders, with consequent reduced running time at the collieries. With the advent of the cash discount plan, dealers still seem to be loath to stock up. The cash discount plan also is tending to retard buying for stocks as dealers are backward about laying in more than they have cash to pay for. The three discount plans in effect also helped confuse the situation. All companies have announced an advance of only 5c. per ton on June 1, instead of 10c. originally decided on. By this method the repeal of the anthracite tax is being passed on to the retail dealer. There was no particular pressure to move any one size of coal, as all were in fair demand.

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

		Week Ended—			
MIDDLE WEST	Market Quoted	May 4, 1929	May 11, 1929	May 18, 1929	May 25, 1929
Franklin, Ill. lump	Chicago	$2.40	$2.40	$2.40	$2.40
Franklin, Ill. mine-run	Chicago	2.15	2.15	2.15	2.15
Franklin, Ill. screenings	Chicago	1.75@ 1.85	1.75@ 1.85	1.75@ 1.85	1.75@ 1.85
Central, Ill. lump	Chicago	1.75@ 1.90	1.95@ 2.10	1.95@ 2.10	1.95@ 2.10
Central, Ill. mine-run	Chicago	1.60@ 1.75	1.75@ 1.85	1.75@ 1.85	1.75@ 1.85
Central, Ill. screenings	Chicago	1.40@ 1.50	1.40@ 1.50	1.40@ 1.50	1.40@ 1.50
Ind. 4th Vein lump	Chicago	2.25@ 2.55	2.25@ 2.55	2.25@ 2.55	2.25@ 2.55
Ind. 4th Vein mine-run	Chicago	1.50@ 1.90	1.50@ 1.90	1.50@ 1.90	1.50@ 1.90
Ind. 4th Vein screenings	Chicago	1.50@ 1.75	1.50@ 1.75	1.50@ 1.75	1.50@ 1.75
Ind. 5th Vein lump	Chicago	2.00@ 2.15	2.00@ 2.15	2.00@ 2.15	2.00@ 2.15
Ind. 5th Vein mine-run	Chicago	1.25@ 1.75	1.25@ 1.75	1.25@ 1.75	1.05@ 1.75
Ind. 5th Vein screenings	Chicago	1.10@ 1.35	1.10@ 1.35	1.10@ 1.35	1.10@ 1.35
Mount Olive lump	St. Louis	1.90	1.90	1.90	1.90
Mount Olive mine-run	St. Louis	1.75	1.75	1.75	1.75
Mount Olive screenings	St. Louis	1.40@ 1.60	1.40@ 1.60	1.40@ 1.60	1.40@ 1.60
Standard lump	St. Louis	1.70@ 2.20	1.70@ 2.20	1.70@ 2.20	1.70@ 2.20
Standard mine-run	St. Louis				
Standard screenings	St. Louis	1.25@ 1.35	1.25@ 1.35	1.25@ 1.35	1.25@ 1.35
West Ky. block	Louisville	1.25@ 1.75	1.25@ 1.65	1.25@ 1.60	1.25@ 1.65
West Ky. mine-run	Louisville	1.00@ 1.25	1.00@ 1.25	.95@ 1.25	.85@ 1.25
West Ky. screenings	Louisville	.85@ 1.25	.85@ 1.20	.90@ 1.25	.80@ 1.30
West Ky. block	Chicago	1.25@ 1.65	1.25@ 1.40	1.25@ 1.40	1.25@ 1.40
West Ky. mine-run	Chicago	.90@ 1.25	.95@ 1.25	.95@ 1.25	.90@ 1.30
SOUTH AND SOUTHWEST					
Big Seam lump	Birmingham	$1.85	$1.85	$1.85	$1.85
Big Seam mine-run	Birmingham	1.50@ 1.75	1.50@ 1.75	1.50@ 1.75	1.50@ 1.75
Big Seam (washed)	Birmingham	1.50@ 1.75	1.50@ 1.75	1.50@ 1.75	1.50@ 1.75
S. E. Ky. block	Chicago	1.75@ 2.10	1.75@ 2.10	1.75@ 2.10	1.75@ 2.10
S. E. Ky. mine-run	Chicago	1.35@ 1.65	1.35@ 1.65	1.35@ 1.65	1.35@ 1.65
S. E. Ky. block	Louisville	1.75@ 2.10	1.75@ 2.10	1.75@ 2.10	1.75@ 2.25
S. E. Ky. mine-run	Louisville	1.25@ 1.60	1.25@ 1.65	1.35@ 1.65	1.25@ 1.65
S. E. Ky. screenings	Louisville	.85@ 1.20	.80@ 1.10	.75@ 1.10	.75@ 1.25
S. E. Ky. block	Cincinnati	1.75@ 2.00	1.75@ 2.00	1.75@ 2.00	1.65@ 2.00
S. E. Ky. mine-run	Cincinnati	1.10@ 1.60	1.10@ 1.60	1.15@ 1.50	1.10@ 1.50
S. E. Ky. screenings	Cincinnati	1.00@ 1.25	.85@ 1.25	.85@ 1.10	.85@ 1.10
Kansas shaft lump	Kansas City	3.50@ 4.00	3.50@ 4.00	3.50@ 4.00	3.50@ 4.00
Kansas strip lump	Kansas City	2.50	2.50	2.50	2.50
Kansas mine-run	Kansas City	2.50	2.50	2.50	2.50
Kansas crushed mine-run	Kansas City	2.00@ 2.25	2.00@ 2.25	2.00@ 2.25	2.00@ 2.25

WORD *from the* FIELD

Industrial Coal Reserves Drop To Twenty-Seven Days

Stocks of anthracite and bituminous coal in the hands of industrial consumers in the United States and Canada on May 1 totaled about 33,500,000 tons, according to the monthly report of the National Association of Purchasing Agents. Though consumption declined in April as compared to March, the number of days' supply dropped to 27, the lowest figure since April 1, 1926, when the number of days was 26.

Days' Supply of Bituminous Coal In Various U. S. Industries

		Decrease
By-product coke	19	13
Electric utilities and coal-gas plants	51	6
Railroads	24	3
Steel mills	24	7
Other industries	25	4
Average total bituminous stocks throughout the United States	25	7

Estimates of Output, Consumption and Stocks

	United States Production	Industrial Consumption	On Hand in Industries
April 1928	39,081,000	35,230,000	47,432,000
May	44,748,000	34,844,000	43,670,000
June	41,264,000	32,784,000	40,890,000
July	41,785,000	33,527,000	40,700,000
August	48,598,000	33,890,000	39,415,000
September	48,332,000	34,223,000	40,090,000
October	58,914,000	36,500,000	40,778,000
November	53,498,000	35,879,000	41,520,000
December	49,606,000	37,354,000	41,010,000
Jan. 1929	58,500,000	35,518,000	41,492,000
February	54,000,000	38,175,000	40,808,000
March	44,391,000	40,566,000	40,108,000
April	43,329,000	37,750,000	35,385,000
May 1	.....	.....	33,468,000

Stocks of bituminous coal in the hands of commercial consumers on April 1 were 36,000,000 net tons, according to a survey by H. O. Rogers and F. G. Tryon, of the U. S. Bureau of Mines. This shows a decrease of 5,800,000 tons from the total of Jan. 1. On Jan. 1, the date of the last survey, the stocks were 41,800,000 tons but the production has since declined while the consumption for the major classes of consumers has increased, the stocks dropping to 36,000,000 tons on April 1.

Alabama Blast Kills Nine

Nine men were killed and two others severely burned in an explosion May 27 at the Connellsville mine of the Yolande Coal & Coke Co., Yolande, Ala. The blast, said by company officials to have been caused by an overcharge of dynamite, occurred while twelve men of the night shift were at work. The nine dead and two injured men were brought to the surface early in the morning of May 28, the twelfth member of the crew making his way out uninjured. Little damage was done to the workings by the explosion.

R. & P. Sales Department Is Reorganized

B. M. Clark, president, Rochester & Pittsburgh Coal Co., announces the reorganization of the sales department, effective May 1. J. Noble Snider, vice-president in charge of sales, has resigned from that position though still remaining in the industry. Malcolm McAvity, formerly with the Rochester & Pittsburgh Coal Co. (Canada), Ltd., succeeds Mr. Snider, with offices in New York.

The sales department has been expanded and the market territory divided into districts, each in charge of a sales manager. These are: for New York, Everett D. Davis, formerly assistant freight traffic manager, Buffalo, Rochester & Pittsburgh Ry., with offices in Rochester, N. Y.; for the Eastern district, Clifford E. Craft, formerly president of the White Star Coal Co., New York, with offices in New York, and for the Upper Great Lakes region, J. Floyd Massey, formerly vice-president, Woodruff, Massey & White, Inc. F. E. Clark, formerly in charge of the Philadelphia office, has been appointed assistant to the vice-president with offices in New York.

Trade-Practice Code Adopted By Utah Operators

The Utah Coal Producers' Association recently adopted and submitted for the approval of the coal industry of Utah a code of practices for the marketing of its product. Misrepresentation, breach of contract, commercial bribery, secret rebates, price discriminations and dumping were condemned. Arbitration as a means of handling disputes was indorsed and the producer and retail dealer were defined. The terms set forth in the accompanying table were approved as distinguishing and identifying sizes for the domestic trade.

