

COAL AGE

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The President Writes a Blank Check

THE ADMINISTRATION PROGRAM on coal, as outlined in the President's message to Congress this week, offers nothing new or novel. For guidance in dealing with an industry which already "has been the subject of repeated investigation and reiterated recommendation" President Coolidge presents a restatement of the position he took in his message on the same subject two years ago. Such differences as exist between the two documents are largely differences in phraseology, not differences in ideas. Price is no longer specifically mentioned, but protest is again registered against a legislative status which leaves the national government "so powerless that its only attitude must be humble supplication" in times of emergency.

The President, as in 1923, ventures a non-committal indorsement of the conclusions of the Hammond coal commission. The report of that body, he tells Congress, "should be brought forward, reconsidered and acted upon." Only two recommendations of the many made by the commission, however, have been emphasized in the President's message. These are emergency control and regional consolidations. Into the latter, the President reads a need for "more freedom in the formation of marketing associations, under the supervision of the Department of Commerce." On the key to the control recommended by the Hammond fact-finding agency—the creation of a coal division within the Interstate Commerce Commission—the President is silent.

In an official pronouncement so broad in its implications, so meager in particularization, it is impossible to determine just where the national administration stands. A meticulous critic might ask for a definition of "modern methods of adjusting differences between employers and employees" before subscribing to the opinion that present management "is very close to a national economic failure." He might point to the acrimonious wrangling over railroad consolidations since the merger clauses were written into the Transportation Act of 1920 as proof that bureaucratic acceleration of combinations is not an infallible substitute for economic laws. And the possibilities of academic discussion of the pitfalls of emergency control to bring recalcitrant labor to a sense of its public responsibilities are almost limitless.

But, in the absence of a clear-cut, definite program for dealing with these questions, such discussion must be largely futile. It is this absence of clear-cut, definite, detailed proposals, however, which makes the situation created by the President's message dangerous to the coal industry and to the nation. We cannot come to grips with realities because the message is vague. It may mean anything, everything or nothing. That indefiniteness is the politician's opportunity. The Borahs, the Oddies, the Treadways and the Blacks can bring in bills embodying almost anything short of nationaliza-

tion—and who can say that their ideas are or are not consonant with the Coolidge program?

Nothing illustrates better the tremendous problems involved in coal than the indefinite character of the President's message. Mr. Coolidge has undoubtedly had the advice of men who have given close study to the situation. Nevertheless, despite this counsel, the President is not ready to present a definite program. It reveals a spirit of caution which might well be emulated in other quarters.

Leisure or the Forward Step?

NOBODY CAN TELL what the anthracite miners really want. They are asking for more pay, it is true, but they could have had that at any time by working more hours or more steadily and that without arriving at an eight- or even a seven-hour day.

So it appears that they want the same pay at less hours or less effort. If that is the case most of the plans for greater efficiency that the mechanical engineers are urging and which are based on intensive effort and a full eight hours of work would not afford the miner just that for which he is striking. Perhaps, however, the strike is neither for wages nor for leisure but for that "forward step" which the anthracite mine workers, like labor in general, are always desiring. There are, however, natural limits to such progress.

The Last Ounce of Energy

FOR THE PREVENTION of accident and breakage of material we have introduced factors of safety. We don't demand the last ounce of our ropes or of our metal parts, but why not have a factor of safety for our locomotives and motors? Why load them to the limit? To avoid some of such excessive loading we have fuses and circuit breakers, but why reach such loads as burn fuses and throw out breakers? The better way is to keep well within such loads so as to keep the machines continuously in operation.

It is best to arrange that no more than a certain number of coal-loaded cars and a certain number of rock-laden cars be hauled in a trip, not for safety but for certainty of operation. No plant is running with assurance if it is using the last ounce of its available effort. The factor of certainty of operation is almost as important as the factor of safety. Those who expect to get a given tonnage day by day cannot afford to neglect it. Some foremen believe in making every trip the largest load the locomotive can haul—the lazy man's load—but a better plan is to go more often to the sidetrack and to haul the coal without interruption. If a bad grade interferes with movement the demand for power should not be increased. Instead the load should be eased if it can be done by a better grade.

At one mine where there were twenty-one locomotives, requisition was made for two more. Instead of

complying with the requisition an inquiry was made. It was found by lessening the number of cars behind some of the locomotives they could be assured against stalling and consequently could make more trips, hauling more coal than ever.

Many managers fix a limit on the length of trips to avoid slow speed, stops, circuit breaking, fuse burning and whatnot, and when they can't safely fix the length of trip to suit their ideas they scan the grades which are making the trouble, and with a night force correct the annoying restriction. The stupid waste of time on short hills is one of the aggravating features in much mining practice. What we need is not so much a boss driver as a traffic master with ideas and imagination and in a large mine a train dispatcher working under him.

Quality of Coal

A DEALER in high-grade products has a standing in the community as excellent as his goods. A cheap-John, a maker of honest goods perhaps but of low quality for those who are willing to accept a low standard, has a low reputation among his fellows. A man whose goods are brummagem has a reputé as low as his products.

Consequently, the coal industry, if it would establish itself, must seek to attain a reputation for producing a high-grade commodity. It must not try to pass off just what the public is accustomed to or may be induced to take. Standards must be higher. What does a man do when he finds that a tool he has bought curls at the edge? Does he say that iron will curl and remain satisfied or does he declare that the tool should be of steel of such quality that good work can be gotten from it?

None of us wants poor goods. Why then will some men try to sell them? In any attempt to be favorably regarded by the public eye, clean coal is one of the first steps, just as the manufacture of hard and durable steel is the first step that a tool-steel manufacturer takes to establish his reputation. This seems elementary reasoning, but with some coal operators it has not sunk deeply enough. Some are glad that other coals are dirtier than theirs because that fact helps sales. It's true it does, but the unfortunate fact is that the poor coal on the market, which aids the sales of clean coal, spoils the reputation of every coal producer and of the entire industry.

Everybody's Business

SO UNIVERSALLY are we moved by self-interest that the man, unless he is paid for his action, who tells another what he should do to protect a third party is said to be meddling. So perhaps it is just as well that the fatalities due to coal dust and gas have so interested and excited the public that a mine operator who enforces safety practices now without censure can criticise his lax neighbors on the ground that they are laying not only their own but all mines open to the liability of government regulation and to reprobation of the public which will make the conduct of the coal business difficult.

Sentiment ought to be rampant in regard to rock dusting. The man who delays it or does it in a niggardly manner and the man who does not do it should be put on an attitude of defense not only as against

the mine inspector but as against the operators in his field and every other field. It is not a matter to meditate on and discuss and leave for a later date. Let every operator who hasn't a dusting machine dust his mine with a shovel till he can get the necessary equipment. There is no valid reason for delay. It will be a crowning disgrace if a single dust explosion occurs this winter, and the man who has it will be putting the coal-mining industry before the public in the worst possible guise.

We may not be able to improve loading practice in a single year or two or even three, but we can mobilize for rock dusting in a few weeks. It was a truly sorry tale Captain Steidle told at the West Virginia Coal Mining Institute. We have done so little, as he showed, to make our mines immune since the movement got well started by the passing of the Utah regulations.

This rock dusting is everybody's business. The trade associations would do well to take it up, and the institutes. The industry should show itself a unit in putting this form of safety over. It is one of the first factors in better public relations.

The Cool of the Mine

SOMETHING IN MINES is attractive, or underground mine workers would not be so unwilling to accept surface work. That thing is the cool air. If the surface worker were as well protected against heat as the worker in the coal mines, only the wage would be alluring in coal mining.

It will not be long, however, before the office and even the home will be kept, if not as cool as the mine, at least as comfortable and free from excessive heat. At the Luray Cavern, a show place in Virginia, a sanitarium was built on the hill and connected with pipes that ran down to the cave. The escaping air kept the sanitarium cool through the long summer days. Today the house, no longer a sanitarium, is cooled in the same way.

Under the city of Chicago are a series of tunnels used for freight and wires. These tunnels are cool at all times, and for a while some of the motion picture houses were kept cool with the effluent air from these tunnels.

The mines in the future will be the means by which the homes, hospitals and motion picture houses will be kept cool, but not with the cool air of the excavations. Coal will furnish the power which sets the refrigeratory machinery in operation. That such coolness is appreciated is well illustrated by the remark of a woman whose husband was a sewer digger. He came home late one night for dinner and she objected. "Here am I," said she, "moilin' all day over this stove agettin' of your meals, and you down in that nice cool sewer!" There are compensations in coolness and, let the coal trade be well advised, profit also. The coolness of the mine is a suggestion for future expansion in coal demand.

RESILIENCE MAY BE MORE IMPORTANT than hardness in resisting wear. Thus rubber is giving good service in ball mills, and in pump impellers. It has done excellent work as elbow parts in pipe lines delivering concrete where manganese steel and cast iron failed. Perhaps we shall come to the use of rubber, soft or hard, for chutes, launders and flushing pipes in back filling.

Electric motors, synchronous
Electricity in mining

Good Power Factor Conditions Always Serve to Lower Capital Charges and Energy Costs

Careful Selection of Apparatus Is Most Necessary—
Corrective Equipment Now Available Permits Power
Devices to Carry Larger Loads and Reduces Bills—
Applications of Synchronous and Static Condensers

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WHETHER A COAL COMPANY generates its own electrical energy or purchases it, good power factor conditions on its lines are always desirable and economical. Where poor power factors exist excessive capital must be laid out to carry idle currents. Wires, poles, insulators, crossarms, switches, transformers and motors must be of larger capacity than would be required if the power factor were good.