Coal Sizes for Domestic Trade

	Screen Size Over	Screen Size Through
Dust	....	¼ in.
Screened slack	¼ in.	1¼ in.
Round Hole Shaker Screen		
Slack	....	1¼ in.
Nut	1¼ in.	3 in.
Domestic Lump	3 in.	....
Stove, cobble or California lump	3 in.	8 in.
Lump	8 in.	....
Mine-run	Unscreened coal	

Central States Congress Considers Safety

Employers are, as a rule, sympathetic to the humanitarian interests of their employees, declared W. L. A. Johnson, president, Rayville Coal Co., Kansas City, Mo., before the Third Annual Central States Safety Congress, held May 1 at the President Hotel, Kansas City, Mo. This attitude is evident, he continued, when the hundreds of thousands of dollars expended in the interests of safety first, welfare work and health conservation policies are considered.

Enforcing safety rules does not present as easy a problem in mining as in industrial enterprises and "the best the employer can do on his own initiative is to provide as far as humanely possible the material and equipment for safety and inaugurate safety rules, depending upon the co-operation of the employee to secure the ultimate result. This the coal operators are doing in largely increasing measure year by year. It is also a matter of satisfaction to know that the employee is co-operating to a considerable extent, though perhaps not to as large an extent as is desirable to secure the best results."

Safety not only reduces accidents and corresponding suffering and loss to employees and their families but also lowers the cost to the employer, as well as inspiring confidence in his workers and building up a more efficient organization. Mechanization seemingly has joined with safety in the reduction of the number of fatalities per million tons of coal mined, but there also has been a steady decrease in the rate, which can be ascribed only to the definite part that safety training has played.

In conclusion, Mr. Johnson stated that two things are necessary to secure the highest ideals in safety work—close co-operation between employer and employee. The employer must be willing to bear his share of the expense by furnishing the material and the employee should be willing to enter into and encourage safety and first-aid training work.

Mine-Fire Appropriations Bill Vetoed

A bill to set up a fund of $100,000 to be used in fighting mine fires was vetoed by Governor Fisher of Pennsylvania on May 10 on the ground that the sum was insufficient to make any material progress in the work. The Governor held that before the state embarked upon such an undertaking it should be prepared to carry it out over a long period of years by the expenditure of large sums of money.

Growing Responsibilities of Business Chamber of Commerce Theme

THE increasing responsibilities of business was the keynote of the seventeenth annual meeting of the Chamber of Commerce of the United States, held at Washington, D. C., April 29 to May 3. This keynote, emphasizing the magnitude of the rôle American business is called upon to play, not only in the national but in the international field, was struck by Julius H. Barnes, past president of the Chamber, in his address at the opening session April 30. William Butterworth, president, was in the chair, and gave the welcoming address. The third speaker at this time was Earl Elijah, master farmer, who discussed "The Relation of Business to Agriculture."

National economic questions were brought into the practical perspective of business at twelve round-table conferences held on April 30 and May 1. The topics chosen for discussion at these conferences included "Marketing Agriculture Products," "Trade Practice Conferences," "Industrial Extension Problems," "Government Influence on Transportation," "Government Policies Relating to Raw Materials and Water Power," "Modern Planning and Financing of Cities," "Mass Merchandising—The Producer, Distributor and Consumer," "Tariff Principles," "Business Finance and the Credit Supply," "Life and Property Conservation," "Traffic of the City and Its Trade Area" and "Employer-Employee Relations."

At the trade practice conference Col. Nelson B. Gaskill, former chairman of the Federal Trade Commission, after approving of its work, stated that he believed it had shown a tendency to make rules for industry instead of accepting or rejecting rules that industry made itself. He suggested that the trade-practice rules adopted by industries in conference with the commission should be submitted to the courts to determine which of them were enforceable. Abram F. Myers, also a former chairman of the commission, took issue with Colonel Gaskill, and said that such alterations as the commission had made in the rules submitted by the industries had been designed merely to bring the rules clearly within the law, so that they would have the support of the courts. The sentiment of the meeting appeared to be strongly in favor of the trade-practice conferences.

WHILE oil men predicted that the known oil reserves will not last more than 15 years, members of the coal industry assured the conference on "Government Policies Relating to Raw Material and Water Power" that the supply of their product is so great as to be practically unlimited. Much interest was attached to the possibility of using coal instead of oil for purposes to which coal is equally if not better suited.

The bituminous coal industry has been watching with interest the attempts of the oil industry to establish stability within itself, declared C. E. Bockus, president, Clinchfield Coal Corporation. Their accomplishment, it is hoped, will throw some light on the problems which coal operators are facing. Mr. Bockus asserted that no basic industry, including coal, can function properly if more than one-half of its well-managed concerns can show no profit whatever on the capital invested.

Better conditions can be brought about in the coal industry as well as in all other businesses through a modification of the Sherman Act, declared Harry L. Gandy, executive secretary, National Coal Association. If the courts would interpret the contract section as liberally as they do the monopoly clause, there would be no trouble. In many cases contracts are attacked before they are made. To correct the situation he proposed that the machinery of the Sherman Act be made to apply only to such contracts in restraint of trade that are not in the public interest.

Retirement plans for employees and readjustments caused by mechanization were discussed at the conference on "Employer-Employee Relations." Making the "older worker" an independent economic unit is being approached in various ways in industry, but primarily through the pension plans. These plans find expression in industrial companies and in trade unions, with the economic motive prevailing in the former and old-age benefits or poor relief dominant in the latter. The modern idea, however, is that a pension system should be a part of the policy of management in the interest of greater efficiency and better morale.

Homer Ferguson, former national president of the Chamber of Commerce, commended the pension system as a means of eliminating the incompetent and those who are unable to adapt themselves to the ways of modern industry. J. C. Clark, Southern Pacific Ry., emphasized the necessity of setting up the pension system on an actuarial basis with the same elements as life insurance and organized and administered on the same basis. With such a system, an age limit is not necessary and a compulsory retirement age can be disregarded. M. W. Alexander, president, National Industrial Conference Board, declared that the employer must meet the problem of the older worker himself or accept the alternative of expensive legislative plans.

IN considering the second topic, the conference was generally of the opinion that the displacement of workers by machinery was not sufficiently extensive to cause difficult problems of employment.

At the general session held May 1 Chester H. Rowell spoke on "Our Stake in the Pacific"; C. H. Cahan, M. P., Dominion of Canada, on "Business Problems Which Concern Both Canada and the United States," and Willis C. Hawley, chairman, Ways and Means Committee, U. S. House of Representatives, on "Making a Tariff." William Butterworth, national president, Chamber of Commerce made the initial address at the general meeting held in the morning of May 2, his topic being "The Business Man and His Organizations." J. Frank Grimes, president, Independent Grocers' Alliance of America, talked on "What Is the Future of Small Businesses," and Christie Benet, general counsel, Interstate Cotton Seed Crushers' Association, spoke on "The Trade Association and the Federal Trade Commission."

Mr. Benet pointed out the significant fact that although 50 industries have held trade-practice conferences since 1919, and seven more are scheduled for May and June, only 24 complaints have been filed with the Federal Trade Commission claiming infractions of the codes of practice so established. No

Bureau of Mines Approves Explosives

Additions to the list of permissible exposives since the publication, in *Coal Age*, August, 1928, of the approved list issued by the United States Bureau of Mines are given in the following table:

Additions to the List of Permissible Explosives, September, 1928

Brand	Class Designation Vol. Poisonous Gases	Basis Characteristic Ingredient	Weight of 1¼x8 Inch Cartridge, Grams	Smallest Permissible Diameter, Inches	Unit Deflective Charge, Grams	Rate of Detonation in 1¼-Inch Diameter Cartridge, Ft. per Sec.	Mfrs.
EP-28	A	1a	116	¾	220	10,170	1
October, 1928							
Coal-Gel No. 1	A	6	224	1¼	267	2,570	2
Coal-Gel No. 2	A	6	226	1¼	273	3,170	2
December, 1928							
Monobel No. 12, L. F.	B	1a	99	¾	242	9,120	3
Gelobel No. 3, L. F.	A	6	247	1	259	7,770	3
Unilite No. 1	B	1a	114	1¼	240	8,460	2
February, 1929							
Unilite No. 2	B	1a	103	1¼	244	8,100	2
Monobel No. 9-A, L. F.	A	1a	142	¾	208	7,510	3
May, 1929							
Austin Red Diamond, No. 8, L. F.	A	1a	169	¾	217	8,230	4
Austin Red Diamond, No. 9-A, L. F.	A	1a	142	¾	208	7,510	4

[1]Hercules Powder Co. [2]Union Explosives Co. [3]E. I. du Pont de Nemours & Co. [4]Austin Powder Co.

cease and desist order based on a trade-practice conference rule has so far been appealed. And the trade-practice rules of the creamery industry have now been in force ten years.

Industry has no cure-all in this process but the trade-practice conference brings leadership and co-ordination, and even those who have not joined in the conference are slow to dispute its action. It is recognized also that they have taken responsibility for a function that no other government agency has assumed. In Mr. Benet's opinion, no new laws are needed for the regulation of industry, and the Sherman Act should be repealed.

Several recommendations were made by Mr. Benet, as follows: The Federal Trade Commission should establish branches in other cities to aid in trade-practice work; representatives of the departments of Commerce and Justice should be present at trade conferences; industries not desiring to hold such conferences should voluntarily file with the commission such rules as they are now working under and rules established in trade-practice conferences should be given a status of legality so that infractions against them may be punished.

Dr. Julius Klein, assistant secretary, Department of Commerce, substituting for Secretary Robert P. Lamont, delivered the opening address at the afternoon session on May 2. Dr. Klein vigorously condemned paternalistic interference with business and commended the Chamber as being the greatest single agency in keeping the United States comparatively free from governmental interference in the course of business. Its standards, ethics and control rest in the hands of business, Dr. Klein declared, and he assured the members that the Department of Commerce stood with them in safeguarding the principle of co-operation instead of interference.

At this same session Leonard P. Ayres, vice-president, Cleveland Trust Co., spoke on the "Credit Supply and the Security Market," and John G. Lonsdale, president, National Bank of Commerce, St. Louis, Mo., on "The Tax Dollar." On Friday, May 3, C. F. Kettering, research laboratories, General Motors Corporation, chose as his topic "The Impact of Science on Business," and John H. Fahey, publisher, Worcester (Mass.) *Post*, summed up the high spots of the annual meeting. Resolutions were then discussed and adopted. William Butterworth, Moline, Ill., was re-elected president and Julius H. Barnes, New York, was chosen as chairman.

Sonman Cuts Wages

Effective June 1, the Sonman Shaft Coal Co., operating mines near Portage, Pa., made a substantial reduction in its wage schedule. Pick mining was reduced from $1.01 to 85c. and machine loading from 64.79c. to 60c. per gross ton; inside day labor from $6 to $5 per day. The scale for outside day labor will range from 45c. to 55c. per hour with certain preferred jobs remaining at $5 per day. In the Sonman Slope or "E" seam, all room yardage was removed at a reduction of 15 per cent and is given in the heading yardages. In the Shaft mine or "B" seam, all allowances for rock or rolls in rooms was removed and the regular room yardage reduced 15 per cent. Heading yardage also was reduced 15 per cent. Lamp rentals are now 6c. per day instead of 7c., and the price of powder also was reduced.

T. T. Read

The assistant secretary of the American Institute of Mining and Metallurgical Engineers has accepted a position as professor of mining at Columbia University. Mr. Read will assume his new duties in the fall and will continue as associate editor of Mining & Metallurgy.

Colorado Site of Plant For Treating Coal

A plant costing $300,000 for the production of gasoline and other by-products from lignite coal is to be erected in the northern Colorado coal field, according to reports recently published. It is understood that a British syndicate is backing the new development and will use a low-temperature process perfected in Great Britain and Germany for the extraction of the motor fuel and other volatile oils, after which the solid residue will be briquetted. The initial capacity of the proposed plant is 500 tons per day.

Illinois First-Aid Contest Set for July

A state first-aid contest will be held at Taylorville, Ill., July 3-4, 1929, under the auspices of the Peabody Coal Co., United Mine Workers, Taylorville Trades and Labor Assembly, Association of Commerce and the Lions Club and under the direction of the State Department of Mines and Minerals and the U. S. Bureau of Mines.

Personal Notes

R. H. Gross, president New River Company, is now visiting manufacturing interests on the Continent in the course of a tour which will take him to London, Paris, Berlin, Moscow and Leningrad.

H. B. Lee, professor of electrical engineering, Virginia Polytechnic Institute, Blacksburg, Va., conducted a party of 25 members of the junior and senior classes on a two-day inspection trip through the coal mines around Welch, W. Va.

Thomas Newhall and Arthur E. Newbold, Jr., of Drexel & Company; Nathan Hayward, president, American Dredging Company, and J. Willison Smith, president, Real Estate-Land Title & Trust Company, have been added to the board of directors of the Philadelphia & Reading Coal & Iron Company.

Roy A. Kirk, manager Pike's Peak Coal Company, will enter the organization of the Iron City Coal Company, both firms being located at Pueblo, Colo., as general manager and secretary-treasurer.

A. J. Hoskin, formerly research associate, Purdue University, has joined the staff of *Pit and Quarry*, Chicago, as editor.

John P. White, Kansas City, former president of the United Mine Workers and now its international representative, has agreed to act as a joint umpire between the miners and the Union Pacific Coal Company, should any further dispute arise.

John J. Lincoln, Elkhorn, W. Va., formerly general manager of the Crozer Coal & Coke Company and treasurer of the Pocahontas Operators' Association, has been elected vice-president of the Crozer Coal & Coke Company, Crozer Land Association, Upland Coal & Coke Company, and Page Coal & Coke Company.

Dr. W. E. Wickenden, director of investigations for the Society for the Promotion of Engineering Education, has been chosen president of the Case School of Applied Science, and will assume his new duties in the latter part of May.

Frank G. Fenix, Joplin, Mo., has been reappointed state mine inspector of Missouri by Governor Henry S. Caulfield for the term expiring May 1, 1933.

James B. Beardslee, formerly of the North-Western Fuel Co., St. Paul, Minn., has been appointed assistant to the president of the Pittsburgh Coal Co.

W. J. Freeman, president of the Bon Ayr Coal Co., the Glen Ayr Coal Co. and the Fayette Realty & Development Co., Terre Haute, Ind., has been elected a member of the board of directors and a member of the executive committee of the National Coal Association.

C. W. Hare has resigned as general manager of the Anthracite Coal Service, his place being filled by Charles A. Connell as acting general manager.

Problems of New Era in Merchandising Engage Retail Coal Men

PROBLEMS of the new era in coal merchandising were the keynote of the program of the twelfth annual convention of the National Retail Coal Merchants' Association, held at the Hotel Stevens, Chicago, May 27-29. "If we are to compete with the other industries storming our gates," declared Milton E. Robinson, Jr., president of the association, in opening the convention, "we must give the public what those industries offer: convenience and cleanliness. The old idea of dumping coal in a basement and considering the job finished is gone forever."

Regret that the spring reductions in anthracite mine prices had not been greater was voiced by James C. Tattersall, chairman, anthracite trade relations committee. He criticized the failure of retailers in some communities to pass on the discount to the consumer. Installment selling was condemned by the speaker. His report also covered developments in the fight to repeal the anthracite tonnage tax and the present controversy over weight allowances on wet-washed coal. Closer contacts with bituminous producers in studies of proposals affecting retail interests were reported by Frank E. Carey, chairman, bituminous trade relations committee.

Under the title, "The Coal Industry Rediscovers Automatic Heat Control," Lorin W. Smith, Jr., Minneapolis-Honeywell Regulator Co., pointed out the advantages of selling a real heat service which would make coal burning comparable with the combustion of competitive fuels. The campaign of the building trades to modernize some 16,000,000 antiquated American homes, he said, offered an excellent opportunity for progressive retailers to recover some of the ground lost to oil and gas. Personal comfort, not mere heat units, must be sold if the public is to continue a satisfied customer of the coal man. Coal selling must be modernized to be in step with modern buying habits.

That the coal merchant "who pushes the sale of coke to the detriment of other fuels which he is handling is simply hastening the day when this portion of his sales will be handled by utility interests," was the conclusion offered by C. M. Terry, Chicago manager of the Anthracite Coal Service. In the East, he said, coke interests had capitalized on the pioneering promotional work of the retailers by selling their product in direct competition with the coal man. He thought that direct sales in Lafayette and South Bend, Ind., and in Rockford, Ill., was the entering wedge in a similar program in the West.

How Washington, D. C., retail merchants have organized a co-operative vacuum furnace-cleaning service was described by Edward D. Shaw, secretary of the Merchants' and Manufacturers' Association of that city. That the domestic stoker is the coal trade's life-saver was the theme developed by J. A. Thorson, division sales manager, Iron Fireman Manufacturing Co.

Pinch-hitting for Daniel T. Pierce, vice-chairman, Anthracite Operators' Conference, E. W. Parker, director, Anthracite Bureau of Information, read Mr. Pierce's address on "The Anthracite Renaissance." Contrasting the present situation with conditions existing five years ago, Mr. Pierce called attention to the establishment of engineering service for the retailer and large consumer, an organized research plan for the industry, improved labor relations, improved quality of the product shipped and greater co-operation with the retail distributors. Downward readjustment of freight rates remains to be accomplished.

Milton E. Robinson, Jr.

Re-elected president of the National Retail Coal Merchants' Association at the twelfth annual convention of that organization held at Chicago last month.

"Collectively and individually," said Mr. Pierce, "the anthracite industry is spending several million dollars on service, research and advertising. But its expenditure in these directions is insignificant to what it has spent and is spending on improving the quality of its product. To prepare and ship coal of the quality that is now going to market is costing the industry $20,000,000 a year more than a like volume would have cost five years ago. Is not this evidence of the good intent of the industry and of its belief in its future?

"We are putting out the finest grade of solid fuel that was ever shipped to market, and that the public will take it in increasing quantities is a certainty. Old markets are being reclaimed and expanded; slowly, if you please, but surely. It is a big job. A gain of 400 tons a week in Chicago sounds big, and it is. But multiply 400 by 52 and you will see that it takes a lot of work to get back the millions of tons that we lost in the West largely as a result of war measures. And make no mistake, anthracite here, as elsewhere, is making gains, not losses. The gain in the last coal year was almost an even 500,000 tons."

That consumers can be made "anthracite-conscious" in competitive territories was the contention of R. W. Clark, vice-president, Hudson Coal Co., who said it was high time consideration should be given to "hands across the states" as well as "hands across the sea." Retailers were asked to take the battle of anthracite to the consumer "on the merits of our present-day guaranteed product, which is superior to anything heretofore produced."

There is a "close bond between the retail and production branches of the industry," said Harry L. Gandy, executive secretary, National Coal Association. "We are all parts of the same yardstick when it comes to domestic coal-heating service." Continued and enlarged co-operative effort is needed. There must be a growth of the same close relations between the soft-coal operators and the retail distributors as exists in the East between the anthracite operators and the retailers. The community of interest must be recognized for the good and the profit of all. The movement along this line is now well under way and still more rapid development can be anticipated.

What was in effect a symposium on "dustless" coal occupied the major portion of the final session of the convention. J. R. Belnap, inventor of one process, discussed the advantages of treatment at mines vs. treatment of coal at the retail yards and concluded that no general rule as to where the treatment should take place could be laid down. W. D. Langtry, Commercial Testing & Engineering Co., talked on the question from the standpoint of the chemist. George A. Mau, Dennison Coal Co., speaking from the standpoint of the retailer, declared that good "dustless" coal "is the greatest selling force ever offered, the best advertisement and the greatest service that any retail dealer can give to the consumer."