From an operating point of view serious difficulties arise because of high circulating wattless currents; voltage regulation becomes bad, line drops are large, motors will not develop their rated torque, switches and fuses needlessly interrupt service, conductors get hot and high maintenance costs result.

Many coal companies have given the question of power factor correction but little attention. This is either because they generate their own power or purchase it from a utility company which has not seen fit, as yet, to enforce the penalty clause which is no doubt in all its power schedules.

These difficulties and costs produced by poor power factors may exist either with coal company generated energy or custom power purchased without a penalty charge. Whatever expense is added to the power bill when the penalty clause is enforced is really an additional cost.

A penalty charge upon a power bill is perfectly reasonable and justifiable from the power company's point of view. Wattless currents necessitate capital invest-

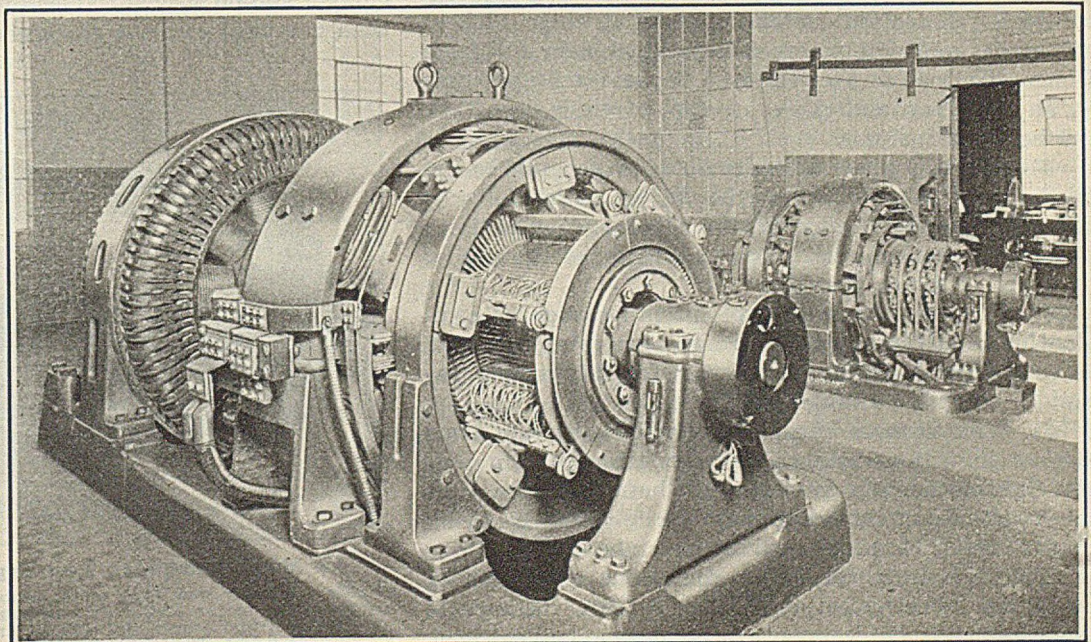
ments in power plants, generators, wires, transformers, etc., which earn no income unless a special charge is made. Ordinary meters do not register wattless current; the idle current does not turn their elements.

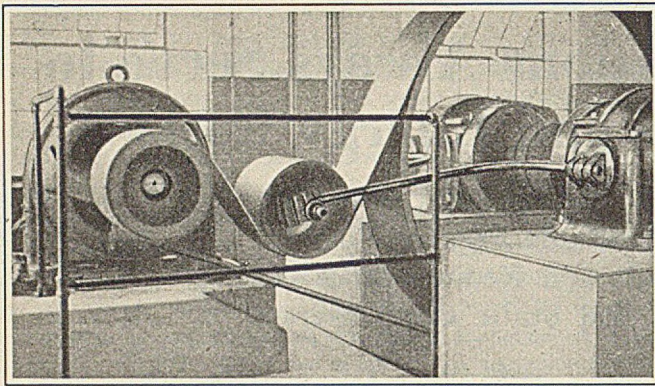
Obviously, if the power company's penalty charge is justifiable, because of the additional investment in equipment thus made necessary, the user of power has an added expense due to this same wattless current circulating in his apparatus. In fact, this matter is more serious to him because it affects his production also. For example, if an induction motor receives 10 per cent less than normal voltage, because of poor power factor conditions, its torque is reduced nearly 20 per cent and it can do less work. A larger size motor to replace this one would require more capital and in fact, when applied to the load would aggravate the condition.

Power customers who buy energy under a schedule with no penalty clause actually do pay for having poor power factor loads. This they may not know but, nevertheless, it is true. Great improvements have been made lately in the processes involved in the generation, distribution and sale of public utility energy. All of these advantages have not been reflected in reduced power rates. Rather than enforce a penalty clause for poor power factor many power companies have chosen to let the customer pay this charge, perhaps unknowingly, in an energy rate which has not completely reflected the improvements made in power plants.

Near the Cause

The motor-generator set in the foreground has a 440-volt synchronous motor. It receives its supply from the low-voltage side of a bank of transformers which feeds the induction motor load of the Baker breaker of the Glen Alden Coal Co. Thus the leading current taken by this unit counterbalances the lagging current of the breaker motors.





Units in All-Day Service Are of Great Value for Corrective Purposes

A small synchronous motor is shown here driving an air compressor at a mine of the Hillside Coal and Iron Co., in Forest City, Pa. Units like this one though small do much to correct lagging currents of hoist motors which must be of the induction type.

Power factor correction begins with the prevention of conditions which produce high wattless currents. When laying out or surveying an electrical system with the idea of obtaining good power factor operation the following points should be considered:

(1) At nearly all mines certain types of loads lend themselves equally well to either direct-current or alternating-current motor drive. Under some circumstances instead of using an induction motor, it may be advisable to select a direct-current motor which receives power through a synchronous motor-generator set or rotary converter. Whenever there are no serious drawbacks to this arrangement, the possibility of obviating at least some inductive load presents itself right here.

(2) In the selection of an induction motor its power factor characteristics should be given careful consideration. The type and design of the motor should be such that it will meet the load conditions and at the same time operate at high efficiency and good power factor, especially at its normal load. High-speed induction motors have the best power factor characteristic curves.

When calculating or otherwise determining the size induction motor required for a given service it is always desirable, consistent with load and operating conditions, to select a motor which is no larger than properly required. Induction motors operate at their highest efficiencies and best power factors at or near full load. Hence, if a load is over-motored it necessarily operates at an efficiency and power factor which is less than the best obtainable.

(3) A synchronous motor should, in general, be applied to all loads which can be driven successfully by this type of unit. It may even be advantageous at times to adopt special means or devices to make the use of this type of motor possible.

(4) The use of special type machines such as combination induction- and synchronous-motor units should be considered. Motors and devices of this nature are rapidly becoming standardized.

(5) Transformers should be selected with the same care as induction motors. Because transformers usually are permanently connected to their lines, considerable reactive-current hours may be registered by them.

(6) The synchronous condenser may be applied either to prevent poor power factor conditions or to correct the power factor of a line. In the first instance it would probably be designed to carry a mechanical load,

while in the second case it may be floated on the line and merely supply leading current.

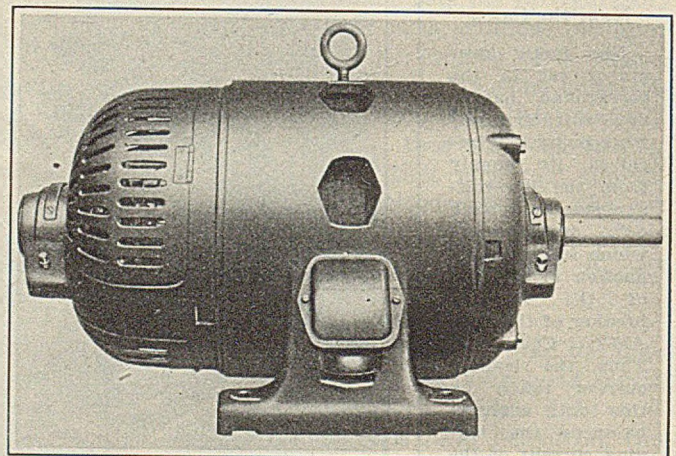
(7) Static condensers generally perform no other function than the correction of poor power factor conditions.

Oftentimes the design and operating conditions of a mine hoist permit the use of an induction motor drive or a direct-current drive. In such instances here is an opportunity to consider the desirability of selecting an induction motor with its high inductive current or a direct-current motor receiving power through a synchronous motor-generator set or a rotary converter.

Again, the haulage system of a mine nearly always necessitates the use of direct-current locomotives. When the feeders are properly designed and other conditions satisfactory it may at times be advisable to operate mine pumps, small hoists, air compressors, coal cutters, etc., by direct-current energy supplied through a motor-generator set or rotary converter rather than by alternating-current induction motors.

The best motor for a given duty is usually that type which gives the greatest reliability, has suitable torque, good speed characteristics and the highest efficiency. The induction motor has these characteristics and is exceptionally low in price. It, however, possesses a disadvantage in that it draws a large lagging current from its supply line. This reactive current is almost as large at light loads as at full load. The data in the accompanying table makes this fact quite clear. If the motor is applied to a constant load equal to its full load capacity, the power factor will be maximum at all times. It is apparent however, that the ratio of the reactive current to the energy component increases under light loads and consequently the power factor becomes low. The selection of the proper induction motor, therefore, plays an important part in obtaining a good power factor for a plant or power system.

Synchronous motors are designed to operate at unity power factor or leading power factor. When applied to a circuit having a lagging power factor, the resulting power factor is always nearer unity than before. Synchronous motors may be designed for the purpose of carrying full capacity mechanical load or any percentage of mechanical load to none at all. Obviously, a machine designed for the purpose of carrying a high reactive current and no mechanical load is of lighter construction than one built to drive machinery.



A Motor Combining Two Types Has Been Built

This relatively new type motor embodies the characteristics of an induction motor and a synchronous motor. At normal loads it is a synchronous unit, but while being started and when highly overloaded it acts like an induction motor.

All types of synchronous motors have their fields of application depending upon the conditions to be met and the results to be obtained. Slow-speed synchronous motors generally are designed to operate at unity power factor. This is because the increased cost of material and lower efficiency resulting by making these slow-speed types suitable for leading power factor become governing considerations.

High-speed synchronous motors may more economically be designed for leading power factor service. These motors are highly recommendable because they provide a means of adding both mechanical load and obtaining power factor correction at the same time. In nearly all power systems a high power factor load

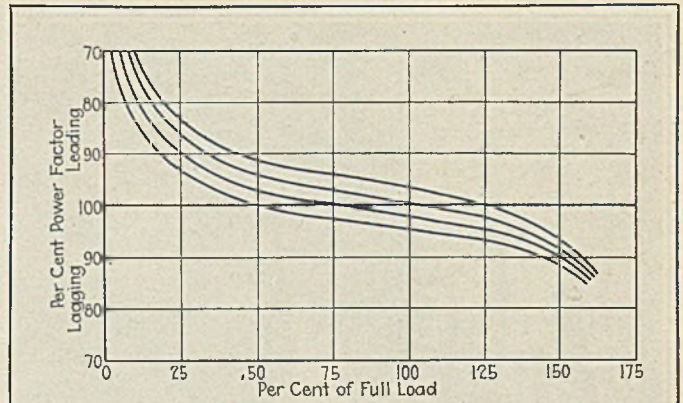


Fig. 1—Power Factor Characteristic of Synchronous Motor Leads and Lags

These curves show the approximate shape of the power factor curves of a synchronous motor. Depending upon the field current applied, the motor may operate with leading current until the load reaches any predetermined value. Ordinarily a synchronous motor should be supplied with nearly full field excitation so that it will take a leading current most of the time and thus aid materially in correcting power factor.

Characteristics of Three-Phase 60-Cycle Motors

Horse-power	Speed in R.p.m.	Volts	Full Load Eff.	Full Load P.F.	Kva. Input	Approximate Reactive Kva.	
						Full Load	No Load
1/2	1,200	220-440-550 volts.	73	65	0.786	0.596	0.517
	900		69	49	1.10	0.956	0.846
3/4	1,800	220-440-550 volts.	80	79	0.885	0.543	0.464
	1,200		76	72	1.02	0.708	0.608
1	900	220-440-550 volts.	75	59	1.27	1.02	0.99
	1,800		82	80	1.14	0.681	0.567
1 1/4	1,200	220-440-550 volts.	79	75	1.26	0.832	0.706
	900		77	70	1.38	0.986	0.848
2	1,800	220-440-550 volts.	85	85	1.55	0.820	0.665
	1,200		81	77	1.79	1.13	0.95
3	900	220-440-550 volts.	79	68	2.09	1.53	1.32
	1,800		85	86	2.03	1.038	0.83
4	1,200	220-440-550 volts.	84	82	2.16	1.235	1.02
	900		81	70	2.63	1.87	1.61
5	1,800	220-440-550 volts.	86	88	2.95	1.40	1.10
	1,200		85	83	3.16	1.78	1.46
7 1/2	900	220-440-550 volts.	82	73	3.74	2.55	2.18
	1,800		87	89	4.82	2.19	1.71
10	1,200	220-440-550 volts.	86	86	5.04	2.57	2.07
	900		85	77	5.71	3.64	3.07
15	720	220-440-550 volts.	82.5	73	6.19	4.23	3.61
	600		83.5	70	6.37	4.54	3.90
20	1,800	220-440-550 volts.	88	90	7.06	3.07	2.36
	1,200		88	87	7.30	3.60	2.87
25	900	220-440-550 volts.	86	77	8.44	5.38	4.54
	720		85.5	75	8.72	5.76	4.89
30	600	220-440-550 volts.	85.5	67	9.75	7.24	6.26
	1,800		89	91	9.20	3.82	2.90
40	1,200	220-440-550 volts.	88	88	9.61	4.56	3.60
	900		86.5	81	10.61	6.23	5.17
50	720	220-440-550 volts.	87	77	11.10	7.10	5.99
	600		85.5	74	11.88	8.00	6.81
75	1,800	220-440-550 volts.	90	91	13.6	5.64	4.28
	1,200		89	87	14.5	7.14	5.69
100	900	220-440-550 volts.	87.5	84	15.2	8.24	6.72
	720		86	84	15.5	8.40	6.85
150	600	220-440-550 volts.	86.5	74	17.4	11.8	10.06
	1,800		89.5	88	19.0	9.0	7.1
200	1,200	220-440-550 volts.	89	86	19.5	9.96	8.01
	900		89	84	19.8	10.7	8.72
250	720	220-440-550 volts.	87.5	83	20.6	11.48	9.42
	600		86	81	21.5	12.6	10.45
300	1,800	220-440-550 volts.	90	91	22.8	9.46	7.18
	1,200		89	89	23.6	10.72	7.30
400	900	220-440-550 volts.	90	85	24.4	12.9	10.46
	720		89	83	25.3	14.1	11.57
500	600	220-440-550 volts.	89	83	25.3	14.1	11.57
	1,800		89	90	28.0	12.2	9.40
600	1,200	220-440-550 volts.	89.5	90.5	27.6	11.7	8.94
	900		89	88	28.6	13.6	10.74
750	720	220-440-550 volts.	88	86	29.5	15.05	12.10
	600		88	84	30.2	16.4	13.38
1000	1,800	220-440-550 volts.	89.5	91	36.7	15.2	11.53
	1,200		89	91	36.9	15.3	11.61
1500	900	220-440-550 volts.	89.5	88	38.0	18.0	14.20
	720		88.5	88	38.4	18.2	14.36
2000	600	220-440-550 volts.	89	84	39.9	21.7	17.71
	1,800		90.5	92	44.7	17.6	13.13
2500	1,200	220-440-550 volts.	90	91	45.5	18.8	14.25
	900		89.5	89	46.6	21.2	16.54
3000	720	220-440-550 volts.	88	88	47.6	22.6	17.84
	600		88	82	51.7	29.6	24.43
4000	1,800	220-440-550 volts.	90	93	53.4	19.6	14.26
	1,200		90	89.5	55.5	24.8	19.25
5000	900	220-440-550 volts.	90	90	55.2	24.0	18.48
	720		89.5	86	58.1	29.6	23.79
6000	600	220-440-550 volts.	89	84	59.8	32.4	26.52
	1,800		91	93	66.1	29.3	22.69
7500	1,200	220-440-550 volts.	90	91	68.3	28.3	21.47
	900		89.5	90	69.1	30.0	23.09
10000	720	220-440-550 volts.	89.5	88	71.0	40.6	33.50
	600		89.5	85	73.5	38.8	31.45
15000	1,800	220-440-550 volts.	90.5	91	90.4	37.5	28.46
	1,200		90.5	88	93.6	53.6	45.24
20000	900	220-440-550 volts.	90.5	85	96.8	51.1	41.42
	720		91	89	115	52.4	40.9
25000	600	220-440-550 volts.	89.5	89	117	53.3	41.6
	1,800		91	84	122	66.2	54
30000	1,200	220-440-550 volts.	90.5	91	136	56.4	42.8
	900		91.5	89	137.5	62.6	48.85
40000	720	220-440-550 volts.	90	90	142	81.0	66.8
	600		91	89	184	83.8	65.4
50000	1,800	220-440-550 volts.	91	89	184	83.8	65.4
	1,200		90.5	82	201	115	94.9
60000	900	220-440-550 volts.	90.5	82	201	115	94.9

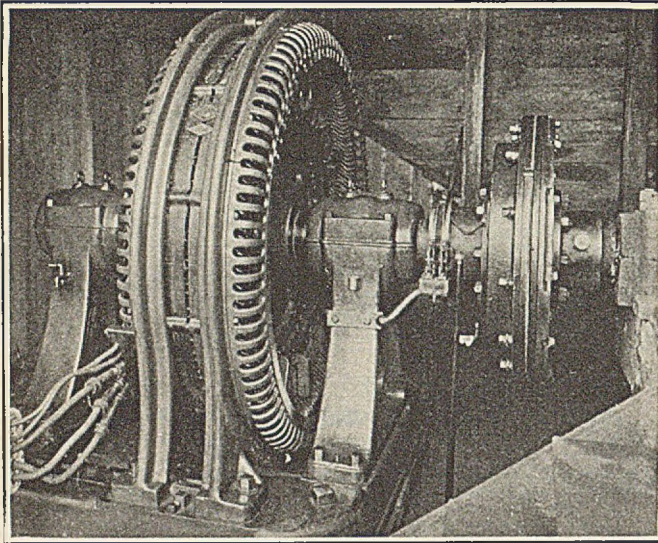
does more to correct a lagging power factor condition than large purely reactive capacities provided by synchronous machines floating on the line and not carrying any mechanical load.