Intelligent merchandising is the crying need of the industry in the opinion of P. M. Snyder, president, Smokeless Operators' Association, who felt that if a way could be found to stop the shipment of unsold coal that would go far in stabilizing the industry., Holly Stover, secretary of the smokeless organization, stressed the recent adoption of a standardization program by his group. "Within 30 days probably every mine in our area will be dispatching to the markets daily a uniform size of our various grades."

The resolutions adopted at the closing session of the convention:

(1) Reaffirmed previous condemnation of sales of coal by industries to their employees;

(2) Urged the restoration of 30 days' net terms in anthracite sales;

(3) Called upon retailers to pass on to the consumer the reductions in anthracite prices due to the repeal of the Pennsylvania state tonnage tax;

(4) Approved creation of a special

committee to work for the universal application of wet-wash allowances;

(5) Urged co-operation with equipment manufacturers to work for better heating installations;

(6) Commended the Anthracite Coal Service;

(7) Opposed class legislation;

(8) Recommended a further increase in anthracite spring discounts;

(9) Pledged continued activity to the campaign to elect Roderick Stephens to membership on the directorate of the U. S. Chamber of Commerce;

(10) Approved the practice of rendering boiler and furnace cleaning service, but condemned service rendered without direct charge as unethical and unfair competition.

One feature of the convention which attracted widespread attention and favorable comment was the exhibits of coal-combustion equipment, trucks, yard supplies and coal operating companies. The development of this feature was due to the activities of the Chicago committee, made up of members of the Chicago Coal Merchants' Association.

Coming Meetings

Colorado and New Mexico Coal Operators' Association; annual meeting, June 19, at 513 Boston Building, Denver, Colo.

American Institute of Electrical Engineers; annual summer convention, June 24-28, at Swampscott, Mass.

Illinois Mining Institute; annual meeting and river trip on Steamer, Cape Girardeau, leaving St. Louis, Mo., June 27 and returning June 30.

American Society of Mechanical Engineers; July 1-4, Salt Lake City, Utah.

Cambria County Industrial Exposition; exhibits of industrial and mining machinery; July 1-6, at Ebensburg, Pa.

Illinois State First-Aid Contest, under auspices Peabody Coal Co., United Mine Workers and U. S. Bureau of Mines; July 3-4, at Taylorville, Ill.

Coal Mining Institute of America. Summer meeting July 5 and 6 at Ebensburg, Pa.

Fifth Annual Pennsylvania Championship First-Aid Meeting; July 6, at the Schwab Arena, Ebensburg, Pa.

Central Pennsylvania Coal Producers' Association, fourth annual summer meeting; July 6, at Ebensburg, Pa.

Eleventh Annual First-Aid Meet of the State of Alabama, sponsored by the Alabama Mining Institute and the Bureau of Mines; July 6, Municipal Auditorium, Birmingham, Ala.

Fifth Annual Reunion, Old Timers' Association, Union Pacific Coal Co.; July 20, Rock Springs, Wyo.

Annual First-Aid Meet of the Harlan County Coal Operators' Association; Aug. 24, Harlan, Ky.

Oklahoma Coal Operators' Association; annual meeting, Sept. 3, at McAlester, Okla.

Eighth International First Aid and Mine Rescue Contest, sponsored by U. S. Bureau of Mines; Sept. 12-14, at Kansas City, Mo.

World Engineering Conference, October, 1929, at Tokyo, Japan.

Fuels Division, American Society of Mechanical Engineers; third national meeting, Oct. 7-10, at Philadelphia, Pa.

National Coal Association; twelfth annual meeting, Oct. 23-25, at Sinton Hotel, Cincinnati, Ohio.

William K. Field

William K. Field Dies

William K. Field, formerly president of the Pittsburgh Coal Co., died at his home in Columbus, Ohio, June 4, following a year's illness of complications induced by Bright's disease. Mr. Field, who was 64 years old, was born in Columbus, received his early education in the public schools and at an early age became a clerk with the Scioto Valley R.R. In 1892 he became affiliated with the Sunday Creek Coal Co., being placed in charge of the sales office and docks of the St. Paul & Western Co. in 1896. In 1902 he relinquished that position to become president of the New Pittsburgh Coal Co., a subsidiary of the Pittsburgh Coal Co., and held that position until 1909, when he became president of the Sunday Creek Coal Co.

Mr. Field held the position of president of the Sunday Creek company until 1914, when he was named vice-president of the Pittsburgh Coal Co. Two years later he was promoted to the presidency of the latter company, which position he held until 1927, when ill health forced his resignation.

* * *

W. J. Manley, assistant to the president, Pittsburgh & West Virginia R.R., died suddenly at Pittsburgh, Pa., May 28. Mr. Manley formerly was traffic manager of the Logan Coal Operators' Association and served on the Transportation Committee of the National Coal Association for several years.

* * *

James Wilcox, age 74, prior to his recent retirement superintendent of the Piper operation of the Little Cahaba Coal Co. and the Coleanor mines of the Blockton Cahaba Coal Co., died at his home in Birmingham, Ala., May 22.

Competitive fuels and a narrow margin above costs of reclaiming old areas in a virtually worked-out mine are the reasons given by John C. Haddock, president, Haddock Mining Co., Wilkes-Barre, Pa., for the closing of the Black Diamond colliery. The date of reopening is indefinite.

Cap Lamp Ban Defeated In Illinois House

An attempt to ban the use of electric safety cap lamps in the mines of Illinois was finally defeated in the lower branch of the General Assembly of the state on June 7, when a move to reconsider the bill, which had failed to receive a constitutional majority on the preceding day was defeated. The vote on the motion to reconsider was 59 to 34—18 votes less than the constitutional majority.

The bill, a proposed amendment to section 13 of the Act of 1911, which passed the State Senate unanimously on May 14, would have prohibited the use of "lamps of the battery type requiring said battery to be worn upon the body." The bill was backed by a group of miners in the southern part of the state, but lacked the indorsement of the state labor organizations and the approval of the State Mining Investigation Commission. It was actively opposed by the operators. Proponents of the amendment asserted that the use of battery-type lamps endangers the health of the miners, but this claim was denied by safety workers who have investigated the subject and who conceded only a few cases of minor burns from defective equipment.

Low Temperature Plants To Be Built in Utah

Proposed plans of the Utah Cokoal Co. call for the erection of a coal-treating plant using the Jenson "Dual Gas" process in Carbon County, Utah, according to F. E. Settle, manager of the Cokoal company. The first unit of the proposed plant would involve an expenditure of $50,000, the capacity to be 100 tons per day. Ultimately the capacity of the plant would be 4,000 tons, requiring the services of 300 to 400 men. Construction of the first unit of a plant, at Murray, with an ultimate capacity of 2,000 tons per day, has been started, according to reports, and it is expected to be in operation in July.

Anthracite Use Increases

Notwithstanding the untoward weather conditions that prevailed during the winter of 1928-9, the consumption of anthracite in the coal year ended March 31, 1929, as reported to the Anthracite Bureau of Information, showed an increase of approximately half a million tons. The commercial production, which includes railroad shipments and local sales, but excludes colliery consumption, in the coal year 1928-9 amounted to 64,060,000 gross tons as compared with 64,005,000 tons the preceding year, an increase apparently of only 55,000 tons. On March 31, 1929, however, the quantity of coal in storage was less by 425,000 tons than on April 1, 1928, so that the quantity going into consumption actually increased by 480,000 tons.

Standardization Committee Holds Meeting

The joint subcommittee on standardization appointed by the National Retail Coal Merchants' Association and the National Coal Association held its first meeting in Chicago, May 28, to discuss the standardization programs of the Smokeless Operators of West Virginia, dock operators at the Head of the Lakes, southern Illinois operators and other groups. The committee directed Harry L. Gandy, executive secretary, National Coal Association, to assemble such standardization programs as were in use and submit these to bituminous operators along with a request for their opinions and suggestions.

New Companies Formed

The Darby Coal Co., Kemmerer, Wyo., was recently incorporated for $300,000 to operate the Blazon seam, 15 miles south of Kemmerer. Officers are M. J. Goldberg, E. C. Madden and James Lees. It is proposed to make the company co-operative and pay the union scale for labor.

The Pine Bed Coal Mining Co., Rawlins, Wyo., was recently incorporated for $50,000 for the purpose of operating coal properties in Carbon County. Those in charge of the company are F. L. Goheen, David Goheen, E. P. Weatherly, J. H. Hankia and Thomas W. O'Hara.

The Carlos Coal Co., Garland, W. Va., has been organized for the purpose of operating mines in the Sandy River district of McDowell County. Incorporators include David F. Reid, Garland, W. Va.; G. J. Cooper, Welch, W. Va., and J. W. Atwood and Riley Roberts, Nacols, W. Va.

The Soper-Reynolds Coal Co., Morgantown, W. Va., was recently incorporated for $25,000, and has leased the Miller mine in Harrison County, formerly operated by the Prendergast Coal Co. The incorporators include W. H. Soper, president; J. J. Reynolds, general manager, and C. W. Reynolds, Fred R. Davis, R. Myrtle Davis.

Discusses Economic Changes

Broader understanding of economic forces, more general co-operation in avoiding pitfalls, and a larger measure of self-restraint on the part of all elements of the business, financial and industrial world, have resulted in the period from 1922 to the beginning of 1929 being of unusual stability as well as of intense activity. This balance has been maintained in the face of a "spotty" spread of national progress, and in spite of unusual conditions, both national and international, arising out of peacetime readjustments. These views are expressed by the Committee on Recent Economic Changes of the President's Unemployment Conference in a unanimous report, made public May 15, analyzing and interpreting surveys of our recent economic life. The report and surveys, the latter compiled by the National Bureau of Economic Research, appear in a two-volume book, "Recent Economic Changes," published by the McGraw-Hill Book Co.

The committee report discusses such phases as: "Widespread benefits of productivity," "the speed which power has added to production," "the spread in the source and use of credit," "price relationships, wages and the cost of living," "relative price stability," "production increase and the expansion of human wants," "mass services," and "economic balance." It sounds a warning note that our future progress must depend on informed, intelligent leadership, aware of "the relations of the parts, each to the other," upon "incessant observation and adjustment," through which "we can learn to maintain the economic balance."

The report will be reviewed in greater detail in a later issue of *Coal Age*.

New Arch System Presented At Wilkes-Barre

At the Westmoreland Club, Wilkes-Barre, Pa., May 23, the Engineers' Society of Northeastern Pennsylvania was addressed by Edgar C. Weichel on the Schaefer method of roof support in mines. Mr. Weichel described the arch at the Powderly colliery. This arch replaces timbers which formerly lasted only 6 months and were of 30-in. diameter. The roof is fractured to the surface and on the move and the arch is of precast concrete laid so as to yield at all joints, thus laying the main burden of support on the less readily yielding enviroining rocks.

Bureau of Mines Issues Permissible Plates

Approvals of permissible mining equipment issued by the U. S. Bureau of Mines during the month of April are as follows:

(1) Northern Conveyor & Mfg. Co.; pit-car loader; Continental Electric Co. 1-hp. motor and Union Electric & Mfg. Co. control, 230 volts, d.c.; Approval 168; April 5, 1929.

(2) Brown-Fayro Co.; "Brownie" model HG room hoist; Westinghouse 5-hp. "RH" motor No. 89-C-874 and control No. 89-C-837, 250 volts, d.c.; Approval 169; April 5, 1929.

(3) Goodman Mfg. Co.; Scranton 5x6 mine pump; Goodman 5-hp. motor and control, 250-500 volts, d.c.; Approvals 170 and 170-A; April 9, 1929.

(4) Goodman Mfg. Co.; shaker conveyor; Goodman No. 95, 10-hp. motor and control, 250 volts, d.c.; Approval 171; April 17, 1929.

(5) Goodman Mfg. Co.; type 224-E.J. slabbing machine; 50-hp. motor, 500 volts, d.c.; Approvals 172 and 172-A; April 29, 1929.

(6) Fairfield Engineering Co.; mine-car loader; Crocker-Wheeler 1½-hp. motor and starting switch, 250-500 volts, d.c.; Approvals 173 and 173-A; April 30, 1929.

(7) General Electric Co.: type LSBE-2C6-C12 power truck and gathering locomotive; battery, 48 cells MVA Ironclad Exide, 33 plate; Approval 1519-C; April 6.

Electrical Engineers Visit Highland No. 5 Breaker

A trip to the new Chance preparation plant at Jeddo, Pa., briefly described in the last issue of *Coal Age*, opened the meeting of the Lehigh Valley Section of the American Institute of Electrical Engineers, June 1, held at Hazleton, Pa. In the afternoon A. O. Austin, Ohio Brass Co., delivered an address on flashovers from feed lines to arms, poles and guy wires of transmission lines. At the evening session A. J. Althouse was declared, as a result of letter ballot, chairman of the section. The vice-chairmen are O. J. Standing, W. M. Harbaugh and J. E. Charest. The managers for the coming year are E. H. Tyson, Hazleton; M. L. Roper, Scranton; W. A. Everson, Allentown; N. S. Hibschman, Bethlehem, with E. P. Weaver, secretary. S. Q. Hayes, general engineer, General Electric Co., described professional trips to Panama, Colombia and Ecuador.

Bishop Murray Formerly a Lonaconing Miner

The sixth annual banquet of the Western Maryland Night Mining Classes was held at Lonaconing, Md., Saturday evening, May 25. John Gardner Murray, Presiding Bishop, Protestant Episcopal Church, a native of Lonaconing and a former mine employee, was the guest of honor. Among the unusual features of the evening's entertainment was the presence of five old miners who worked in the mine at the same time as Bishop Murray. An old time book showed the various shifts worked by Bishop Murray in the first months of the year 1873. An unusual feature was the presence of Isaac Bradburn, representing the fourth generation in continuous employment at the Jackson mine, which is the mine in which Bishop Murray worked in earlier years.

New Plant Construction

New contracts for topworks and construction under way or completed at various coal operations reported last month include the following:

Algoma Coal & Coke Co., Algoma, W. Va.; contract closed with Roberts & Schaefer for Menzies Hydro-Separator coal-washing equipment, capacity 100 tons per hour, to wash egg, stove and pea coal. To be completed Sept. 1.

American Rolling Mill Co., Nellis, W. Va.; contract closed with the Koppers-Rhéolaveur Co. for a complete coal-washing plant, including equipment and erection. Included in the equipment is a Rhéolaveur washer for treating 4x0-in. coal and dewatering shakers, a drier for minus ⅜-in. coal, sludge dewaterers and mixing devices. Capacity, 2,000 tons per day of boiler fuel.

Butler Consolidated Coal Co., Wildwood, Pa.; Allen & Garcia authorized to construct air-cleaning plant, capacity 400 tons per hour of 4x0-in. coal from

the Freeport seam. Peale-Davis tables will be supplied by the Pennsylvania Mining Machinery Corporation.

Hocking Valley Mining Co., Hocking, Ohio (additional equipment); contract closed with Roberts & Schaefer for Menzies Hydro-Separator coal-washing equipment and Arms sizing and dewatering screens, capacity 50 tons per hour. To be completed July 1.

Philadelphia & Reading Coal & Iron Co., Philadelphia, Pa.; work on the new Locust Summit breaker now under way under the direction of Allen & Garcia. Capacity, either 12,000 tons in eight hours or 15,000 tons in 16 hours.

Rochester & Pittsburgh Coal Co., Indiana, Pa.; modern steel tipple, capacity 500 tons per hour, recently completed at McIntyre, Pa., by Heyl & Patterson, Inc.

Ott Returned to Office In West Virginia

Lee Ott, first Compensation Commissioner of West Virginia, was returned to office May 31 by Governor William G. Conley as a result of a move by the Legislature to change the administration of the workmen's compensation fund. The term of C. L. Haeberlin of Raleigh County still had four years to run when the Governor appointed Ott to a six-year term under the authority of an act passed by the 1929 Legislature.

Blue Diamond Company To Open Mine

The Blue Diamond Coal Co., Cincinnati, Ohio, will begin within 30 days the construction work leading up to the opening of a new miner near St. Charles, Va. To this end it has purchased the entire plant and equipment of the Black Mountain Mining Co. and will immediately dismantle it to make way for a new steel and concrete plant.

The new mine will be near the old Bonny Blue mine of the Blue Diamond company, but will be an entirely separate unit, with an estimated production of 600,000 tons a year from the High Splint seam. The total investment is estimated to be just under $750,000 and with the completion of this new operation the production of the company will be 3,000,000 tons per year from the Hazard, Harlan, east Tennessee and old Virginia fields.

The Pemberton Coal & Coke Co., Bluefield, W. Va., has acquired the plants and properties of the Bailey-Wood Coal Co. and the Ragland Coal Co., adjoining those of the Pemberton company in Raleigh County, West Virginia. The purchasing company, as a result of these acquisitions, now has an available coal acreage of 5,400 and contemplates closing down the mine just bought, producing from the Big Stick operation of the Pemberton company.

Consulting Engineers Are Appointed

The Allen & Garcia Co., Chicago, have been selected by the Stone & Webster Engineering Corporation to furnish consulting engineering services in connection with the construction of preparation and coal-cleaning plants for the Philadelphia & Reading Coal & Iron Co. They also have been appointed by the Crab Orchard Improvement Co., operating two mines near Eccles, W. Va., as consulting and construction engineers in the rehabilitation of these operations, including tipples, overturning cages, dry cleaning plants and enlargement of the shafts.

Anthracite Royalties Cut

With the expiration of old royalty contracts, the Girard estate, with large holdings of coal land in Schuylkill County, Pennsylvania, has reduced the royalties on anthracite from $1.36 to 70c. per ton. The Sheafer estate is said to have made an even greater reduction, with the proviso that the coal companies pay the taxes. Following the action of the Girard estate, other large coal-owning estates have made a corresponding reduction, and the smaller land owners have announced cuts, though the reductions have not been as great.

King Coal's Calendar for May

May 1—Provisions relating to the sizing and terminology of high-volatile coal adopted by operators at the American Head of the Great Lakes put into force and effect.

May 2—Wheeling & Lake Erie Ry. files petition with Interstate Commerce Commission for reopening and reconsideration of the lake cargo coal rate case, involving rates on coal from Northern and Southern districts to Lake Erie ports. The Chesapeake & Ohio, Norfolk & Western and Louisville & Nashville railroads and counsel for Southern operators have filed motions with the Commission to dismiss similar petitions by the Eastern Ohio Coal Operators' Association and the Western Pennsylvania Coal Traffic Bureau urging that the controversy be brought to a close and the industry stabilized.

May 2—Interstate Commerce Commission suspends, pending investigation as to their reasonableness, tariffs proposing commodity rates of $1.02 per ton on coal from Conway and Colona, Pa., to Youngstown, Ohio, when such coal reaches Conway and Colona via the Ohio River. The new rates represent an attempt to furnish a joint river-rail route between the Pittsburgh coal and the Youngstown steel areas.