Standard synchronous condensers usually are designed to carry mechanical loads up to 70 per cent of their kilovolt-ampere rating. Such a motor when used in this manner provides maximum economy as to first cost of mechanical motor capacity and also as to leading reactive kilovolt-ampere capacity.

Synchronous motors should usually be operated with their field excitation set to correspond with the full rating of the machine. If this is done the reactive capacity will become proportionately more favorably effective at loads less than full. The power factor characteristics of a synchronous motor are in general as shown in Fig. 1. Within certain limits the load at which unity power factor is attained can be increased or decreased by adjusting the excitation of the field. When the machine operates at loads less than that at which unity power factor is attained it takes a leading current, while at higher loads it takes a lagging current and as the load is further increased the power factor characteristic becomes similar to that of an induction motor.

A synchronous converter or rotary converter, as it is sometimes called, lends itself less readily to power factor correction than a synchronous motor because its field can be varied between narrow limits only. Attempting to operate beyond definite limits upsets the balance of the machine and causes serious operating difficulties.

No doubt one of the main reasons why the synchronous motor has not been more generally used, until recent years, is that many of its characteristics are not thoroughly understood. Some of its inherent advantages, nevertheless, embody just those qualities which many electrical men have been seeking. For example, under low voltage conditions, the reactive kilovolt-ampere capacity available for improvement of power factor increases; whereas, under conditions of high voltage the leading reactive kilovolt-ampere capacity available for power factor correction automatically decreases. At abnormally high voltages a synchronous condenser might actually draw a lagging current from the line



Slow-Speed Motor Drives Breaker Machinery

Here is a breaker motor used by the George F. Lee Coal Co. to help reduce the power bill. The motor is started under no load and then connected to the equipment which it drives by means of a magnetic clutch.

and thus hold down the line voltage. Such action tends to stabilize line pressures.

The pull-out torque of synchronous motors varies directly with the voltage, although, under starting conditions the starting torque and pull-in torque vary as the square of the voltage, being similar in this respect to an induction motor. This latter characteristic is easy to understand when we remember that nearly all synchronous motors are started by the use of windings, incorporated in their design, similar to those on an induction motor.

ADVANTAGES OF SYNCHRONOUS MOTOR

Aside from the benefits of power factor correction possible with a synchronous motor, it has several other advantages. Slow-speed synchronous motors are generally more economical in operation and less expensive than slow-speed induction motors. For certain kinds of service such as on air compressors, motor-generator sets or processes necessitating uniform speed the synchronous motor is especially suitable.

Synchronous motor-generator sets supplying direct current for mine service are highly desirable. They maintain constant speed and hence good direct-current voltage regulation. A rotary converter applied to service with an unvarying load, but rarely found at coal mines, is more efficient and probably less expensive in first cost but its characteristics are such that flexibility of operation to obtain power factor correction is limited.

A compound wound synchronous converter, such as is used in mining service, is designed to operate at unity power factor between the limits of full load and three-quarter load. For mining service it has a serious disadvantage, realized more and more, in that the direct-current voltage varies in proportion to the alternating-current supply voltage. With the synchronous motor-generator set the generator speed is always constant and the direct-current voltage is independent of any alternating-current voltage fluctuations.

Heretofore it generally has been thought that the synchronous motor is applicable only to operations or machines requiring constant speed and infrequent starting, also to loads with low starting and pull-in torques. In many cases this is true, but improvements in motor design, in magnetic clutches and other aux-

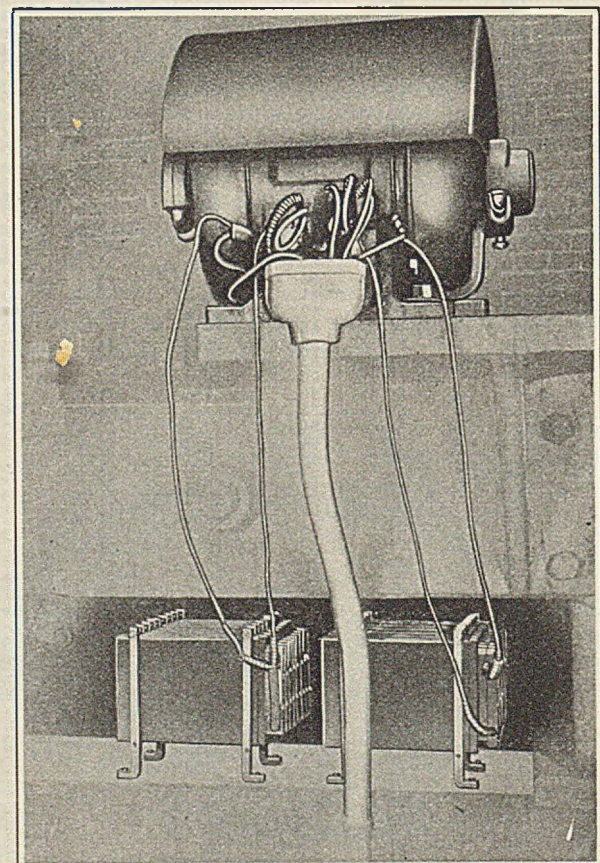
iliary starting devices have greatly broadened the usefulness and application of synchronous motors.

To meet the increasing demand and necessity for those qualities possessed only by synchronous motors, many different types of special motors have lately been designed. Some of these machines are combination types embodying both induction- and synchronous-motor characteristics. Another type is the commutating alternating-current motor. Some of the most successful new motors are types designed with a clutch of some kind so that the high pull-out torque of a synchronous motor can be used during starting service.

TRANSFORMERS EXERT INFLUENCE

It has been believed generally that transformers exert little influence upon power factor conditions. This is not true and becomes most apparent when the customer purchases power upon a schedule which permits the power company to increase its rate by means of a power factor clause in its contract.

Ordinarily, the magnetizing current supplied to a bank of transformers is relatively small but when we consider the fact that transformers usually are connected to the lines the full 24 hr. of every day, the total reactive current hours passing through them becomes exceedingly large in the period of a month. Over-transformered loads are to some degree in the same category as over-motored loads. In cases where three single-phase transformers are too large for the load it may prove advantageous to operate only two of them at a time, connecting them in open delta. In this manner both the no load losses and magnetizing current may be appreciably reduced.



Compensate for Lagging Currents at the Source

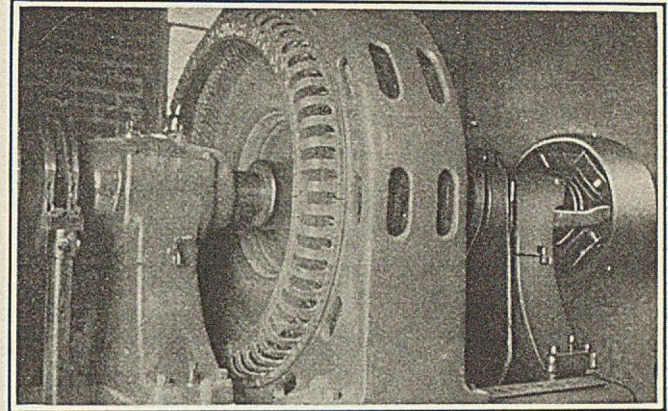
The closer a static condenser is applied to the place where lagging power factors are originated the better becomes its service because correction is accomplished before wires, switches and transformers are loaded with idle current.

The lagging current taken by a transformer may be only 5 per cent of the full load current, but when we consider that the load factor of most mine equipment is low, the magnetizing current ampere hours become proportionately much larger than 5 per cent of the average power load upon them.

After everything possible has been done in the selection of equipment, that is, proper size motors have been applied, transformers have been carefully selected and the opportunities for the use of synchronous motors have been exhausted, etc., it is first of all necessary to see that such equipment is operated to give the best power factor conditions. Then if further power factor correction is necessary attractive results can be obtained by the use of synchronous condensers and static condensers.

CORRECT NEAR PLACE OF ORIGIN

When endeavoring to correct poor power factor every reasonable effort should be made to do so at or near places where it originates. Aside from the benefits derived in the power bill the user should consider the other advantages he can gain for himself. High wattless currents needlessly tie up capacity in wires, switches, meters, transformers, alternators, etc., which might otherwise be used for useful work. Often the necessity for buying new transformers or additional alternating-current generating capacity to carry additional loads can be obviated by correcting power factor on the load side of such units already in service. Therefore, in applying corrective equipment the first thought should be to locate it where it will reduce reactive currents before they pass through transformers, switches, wires, etc. Consistent with this idea,



**Synchronous Motor Drives a Large Mine Fan
And Aids Power Factor Conditions**

The Buck Run Coal Co., near Minersville, Pa., uses this synchronous motor. It is connected to a large fan by a magnetic clutch. The motor cuts down wattless currents in the power system.

small-capacity condensers suitable for use on low-voltage circuits are available for installation directly connected to the motor leads of induction motors.

Present practice suggests that when the required leading reactive capacity for power factor correction is as large or larger than 300 kva. a synchronous motor should be given first consideration. It has the advantage over most other devices for this service in that it has inherent qualities which enable it to stabilize voltage fluctuations. It has an additional advantage in that it can be used in conjunction with automatic voltage controlling devices to maintain good voltage regulation. When so used the reactive current taken by the machine varies automatically to compensate for line voltage variations. Under high voltage conditions the synchronous motor may be operated to hold down the voltage, thus the machine may be easily adjusted to the needs of the circuit.