May 2—Ten million tons of coal, or one-third the year's lake business requirements, has been ordered so far this season. Coal is moving rapidly and is being loaded into the bottoms faster than in 1928. With the passing of May 1, when Minnesota assesses all coal on the docks for taxes, coal will be unloaded steadily at the Head of the Lakes.

May 2—Interstate Commerce Commission finds rates on bituminous coal between points in West Virginia, Virginia and Kentucky and Traverse City, Mich., not unreasonable or unduly prejudicial and dismisses complaint.

May 3—Employees of the Centennial mine of the Boulder Valley Coal Co., Denver, Colo., with mines in Weld and Boulder counties, Colorado, granted a basic wage of $7 a day, the right of collective bargaining, and working conditions identical with those in the union mines of the Rocky Mountain Fuel Co. by the State Industrial Commission. The commission recommended that the operators agree not to sell steam and locomotive coal below the cost of production.

May 6—Representatives of the National Coal Association and the International Railway Fuel Association, meeting in Chicago, agree to co-operate on furnishing and accepting fuel, to reduce contract spread and to equalize monthly requirements as far as possible. Railroads are to consider influence of public demand on size requirements and the committees recommend that direct contractual relations should be had between railroad and operator.

May 10—Governor Fisher of Pennsylvania vetoes bill to set up $100,000 fund for fighting mine fires, stating that the amount appropriated is not sufficient.

May 11—Smokeless operators of West Virginia, meeting at Bluefield, W. Va., approve report of committee on the standardization of smokeless coal sizes and direct that 30 days be allowed for fulfilling contracts and that sales made after that date be in conformity to the new sizes.

May 13-17—Sixth Annual Convention of practical Coal Operating Men and Exposition of Coal Mining Equipment held at Cincinnati, Ohio, under the auspices of the Manufacturers' Division of the American Mining Congress.

May 14—Illinois Senate unanimously passes amendment to the state mining law prohibiting use of the electric lamp of the battery type which requires that the battery be worn upon the body.

May 17—Governor Fisher of Pennsylvania signs Heaton bill repealing anthracite coal tax in three installments, the last to be taken off May 31, 1931. The Jones bill providing for immediate repeal is vetoed.

May 20—Elgin, Joliet & Eastern Railway Co. puts new tariffs in effect cancelling the former privileges of reconsignment granted coal shippers. American Wholesale Coal Association, Kanawha Coal Operators' Association, Corn Belt Coal Dealers and others petition Interstate Commerce Commission for suspension of the new tariffs and ask full investigation.

May 27—Explosion at Connellsville mine of the Yolande Coal & Coke Co., Yolande, Ala., kills nine men and severely burns two others.

May 27—The Supreme Court of the United States decides to review the decision of the Circuit Court of Appeals, eighth circuit, as to loss of coal in transit from Royalton, Ill., to Minneapolis, Minn. The suit of G. I. Crail, doing business as the P. McCoy Fuel Co., against the Illinois Central R. R. was in favor of Crail, the basis of the judgment being the retail value of the coal in Minneapolis. At the instance of the Illinois Central, which contends that the market value rather than the retail value at destination governs, the Supreme Court decided to review the case.

Utah Coal Miners Win Wage Increase

Employees of the Centennial mine of the Boulder Valley Coal Co., Denver, Colo., with mines in Weld and Boulder Counties, Colorado, were granted a basic wage of $7 a day and working conditions such as those prevailing at the mines of the Rocky Mountain Fuel Co., which is operating under a two-year contract with the United Mine Workers, by a decision of the State Industrial Commission, on May 3. The disposition of this case, it is said, probably will affect requests by employees of other mines in this region.

The commission, of which Thomas Annear is chairman, recommended that the operators agree to refrain from selling slack and steam coal at less than the cost of production. It also directed that the company recognize the right of its employees to collective bargaining.

Fewer Men, Lower Earnings At Mines in March

Employment in coal mining—anthracite and bituminous coal combined—decreased 3.3 per cent in March, 1929, as compared with February, and payroll totals decreased 15.3 per cent, according to the monthly Labor Review of the U. S. The 1,310 mines for which reports were received had 305,786 employees in March whose combined earnings in one week were $8,056,001.

Employment in anthracite mines alone was 7.5 per cent lower in March, 1929, than in February and payroll totals were 25.6 per cent smaller. Owing to market conditions a considerable number of collieries were idle during the first half of March.

Employment in bituminous coal mines was 0.8 per cent lower in March, 1929, than in February and payroll totals were 6.9 per cent smaller. These figures are based upon reports from 1,152 mines in which there were in March 194,802 employees whose combined earnings in one week were $4,871,832. There was an increase in employment of 1.2 per cent in the Middle Atlantic geographic division and an increase of 0.2 per cent in the East South Central division, but decreases appeared in the remaining divisions from which bituminous coal was reported.

The details for each geographic division are shown in the accompanying table.

Wholesalers Hold Meeting In Pittsburgh

Many of the foremost problems of the industry were discussed by well qualified speakers at the thirteenth annual convention of the American Wholesale Coal Association, held at the William Penn Hotel, Pittsburgh, Pa., June 11 and 12. In addition to the addresses, trade relations, traffic, contact, resolutions and nominations were considered in business sessions held on both days.

"A Revitalized Industry" was the title of the opening address, given by President R. B. Starek. Other speakers of the two-day meeting included L. I. McQueen, executive manager, Credit Association of Western Pennsylvania, who spoke on "Wholesale and Retail Credits"; Oscar F. Ostby, vice-president, Domestic Stoker Co., "Pennsylvania Anthracite Made Automatic"; James Alfred Thorson, division sales manager, Iron Fireman Mfg. Co., "Automatic Coal Burning in High- and Low-Pressure Boilers Under 200 Boiler Horsepower"; W. D. Trevorrow, chief of sales, Jeddo-Highland Coal Co., "Anthracite's Message to a Revitalized Industry," and H. L. Gandy, National Coal Association, "Where Is the Line?—The Message of Bituminous Coal."

George D. Roberts, treasurer, Balanstat Corporation, addressed the convention on "Health, Comfort and Economy Through Proper Thermostatic Control"; William R. Melton, Chicago, on "The Second Musketeer, or the Wholesaler's Place in the Co-operative Picture," and Ira C. Cochran, commissioner, American Wholesale Coal Association, on "Trade-Practice Conferences and the Anti-Trust Law."

Anthracite Tax Repealer Recently Approved

Governor Fisher of Pennsylvania approved the bill of State Senator Robert D. Heaton, of Schuylkill County, repealing the anthracite tonnage tax in three installments. One-third is to be taken off June 1, 1929, and the remaining two-thirds on June 1, 1930 and 1931. The tax bill of 1921, whose constitutionality was tested in the Dauphin County Court, the state courts and finally the Supreme Court, provided for a tax rate of 1½ per cent on anthracite coal as prepared for the market and produced about $6,000,000 a year in revenue.

At the same time Governor Fisher vetoed the bill of Representative Benjamin Jones, of Luzerne County, providing for the immediate repeal of the tonnage tax. The reason given was that the state's finances would not permit the immediate total abolition of the tax.

Railroads Meet Operators On Sales Relations

Unanimity on questions of mutual interest was reached by representatives of the National Coal Association and a committee of the International Railway Fuel Association at a meeting held in Chicago, May 6. At the joint meeting it was resolved that the widest possible measure of co-operation should exist in the matter of furnishing and acceptance of railway fuel; that contract spread between maximum and minimum requirements be held as low as possible, having in mind good business prudence and prospective actual requirements; that efforts toward equalization of monthly requirements be encouraged; that, if possible, the railroad requirements as to sizes should take cognizance of current public demands and that direct contractual relations be had between the railroads and the operators or the latter's accredited sales representatives.

British Columbia Firms To Briquet Coal

The Canadian Coal & Briquetting Co., in which a group of New Westminster (B. C.) business men are interested, has acquired mining property and 860 acres of lignite at Estevan, Sask. This company, which is now building a new briquetting plant at Merritt, B. C., contemplates extensive development and the erection of another plant at Estevan to supply briquets to Weyburn, Regina, Brandon, Winnipeg and other cities in Saskatchewan

Employment and Payroll Totals in Identical Bituminous Coal Mines in February and March, 1929

Geographic Division	Mines	Number on Payroll Feb., 1929	Number on Payroll March, 1929	Per Cent Change	Amount of Payroll Feb., 1929	Amount of Payroll March, 1929	Per Cent Change
Middle Atlantic	318	55,537	56,203	+1.2	$1,426,850	$1,432,636	+ 0.4
East North Central	170	31,392	30,415	—3.1	968,097	772,723	—20.2
West North Central	57	5,528	5,118	—7.4	158,806	130,990	—17.5
South Atlantic	259	43,550	43,342	—0.5	1,097,040	1,080,908	— 1.5
East South Central	230	44,814	44,905	+0.2	1,005,008	980,071	— 2.5
West South Central	27	2,086	1,891	—9.3	58,386	48,227	—17.4
Mountain	80	11,791	11,367	—3.6	457,420	381,366	—16.6
Pacific	11	1,601	1,561	—2.5	61,582	44,011	—27.1
All divisions	1,152	196,299	194,802	—0.8	$5,233,189	$4,871,832	— 6.9

Per Cent Change in Each Line of Employment, February to March, 1929

Line of Employment	Establishments	Employment Feb., 1929	Employment March, 1929	Per Cent Change	Payroll in One Week Feb., 1929	Payroll in One Week March, 1929	Per Cent Change
Manufacturing	12,151	3,437,733	3,479,686	1.2*	$95,809,938	$97,620,846	2.1*
Coal mining	1,310	316,303	305,786	—3.3	9,510,664	8,056,001	—15.3
Anthracite	158	120,004	110,984	—7.5	4,277,475	3,184,169	—25.6
Bituminous	1,152	196,299	194,802	—0.8	5,233,189	4,871,832	— 6.9
Metalliferous mining	307	52,643	53,983	+2.5	1,543,909	1,667,340	+ 8.0
Public utilities	8,870	644,594	645,810	+0.2	18,834,490	19,530,952	+ 3.7
Trade	3,253	184,737	187,421	+1.5	4,633,475	4,716,332	+ 1.8
Wholesale	1,329	38,104	38,279	+0.5	1,128,148	1,152,494	+ 2.2
Retail	1,924	146,633	149,142	+1.7	3,505,327	3,563,838	+ 1.7
Hotels	1,734	141,426	152,912	+1.1	2,383,979	2,418,428	+ 1.4
Total	27,625	4,777,436	4,815,598	+0.8	$132,716,455†	$134,009,899†	+ 1.0

*Weighted per cent of change, but this month the weighted and unweighted per cents of change in employment are identical; the remaining per cents of change, including total are unweighted.
†Cash payments only.

and Manitoba. The Merritt plant will supply cities and towns in Alberta and British Columbia.