APPLICATION IS LIMITED

The synchronous condenser is only applicable in large sizes for group power factor improvement. This is to some extent a disadvantage where small inductive machines operating from several banks of transformers cause poor power factor conditions. Under such a circumstance the poor power factor conditions are first allowed to accumulate and magnify before being corrected. This allows the heavy wattless currents to tie up transformer, alternator and line capacities which might otherwise be advantageously used. It also permits the circulating currents to cause poor voltage regulation and undesirable heating of conductors.

The synchronous condenser has greater losses than a static condenser and requires attendance unless it is made to function automatically, in which case the first cost is somewhat higher.

Group power factor correction even from the point of view of the static condenser being used for the purpose is often desirable because of low first cost. There are also conditions where the application of condensers of small capacity, either to individual motors or to small groups of motors prove most profitable. A complete line of static condensers conforming in sizes to the most popular induction motors is now available. These condensers are designed for direct application with 220-, 440- and 550-volt motors without intervening transformers or reactors, except where the capacity of

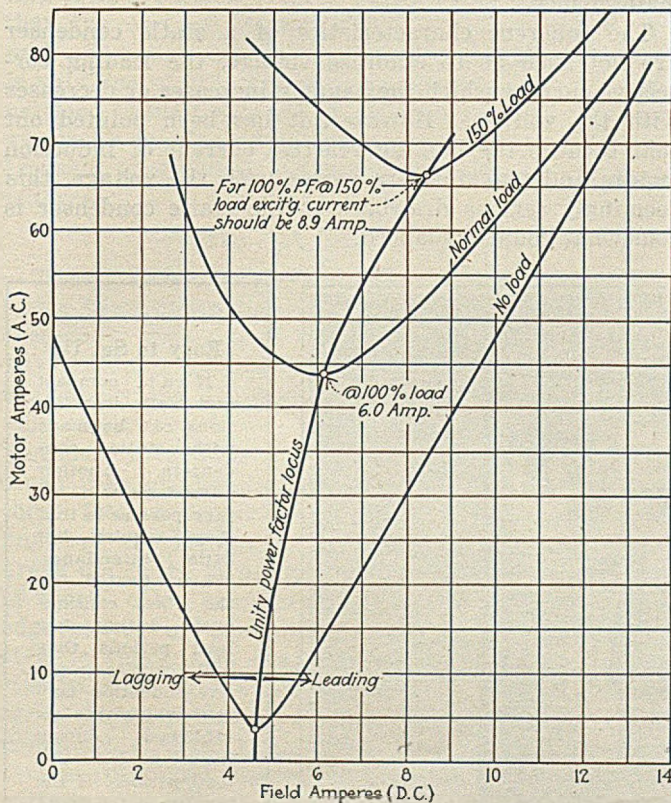


Fig. 2—Use High Excitation to Get Good Power Factor

These are the V-curves of a 225-hp, 1,200-r.p.m., 2,300-volt synchronous motor. They show that it is necessary to excite the direct-current field about 8.5 amp. to carry 150 per cent load at unity power factor and 6 amp. to carry full load at unity power factor. Greater excitation than these amounts for the loads specified causes the motor to take leading current, lower excitation causes a lagging power factor.

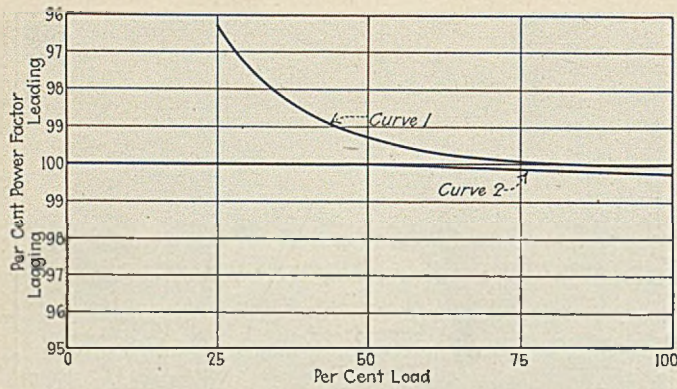


Fig. 3—Good Results Are Obtained When Induction Motors Are Combined with Condensers

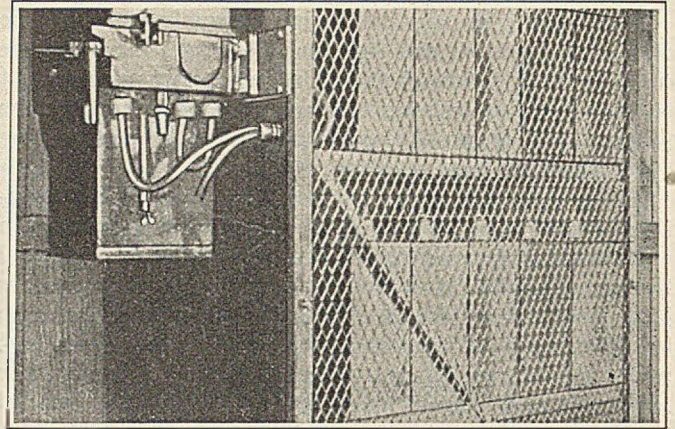
Curve 1 shows the power factor of the line resulting when an induction motor is supplied with a static condenser equal in capacity to that necessary to give 100 per cent power factor at full load. Curve 2 shows the results obtained when a static condenser equal in capacity to the reactive kilovolt-amperes of the motor at no load is used.

the condenser is large enough to make the transformer and high-voltage condenser more economical.

For 220-volt motors a 5-kva. outfit is about the largest economical unit suitable for direct connection to the motor leads. Condensers possibly as large as 30 kva. may be used directly connected to 440-volt circuits. When larger capacity condensers are required the fixed cost per kilovolt-ampere will be less with transformers and high-voltage condensers.

When determining the size condenser to use with an individual motor, much depends upon the characteristics of the motor load. Under some circumstances, especially when the motor operates continuously at full load the condenser may be much smaller than one applied with a motor driving a variable load. Fig. 3 indicates results obtained by the use of a static condenser equal in corrective capacity to the full load reactive kilovolt-amperes taken by an induction motor and also a static condenser equal in corrective capacity to the no load reactive kilovolt-amperes of the motor.

The curves show that when the motor is equipped with a condenser equal to the no load reactive kilovolt-amperes taken by an induction motor, the power



A Static Condenser Outfit Which Quickly Paid for Itself

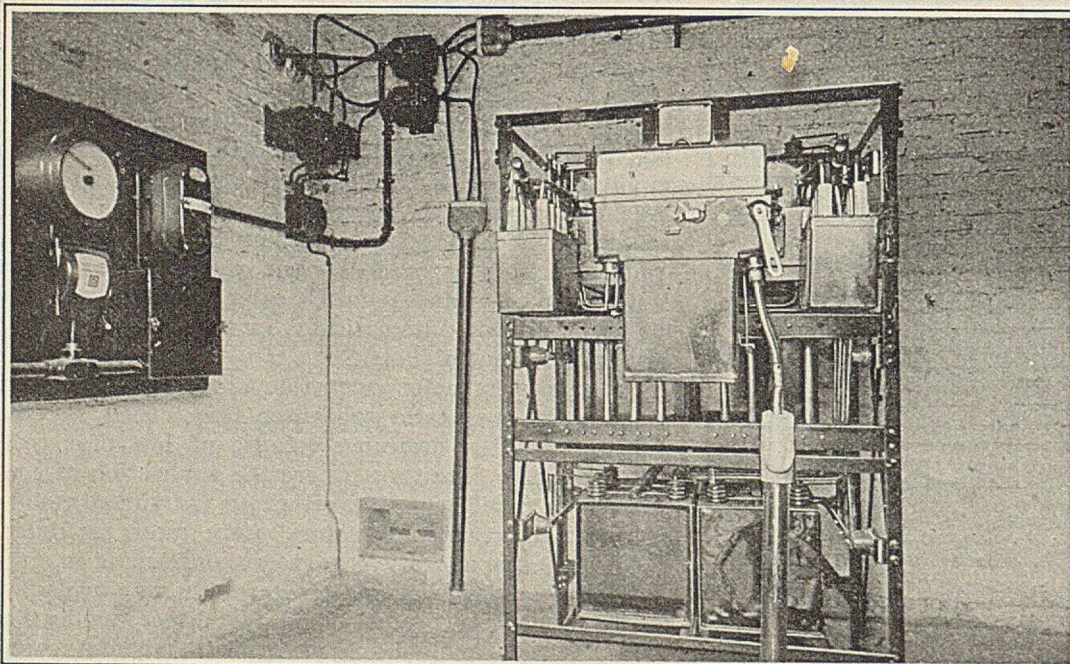
One of the first static condenser installations at an anthracite mine was made by the Richmondale Coal Co. No synchronous equipment was in service at this mine and the static condenser quickly paid for itself by large reductions in the monthly power bills.

factor varies from 0.9976 at full load to unity at no load. Such a condenser, therefore, gives entirely satisfactory results and is generally recommended.

Where condensers are to be used for power factor correction of a group of motors, the capacity of the unit depends upon the improvement desired. Obviously, the diversity factor of the load has a great influence upon the size condenser required.

Static condensers afford more flexible selection than synchronous condensers. A greater range of capacities is available. The location of a static condenser outfit requires no special foundations and the first cost is lower for small units. The losses are low and no or little attendance is necessary for their operation or maintenance.

The inherent characteristics of a static condenser are not such as to stabilize voltage, the leading corrective current which they supply increases or decreases with the voltage. However, it has been pointed out that because the lagging reactive current of induction motors and transformers varies with the voltage, this seemingly serious drawback to the static condenser is somewhat counterbalanced.



Easy to Set Up

Neat, compact and safe installations can be made with static condensers. Another advantage which they possess is that they require but little attendance. When floated on the line continuously during low load periods they will correct reactive induction current which was established during heavy inductive load periods, if the reactive current meter has no ratchet.

Coal cutters

Careful Investigation Shows Common Faults of Bits

Shape, Clearance, Rake, Heat Treatment, Forging Method And Material All Important in Sharpening—Together They Fix Bit Usefulness

By Joseph A. Blake, Jr.
Chicago, Ill.

RECENT EXAMINATION of a large number of reports covering the performance of cutter chains disclosed the fact that most operating troubles resulted from defective bits. These reports extended over a period of nearly three years, included observations at more than sixty mines, and covered the products of several manufacturers. The high percentage of bit defects can hardly be considered as accidental; probably it reflects a generally prevalent condition. Certainly in many cases the efficiency of coal cutting machinery is greatly reduced by the use of poor bits.

Primarily a cutter bit is a roughing tool. It is designed to remove the maximum amount of material in a given time with the minimum consumption of power and at the lowest replacement cost. Its action, in general, is similar to that of a planer tool with the important difference that it must penetrate under the pressure of the feed which is continuous. Conditions of operation are trying. The cutting is usually done dry; there is little chance for the dissipation of heat; vibration is always present and variations in hardness and the presence of impurities in the coal expose the bits to sudden shocks which may be extremely severe.

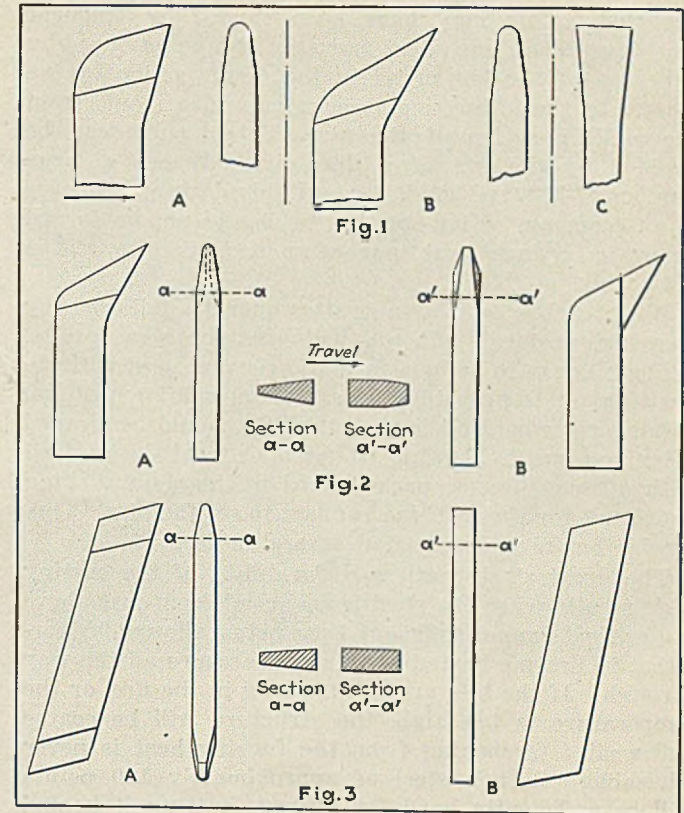
In spite of every precaution, therefore, occasional bit failures are to be expected. If the elementary principles governing the design and heat treatment of cutting tools are ignored, these failures may be so frequent that the cost of operation will be increased several fold. The diminished quantity of coal mined per shift is only one of the factors to be considered in this connection. Nine times out of ten, cutting with poor bits means an overloaded machine. Inevitably this causes frequent shut-downs and heavy expenditures for maintenance.

POINTS OUT SIX BIT DEFECTS

The bit defects observed can be conveniently grouped under the following heads, the order being that of the frequency with which they occur: (1) Weak point, (2) incorrect clearance, (3) incorrect rake, (4) poor heat treatment, (5) bad forging, (6) use of an unsuitable steel.

Almost invariably a weak point is the result of too much rake or clearance or both, since any increase in these factors proportionately diminishes the included angle of the bit point. Bits having this defect may break under the stress of heavy cutting or as the result of shock. Also, since heat is removed from the cutting edge mainly by conduction, if the cross-section of the steel is small, this heat dissipation may not be sufficiently rapid to prevent a dangerous rise of temperature. Sharp points as, for example, the corners of the chisel bit, C, Fig. 1, are easily broken or damaged by over-heating and should, if possible, be avoided. A cutting edge without salients, like that of a round-nosed roughing tool, usually will stand up better under heavy duty than any other.

The rake and front clearance necessary for satisfactory performance depends to some extent upon local



Standard Shapes for Bits

Each possesses advantages and disadvantages that are pointed out in this article in an effort to show mining men what this investigation proved.

conditions. A bit without rake wears rapidly at the point and consumes unnecessary power. As the rake is increased, the force required to split off the chips diminishes, less power is required for cutting and the life of the tool is prolonged, assuming that enough metal is left to support the edge properly. Clearance should be sufficient to insure adequate penetration and avoid friction. More than is required to attain this result is unnecessary and may be harmful. The bits shown at A, Figs. 1 and 3, have a rake and front clearance of 15 deg. In the case of B, Fig. 1, these angles are both 30 deg. when the bit is not inclined. For a given contained angle, the relative rake and front clearance is governed by the inclination of the bit in the chain block. In the case of the bit illustrated at A, Fig. 3, which is formed without hook from a straight bar, the rake is fixed by this inclination and is not varied in sharpening. The double-ended construction, not possible with crooked bits, is a distinct advantage, since it is necessary only to reverse the bit to present a fresh point for cutting.

Side clearance, often neglected, is highly important. The bits, A, in Figs. 2 and 3, will clear laterally and cut with little friction, whereas those shown at B will rub against the coal, consuming power needlessly. This fault also greatly increases the danger of overheating.

Heat treatment really begins with forging and the two operations may well be considered together. Overheating of carbon steel occurs frequently. This is always harmful and if carried beyond a certain point cannot be corrected by subsequent treatment. A safe rule is not to heat this steel above a bright red and to stop forging before it ceases to glow visibly in daylight. No instance of forging at too low a heat was noted, though it is easy to injure high carbon and many alloy steels in this way. One case of superficial decarbonization was

reported. This may have been caused by frequent working. The same effect, however, can be produced by exposure of the hot metal to the direct action of the blast. In the latter case, cracks may also result from the chilling action of the air. This trouble can be avoided by the use of a deep fire. Where a large number of bits are handled, a suitably designed furnace is an economy. High-speed steel should not be forged below an orange heat, nor after it begins to stiffen noticeably.

With carbon steels, a water quench, followed by drawing, preferably in oil, will give the best results. If the bits are to be hardened all over and used without drawing oil is probably the safest quenching medium. In all cases where oil is used the bits should be cleaned after treatment. If this is not done, coal dust mixed with oil may become packed hard in the slots, making it difficult for the machine runners to set the bits. This trouble has been observed at several mines.

The greatest strength and durability of the cutting edge results when the steel is quenched from just above the critical range, sufficient time being allowed to permit it to become heated to this temperature all the way through. If the bits are left too long in the fire, or the temperature is too high, the structure will be coarse and weak. Quenching from the forging heat is never advisable. Carbon steel of approximately 120 points will be sufficiently hard for average cutting if heated to the proper temperature and allowed to cool in the air. Moderate care is necessary, however, when this method is used. If the bits are thrown on a damp floor, good results cannot be expected. They should be laid on a dry surface and shielded from cold air.

SPECIAL TREATMENT FOR ALLOY STEELS

Alloy steels require special treatment. The instructions furnished by the maker for the handling of these products must be intelligently followed if good results are to be attained. Bits made from high-speed steel should be hardened at the point only. If they are hardened all over, the percentage of fracture in service will probably be high. In cold weather it is advisable to warm the steel before placing it in the fire.

In the selection of steels for cutter bits due regard should be paid both to local conditions and to the first cost of the material. An alloy steel may give better service than a carbon steel under certain circumstances yet be so expensive that its use is out of the question. The desirable qualities of any bit are: ability to withstand shock and abrasion, with sufficient hardness to permit the formation of a fairly keen, durable edge. Carbon steel of about 70 points, containing a small quantity of chromium and nickel, seems to be quite satisfactory in average cutting. It has the advantage of being relatively cheap.

Where greater hardness is required, steels of higher carbon content, up to 100 or 120 points are often used. Although such a steel frequently gives excellent service, it must be borne in mind that supersaturated carbon steels are comparatively brittle. Breakage is the commonest form of failure noted for this material. In several instances, shallow grooves made by the setscrew have been sufficient to determine the point of fracture. Burrs and indentations, should always be removed in sharpening. Besides being a source of weakness, such imperfections sometimes make it hard to set the bits and especially difficult to remove any that are broken.