Following the purchase of 8,325 acres of coal land near Princeton, B. C., K. K. Read, J. W. Irwin and other business men of New Westminster, B. C., have organized the Ashington Coal Co. Arrangements are being made for the immediate erection of a mine plant and markets are to be established in British Columbia cities and others as far south of the boundary as San Francisco.

Sizes of Smokeless Coal Set by Operators

At a meeting of smokeless operators held recently in Bluefield, W. Va., to receive the report of the committee on the standardization of sizes, a set of standards for Pocahontas, New River and Winding Gulf coal was adopted by a heavy majority. A reasonable time for the fulfillment of present contracts will be allowed, but new sales after 30 days will be according to the adopted schedule. The standard sizes are given in the following table, mixtures to bear the name of the largest size and slack:

(Round Hole or Equivalent in Size of Coal)

	Through	Over
Lump	.....	5 to 7½ in.
Egg	5 to 7½ in.	2½ in.
Stove	2½ in.	1 in.
Small Nut	1 in.	½ in.
Pea	½ in.	¼ in.
Slack	½ in.	.....
Stoker	1 in.	.....

Note: In the sizes passing through ½ in. and ¼ in., the thickness of the plate has considerable effect on the amount of coal that will pass through. These should be ¼ in. or ⅛ in. thick.

Obituary

JOHN C. LAWLER, of the operating firm of John L. Lawler & Son, Columbus, Ohio, aged 41, died at his home in Bexley, a suburb of Columbus, on May 25, following a year's illness.

ANTHONY W. LOMIS, age 44, president of the Lomis Coal Co., St. Louis, Mo., and former president of the St. Louis Coal Club, died at St. Luke's Hospital, in that city, May 9, of general septicemia.

I. M. TAGGART, president, Spruce River Coal Co., Ramage, W. Va., died at his home in Massillon, Ohio, May 14, at the age of 79 years. Mr. Taggart was graduated from Mount Union College in 1870 and devoted his time up to 1900 in teaching. At that time he became cashier of the Merchants' National Bank of Massillon and later was chosen president and chairman of the board of directors of the Ohio-Merchants' Trust Co. In 1917 he was appointed to the Council of the American Bankers' Association and served three years. Mr. Taggart was influential in the reorganization and financing of the Central Steel Co., from which he recently resigned as director, and also was director of manufacturing plants in Canton, Akron and Salem, Ohio, and a member of the board of the Midland Bank of Cleveland.

Frank N. Cameron of Utah Dies of Influenza

Frank N. Cameron, president, Liberty Fuel Co., Salt Lake City, Utah, and vice-president, Utah Coal Producers' Association, died at his home in Salt Lake City, May 13, of complications resulting from an attack of influenza. Mr. Cameron was born Dec. 29, 1870, at Arnot, Pa., his family later moving to Colorado. Starting with the Utah Fuel Co. as a water boy, he rapidly rose to the position of vice-president and general manager and later became general manager of the Austen Coal & Coke Co. in West Virginia and of the Stag Canon Fuel Co., in New Mexico.

As an independent operator he opened up the Panther mine, which he later sold to the United States Fuel Co., becoming general manager. He next opened up the Cameron mine, near Castle Gate, Utah, and after disposing of that opened up the Liberty mine of the Liberty Fuel Co. and operated it until his death.

John H. Tonkin of Utah Dies of Stroke

John H. Tonkin, aged 60, general manager, Independent Coal & Coke Co., Salt Lake City, Utah, and president, Utah Coal Producers' Association, died at the home of his sister, at Kingston, Pa., May 2. Mr. Tonkin, accompanied by Mrs. Tonkin, came east to the meeting on April 24 of the National Coal Association committee on no-bill coal and open-consignment shipments, of which he is a member. On the 27th, Mr. and Mrs. Tonkin left for a short visit in his sister's home in Kingston, where he suffered a cerebral hemorrhage.

Henry W. Blake Dies

Henry W. Blake, senior editor of *Electric Railway Journal*, one of the McGraw-Hill publications, died May 20 at his home in Englewood, N. J. Mr. Blake, who was 64, served 38 years on the magazine, beginning his editorial career when it was a publication devoted to horse-car interests, and for the past 35 years has been its chief editor.

West Virginia Coal & Coke To Be Sold

Properties of the West Virginia Coal & Coke Co. in both northern and southern West Virginia are to be sold under a decree of the U. S. Court for the Southern District of West Virginia, as a result of foreclosure proceedings brought by the bondholders. The sale will be held at Omar, W. Va., in June, at which time the property, both the northern and southern divisions, will be offered separately and as a whole. Trustees are Walter F. Kearns and the First National Bank of New York City, representing the bondholders in the sum of $9,500,000. Although the company has been in the hands of three receivers—John C. Cosgrove, president, Johnstown, Pa.; Gohen C. Arnold, vice-president, and Lee Ott—under proceedings instituted by the Goodman Mfg. Co. the sale is not to be held under such proceedings but to satisfy the bondholders.

Berkeley Minor, Charleston, W. Va., counsel for the trustees under the mortgage, and Samuel T. Spears, Elkins, W. Va., were designated as special commissioners to conduct the sale. The West Virginia Coal & Coke Co. owns in fee 125,000 acres of coal land and numerous mining plants in northern West Virginia and has under lease several thousand acres of coal land in Fayette and Logan counties, taken over when the company was consolidated with the Main Island Creek Coal Co. and the Hutchinson interests in 1924.

Sizing and Terminology Are Simplified

Dock operators, at a general conference on the simplification of sizes and terminology held under the auspices of the Division of Simplified Practice, Bureau of Standards, U. S. Department of Commerce, at St. Paul, Minn., April 10, adopted the recommendations of a previous conference (*Coal Age*, April, 1929, p. 251), and they were put in force May 1. The Division of Simplified Practice states that the dock project has attracted the attention of other groups in the bituminous coal industry and future action in the same direction is expected.

Operators Cut Prices On Anthracite

Anthracite operators cut the price on domestic sizes 5c. per ton on June 1, following the action of Governor Fisher of Pennsylvania in signing the Heaton bill for the removal of the anthracite tax in three installments, beginning June 1, and ending May 31, 1931. According to Roy C. Haines, executive secretary, Anthracite Co-operative Association, the operators stood ready to make a total reduction of 15c. per ton on the domestic sizes in case the Jones bill providing for the immediate repeal of the tax was passed.

No promise had been made contingent upon the passage of the Heaton bill, but the operators decided to pass on the reduction which they received, in keeping with the spirit of the industry.

Virginia Operators Elect

Lee Long, vice-president, Clinchfeld Coal Corporation, was elected president of the Virginia Coal Operators' Association at the annual meeting held at Norton, Va. R. S. Graham, vice-president, Wise Coal & Coke Co., was made vice-president.

Reconsignment Suspension Subject of Attack

A petition filed with the Interstate Commerce Commission by the American Wholesale Coal Association, the Kanawha Coal Operators' Association, the Corn Belt Coal Dealers' Association and Chicago wholesalers generally, requesting the suspension of tariffs of the Elgin, Joliet & Eastern Railway Co., which are intended to cancel to a degree the free reconsigning of coal on that line, has been granted. It was pointed out that free reconsignment has been the practice since 1908 and a great many business practices have grown up as a result of this arrangement. The Commission was urged to investigate before allowing the railroad to withdraw this privilege.

Other lines in the Chicago territory granting free reconsignment privileges are the Toledo, Peoria & Western and the Chicago & Illinois Midland, which likewise withdrew them on May 20, though no petition asking for suspension has so far been filed. Illinois and Indiana operators' associations joined the railroad in support of the new tariff.

Industrial Museum Opened

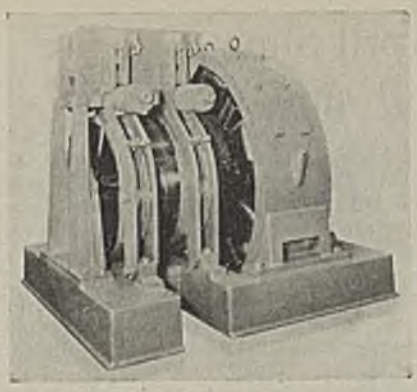
The history of science, engineering and industry will be interpreted, not only by working models but so that the social and economic causes and results will be clarified, in the Rosenwald Industrial Museum, Chicago. This institution is the result of an endowment of $3,000,000 provided by Julius Rosenwald for its equipment and maintenance, and a $5,000,000 bond issue voted by the city for the restoration of the old Fine Arts Building in Jackson Park, which will permanently house the collection. Here technical relics, such as the Corliss beam engine which ran the Pullman works before finally being junked, will be given a permanent home and the directors are seeking to learn of similar machines which might find a place in America's first industrial museum.