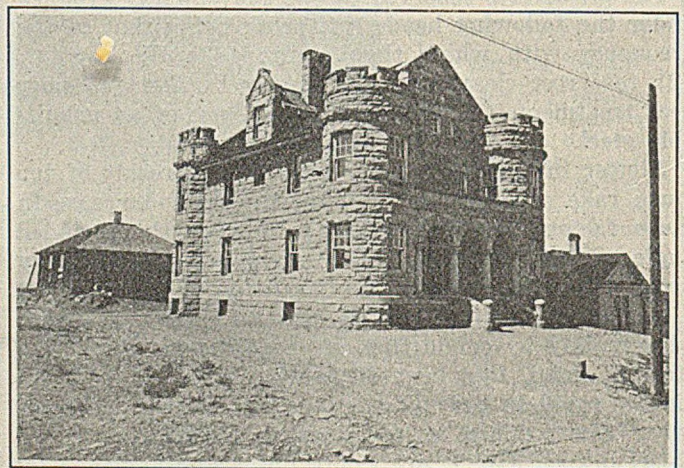
This increases the machine runner's temptation to operate with dead lugs. This steel is more expensive and harder to work than that first mentioned.

High-speed steel is seldom used in coal. Ability to stand high temperature without injury is its chief advantage. It is so expensive that its use, except under unusual circumstances, is not an economy.

Practically everything that has been said in regard to sharpening and heat treatment is generally applicable to cutting tools, and is known to every mechanic. Failure to apply the principles stated in the production of cutter bits probably arises from the type of labor and the facilities available at the average mine. Where the bits are sharpened by hand, the results obtained depend altogether on the skill of the blacksmith. Often his equipment is extremely limited, and if there is much bit sharpening to be done, uniformity of shape and temper can scarcely be expected. Die forging makes it easy to turn out correctly shaped bits with a large saving in time over hand methods but does not affect the problem of heat treatment. Dies are expensive, and their life is comparatively short. All bits produced by a defective die will be badly formed. Because of their high cost, and the time saved, as compared with hand work, there is a tendency to keep in service dies that ought to be discarded.

Finishing bits by grinding after they have been forged, in order to obtain correct and uniform shape, has been tried at a few mines with apparent success. Unquestionably, a better edge can be made by grinding than in any other way. A bit so designed that it could be shaped by a simple grinding operation from a length of bar stock without forging and that could be repeatedly sharpened in the same way, would be almost ideal. This method would eliminate the uncertainty of heat treatment.

Just as in the case of a lathe or planer, the efficiency of a mining machine cannot be greater than that of the cutting tools with which it is armed. Excellence of mechanical design and construction is useless if the bits employed are composed of poor material or are wrongly shaped. The majority of mines might well pay more attention to the forming, sharpening and tempering of their bits than they do at present.



A Coal Miner's Home in the West

The best home in Rock Springs, Wyo., is owned by a Tyrolean miner, John Schlachter, who mines coal at Winton, a coal town nearby, operated by the Union Pacific Coal Co. Schlachter is a skillful stone cutter, mason and builder. Most of the stone work he did himself, using the castellated style so general in his home country. All the house needs is a little grass on its lawn, but to grow that in Rock Springs requires an infinitude of coaxing.

Coal mines & mining : *Safety* : *Rock dust* : *Rock-dusting machines* 809

Rock Dusting Reduces Danger and Lowers Compensation Rating

All Passages, Even to Rooms, Thoroughly Dusted—Machine Delivery Nozzles Oscillate, Effectively Coating Surfaces

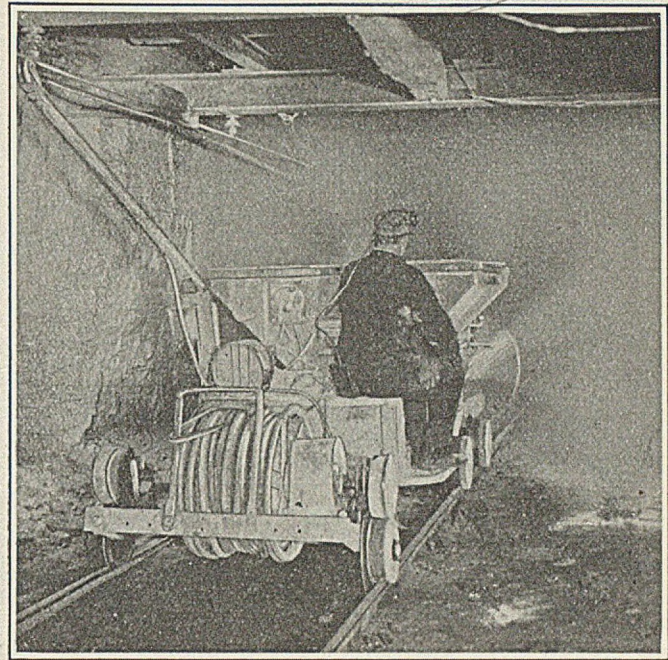
By **Alphonse F. Brosky**

Assistant Editor, *Coal Age*,
Pittsburgh, Pa.

IT IS PROBABLE that the Harmar mine of the Consumers Mining Co., a subsidiary of the Wheeling Steel Corporation, is as thoroughly rock dusted as any coal operation in the United States. This mine is located at Harmarville, Pa., a few miles from the city limits of Pittsburgh. It was the first coal operation in Pennsylvania to be completely treated with inert dust according to the judgment of the state Compensation Rating and Inspection Bureau, for the bureau granted to this company the first credit in compensation rating amounting to 10c. for rock dusting, at the same time removing the charge of 5c. against Item 85, pertaining to a dry and dusty mine.

Standing haulage entries were cleaned up before rock dust was applied for the first time. In the primary application 5.85 lb. of dust was spread per linear foot of entry. Rock dust is applied by hand to the top of all beam roof supports. As places (including rooms) are driven up, rock dust is periodically laid, each such extension reaching to the face. All return airways have been dusted by hand—two sacks or 160 lb. of dust being applied to every 25 lin.ft. These passages are further protected against the dangers of coal dust by a secondary defense consisting of 107 barriers installed

In the headpiece accompanying this article may be seen the Harmar mine duster in action. The operative is not enveloped in the cloud of dust produced but in his position on the rear of the machine breathes pure air while controlling the movements of the duster. Rocking nozzles direct the material discharged to the roof and ribs, effectively coating them.



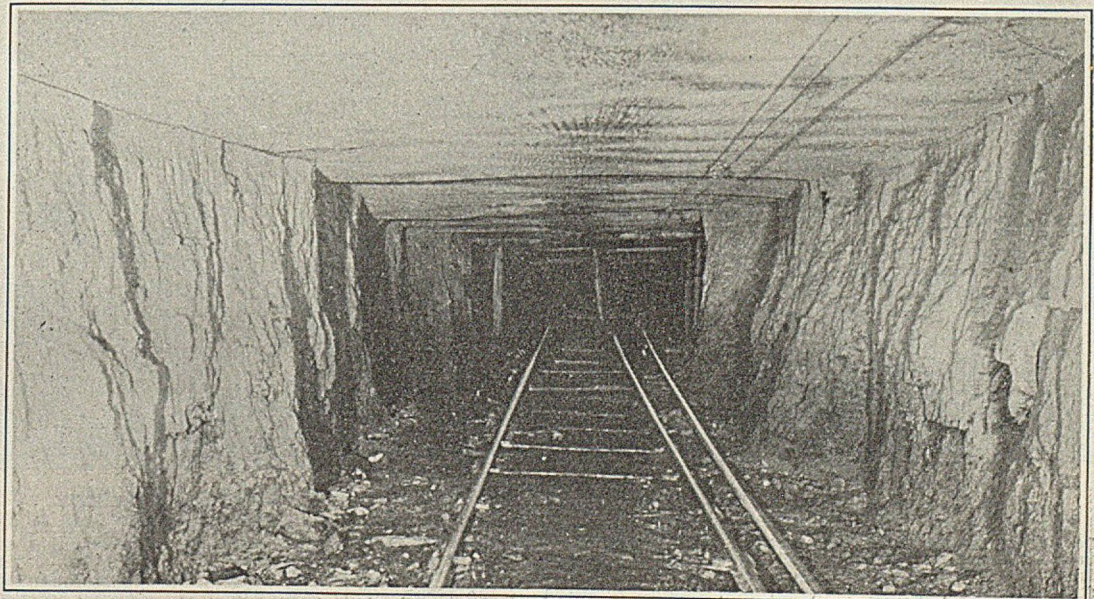
at intervals of 500 ft. Each barrier holds 640 lb. of dust. It is now the practice to rock dust by machine the back entries as they are advanced, before the track is torn out.

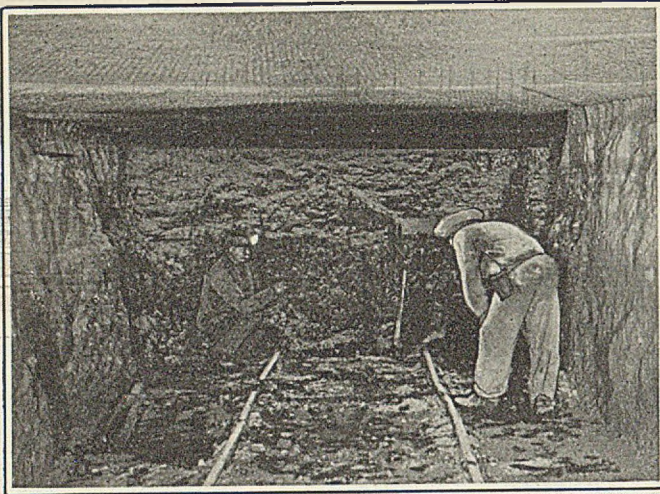
Thus far the company has applied 483 tons of rock dust to about 25 miles of entries and rooms. The practice was started Oct. 1, 1924, and the initial dusting was completed on Feb. 19, 1925. In that period of five months \$2,874.52 was spent for rock dusting and 185,901 tons of coal produced so that the cost of the initial treatment per ton of coal amounted to 1.54c. The expense of rock dusting extension and maintenance per ton at the present time is 0.9c. the dust being applied at the rate of 5.85 lb. per linear foot. The cost should be about 0.5c. per ton of coal under similar conditions if only 3 lb. of dust per linear foot were applied.