Producing Companies Issue Financial Reports

The Pittsburgh Terminal Coal Corporation reports for the quarter ended on March 31, 1929, profit of $131,837 before depreciation and depletion. After deducting $228,484 for depreciation and depletion there was a loss of $96,647.

The Philadelphia & Reading Coal & Iron Co. reported for 1928 a surplus, after all adjustments, of $221,561. In the preceding year a defict of $9,000,127 was reported.

The Maritime Coal, Rail & Power Co. earned $148,715 in 1928, a slight decrease over that of the previous year, which was $152,505. While profits have been sufficient to meet the interest on the bonded debt, they have neither in 1928 nor in the past permitted the creation of adequate reserves for sinking fund, depletion and depreciation.



Gearless Traction Elevator Motor Installed in Arizona Mine

Passenger Elevator Motor Installed in Mine

A gearless traction-type elevator motor recently was installed by the Phelps-Dodge Corporation at a mine in Morenci, Ariz. The usual application of such motors is for operating passenger elevators in large buildings, this being the first time such an equipment has been applied to a mine hoist. The motor, which is shown in the accompanying cut, is the largest of its type ever built for any service.

As the motor and hoisting drum are built as one unit, the equipment is considerably simplified, the separate drum on the ground being eliminated. A further advantage is that standard elevator control can be used, this being more accurate than the usual mine-hoist control. The operator rides in the car, but operation can be governed by a master switch in the hoist house if necessary. The two control stations, however, are so interlocked that operation can be governed from but one point at any one time.

"Buy Illinois Coal," Urges Chamber of Commerce

Under the caption "Buy Illinois Coal" the *Illinois Journal of Commerce*, official organ of the Illinois Chamber of Commerce, devotes a large portion of a recent issue to urging the use of Illinois coal. In calling upon the citizens of Illinois to help in the campaign extolling the merits and value of the home product, the Journal lists the following advantages:

"Illinois has the greatest soft-coal resources east of the Missouri River, 67 per cent of the state being underlaid with it. It is estimated that there are two hundred billion tons in the state, of which less than 2 per cent has been mined. Mining is carried on in 35 counties, covering 39 per cent of the state's area, and embracing 47 per cent of the state's population out of Cook County. Furthermore, Illinois coal will fill any fuel requirement, and transportation costs are low within the state."

Hoover Honorary Chairman Of Edison Committee

President Herbert Hoover has accepted honorary chairmanship and will head the general committee for the national and international celebration of Light's Golden Jubilee. The celebration, commemorating the fiftieth anniversary of the perfection of the incandescent lamp by Thomas A. Edison, was inaugurated by a series of light festivals beginning at Atlantic City, May 31, and will end with the dedication at Deerborn, Mich., on Oct. 21, of the restored Menlo Park laboratories where the lamp was first perfected commercially.

Utah Protests Rates

Proposed reduction of 50c. a ton on coal from Castlegate, Utah, to Colorado, Nebraska, Kansas and Missouri points was protested by the Colorado Public Utilities Commission and the Denver & Rio Grande Western R. R. at a hearing in Salt Lake City in April. Thomas S. Woods, rate expert for the Colorado commission testified that present rates were fixed after extensive hearings, and that any adjustment might bring the entire Colorado rate structure into the issue.

R. K. Bradford, superintendent of transportation for the railroad, testified that the road's operating expenses on the branch lines in the Castlegate vicinity are higher than in other sections. H. W. Prickett, Utah Traffic Service Bureau, represented the Utah Coal Producers' Association, which proposed the reduction. He testified that the requested reduction would still leave the rates higher than those charged by other railroads.

Rate Suspension Asked

Petition has been filed with the Interstate Commerce Commission requesting suspension of tariffs by the Pennsylvania R.R. which have the effect of increasing rates on lake cargo coal 8c. per ton from Clyde No. 1 and No. 2 mines of the W. J. Rainey, Inc., near Fredericktown, Pa. The situation resulted from the railroad raising the rates from $1.46 to $1.54 per ton to remove undue prejudice against mines at Big Meadow Run, Pa.

Rates on bituminous coal in carloads from points in Kentucky, West Virginia and Virginia to Traverse City, Mich., and from Whitsett, Ky., to Morton Grove, Ill., have been found to be not unreasonable or unduly prejudicial by the Interstate Commerce Commission and complaints have been dismissed.

The Coal & Coke Committee, Central Freight Association Territory, held a hearing at Pittsburgh, Pa., May 28, on a proposed increase of 5c. a ton in the freight rate on bituminous coal from Inner Crescent mines to Lafayette, Ind., via all routes. The rate now is $3.04.

Mine Fatalities in April Show Decline From Previous Month and Year Ago

ACCIDENTS in the coal-mining industry of the United States in April, 1929, resulted in the death of 135 men; 99 occurring in bituminous mines and 36 in the anthracite mines of Pennsylvania, according to reports received from state mine inspectors by the U. S. Bureau of Mines. The death rate per million tons of coal mined during the month was 3.12 for the industry as a whole, based on a production of 43,329,000 tons. The fatality rate for bituminous mines alone, based on a production of 36,888,000 tons, was 2.68, and that for anthracite, with a production of 6,441,000 tons, was 5.59.

The rates for the corresponding month last year were somewhat higher both for bituminous and anthracite mines separately, and for the industry as a whole. The bituminous rate of 3.26 was based on 105 fatalities and 32,188,000 tons of coal; 6.08 for anthracite was based on 42 deaths and 6,909,000 tons; and 3.76 for the total was based on 147 deaths and 39,097,000 tons of coal mined. The rates for April this year also showed a decrease over the preceding month for the total and for both bituminous and anthracite.

During the first four months of 1929, 668 men lost their lives in coal mines. The production of coal during those months was 200,454,000 tons, resulting in a death rate of 3.33. The bituminous rate for this period was 2.97, based on 520 deaths and 174,962,000 tons of coal; that for anthracite was 5.81 based on 148 deaths and 25,492,000 tons. For the same period in 1928 the rate for bituminous mines alone was 3.02, with a production of 161,702,000 tons and 489 deaths. The rate for anthracite was 6.08, based on 23,678,000 tons and 144 deaths, while the death rate for the industry as a whole was 3.41, based on 185,380,000 tons and 633 deaths.

The month of April, 1929, was free from major disasters, that is, accidents in which 5 or more lives were lost. However, one such disaster in January and one in March with a total loss of 60 lives, indicate a death rate of 0.299 per million tons based exclusively on major disasters during the first four months of 1929. The corresponding rate for the first four months of 1928 was 0.291, based on 4 major disasters in which 54 lives were lost.

A comparison of the accident record for the first four months of 1929 with that for the same period of 1928 is as follows:

	Year, 1928	Jan.-Apr., 1928	Jan.-Apr. 1929*
All causes	3.812	3.415	3.332
Falls of roof and coal	1.868	1.807	1.751
Haulage	0.632	0.540	0.658
Gas or dust explosions:			
Local explosions	0.088	0.108	0.075
Major explosions	0.572	0.291	0.299
Explosives	0.130	0.183	0.135
Electricity	0.155	0.119	0.095
Other causes	0.367	0.367	0.319

Fritz Medal Awarded President Hoover

President Hoover was formally presented with the John Fritz Gold Medal for 1929 for "notable scientific and industrial achievement, as an engineer, scholar, organizer of relief of war-stricken peoples and public servant" in the presence of distinguished engineers, guests at the White House at a luncheon, April 25, 1929. J. V. W. Reynders, past president of American Institute of Mining and Metallurgical Engineers, made the presentation of the award. Others taking part in the ceremonies included Dean Dexter S. Kimball, College of Engineering, Cornell University; Gen. J. J. McCarty, vice-president, American Telephone & Telegraph Co., and John R. Freeman, past president of the American Society of Civil Engineers and the American Society of Mechanical Engineers. President Hoover expressed his gratitude in a brief response.

Accidents Eliminated

During the period from Aug. 4, 1927, to Jan. 23, 1929, the Trotter mine of the H. C. Frick Coke Co. worked 314 men 1,208,000 man-hours and produced over 1,000,000 tons of coal without a single lost-time accident.

Coal-Mine Fatalities During April, 1929, 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	1929	1928
Alabama	3	1	1									5													5	11
Arkansas																									0	0
Colorado	2						1					3													3	2
Illinois	2		2				3					7													7	4
Indiana	1				1							2													2	2
Iowa	1											1													1	1
Kansas																									0	0
Kentucky	5		5				1				1	12													12	13
Maryland																									0	0
Michigan																									0	0
Missouri																									0	0
Montana																									0	0
New Mexico			1									1													1	1
North Dakota			1									1													1	0
Ohio	6								1			7													7	2
Oklahoma																									0	0
Pennsylvania (bituminous)	15	3	3				1				1	23													23	29
Tennessee	3											3													3	1
Texas																									0	0
Utah																									0	0
Virginia	3											3													3	3
Washington																							1	1	1	1
West Virginia	13	4	9				1					27						1					1	2	29	35
Wyoming			1									1													1	1
Total (bituminous)	54	8	23		1		7		1		2	96						1					2	3	99	105
Pennsylvania (anthracite)	20	3	4		1	3					3	34						2						2	36	42
Total, April, 1929	74	11	27		2	3	7		1		5	130						3					2	5	135	
Total, April, 1928	62	12	25	16	13		3		2		3	136	3				3	2	1		1	2	2	8		147