An application of 3 lb. of rock dust per linear foot of passage treated is not enough in the Thick Freeport bed. A 3-lb. coat is too deeply embedded in the cleats and crevices of the coal to be dislodged instantaneously into a cloud. This fact was determined experimentally by applying a jet of air under 80-lb. pressure first to a 3-lb. coat and then to a 5.85-lb. coat. The dust of

This Entry Is Well Dusted

Approximately 25 miles of entries have been treated with rock dust in this mine, which was the first to receive a reduced compensation rate by virtue of this protection. This entry is a main aircourse near the face. The smoothness of roof and the absence of timbers is an indication of topcutting. The cross-section of this entry appears "upside down," that is it is larger at the top than at the bottom. This is because of the top cutting. Ribs sloping inward will, naturally, gather more dust.





Rock-Dusted Face of an Entry

The face of this entry is only about 30 ft. in by of the last breakthrough, yet it is thoroughly rock dusted. Note how the topcutting makes a dangerous roof safe. The man on the left is the safety boss who is in the act of showing the miner where to drill his shot holes in the face.

the lighter coat was only partially stirred up by the air jet whereas that in the heavier application immediately formed into a dense cloud. The point is that a certain quantity of rock dust must be applied to smooth out the recesses in the coal. The filling-in dust is not nearly so effective as that which lies over it.

It is unwise to apply a second coat to an initial layer that is covered with coal dust, as on a shaft bottom. The coal dust will bind the two coats together only while the mine is dry. It forms a plane of weakness from which the second coat separates, falling to the floor, after the dust becomes moist. This was experienced in the Harmar mine. The initial coat should be removed by air or brushing, if necessary, before the fresh coat is applied.

Light, fine dust is not suitable for treating haulage roads. Such material will not stick securely to the ribs and roof and much of it travels with the air, to settle finally on the bottom, where it is picked up and swirled into a cloud by passing trips. But this dust is well-suited for back-entry use if its distribution by the mine air has any distinct value.

High-pressure dusting tends to produce a dense coat whereas low-pressure application results in a fluffy coat. This company prefers the latter, believing it to be the more easily blown into a cloud.

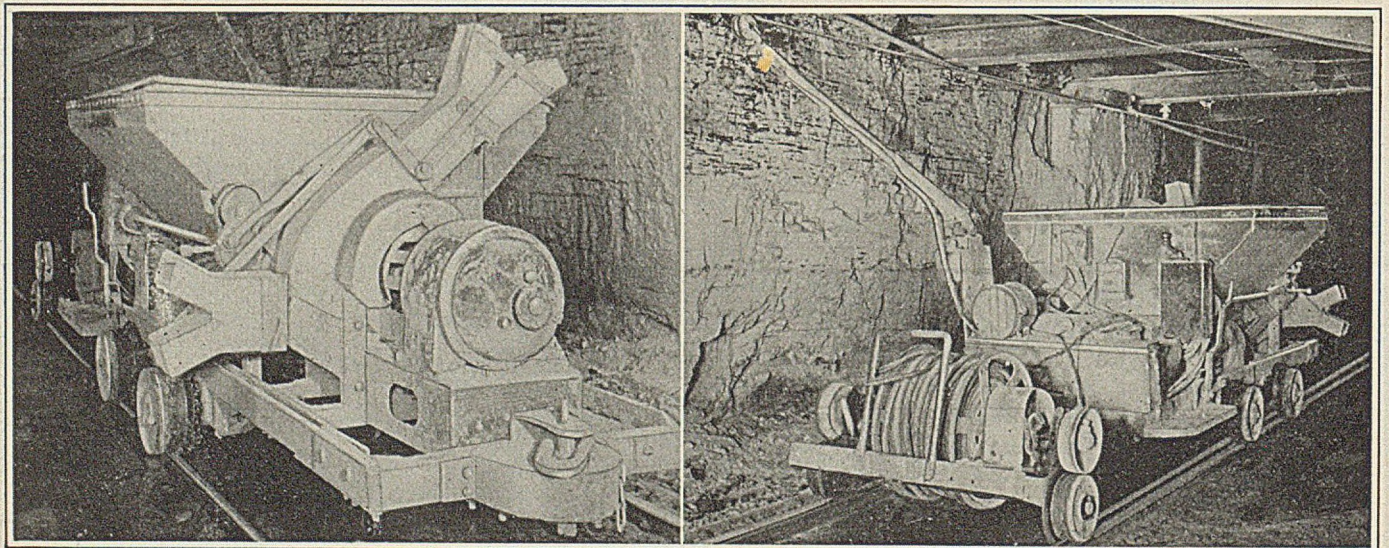
In mines where the roof is bad, as in the Harmar operation, shelf and even trough barriers are maintained in back entries only with difficulty and at high cost because of frequent falls of roof which dislodge these barriers.

Animal haulage is a big producer of coal dust. Until recently two horses were used for gathering in a small isolated section of the Harmar mine. The roadways were cleaned and then dusted. In a few days' time so much spillage from the mine cars was pulverized to such a degree, and so effectually mixed with the rock dust between the rails, as to make the two dusts appear as one. Even on the undisturbed rock dust in the clear a readily perceptible blanket of coal dust had settled.

High-silica dust and its ill effects on the human respiratory organs are almost as readily detected by the practical mining man as by the scientist in the laboratory. A high content of silica can be detected by the reflection of light from its particles. Workmen will complain about the effects of a high-silica dust without knowing that the content of that material in the dust inhaled is high. Further, a high-silica dust will not stick well to the mine surfaces but tends to drop to the floor. These manifestations were noted during the application of one lot of dust containing 7 per cent of silica. The Harmar mine uses a dust of a fineness such that all will pass through a 20-mesh and 75 per cent through a 200-mesh screen. It also must otherwise meet Bureau of Mines requirements.

A rock dusting machine has been developed at the Harmar mine, of the low-pressure type, which applies dust automatically to ribs and roof. One man controls the feed and speed of travel of this device from the rear end. He is in the clear of the dust cloud produced and is assisted by a helper.

A front view of this duster is shown in one of the accompanying illustrations. The overall height of the machine, as measured from the rail to the tips of rocking nozzles when these are in their highest position, is 52 in. The elevation of the top of the storage bin



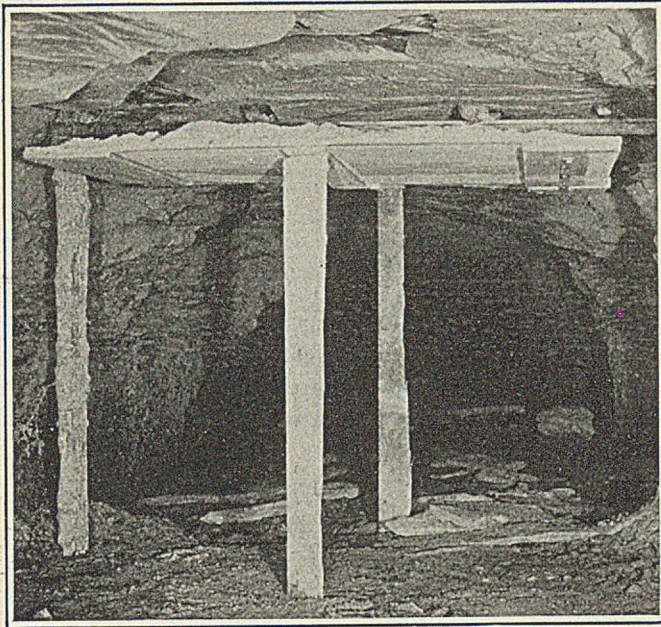
Fore and Aft on the Harmar Mine Dusting Machine

The front of duster with its rocking nozzles is at the left. Dust is fed into a two-compartment blower and discharged into the atmosphere through double or forked nozzles, which rock up and down

with the blower housing through an angle of 45 deg. The dust is thus effectively distributed to all of the mine surfaces.

The rear of duster showing cable reel is pictured at the right. This reel, which is

of the friction type coiling 500 ft. of No. 6 duplex cable, enables the machine to reach the faces of rooms and advancing entries. Speed of travel of this duster is controlled through resistance.



Double-Hinged Door Rock-Dust Barrier

In the back entries of the Harmar mine 107 barriers of the type here shown have been erected. Each of these has been charged with 640 lb. of rock dust. They are hard to maintain because of roof falls. Note the freshly fallen slabs of slate at the foot of this barrier.

above the rail is 45 in. This container has a capacity of 3,000 lb. of dust. It is covered with a wooden lid, not to prevent back pressure (for there is none) from disturbing the dust within it but to forestall damage to the feeder inside the bin in case of a roof fall.

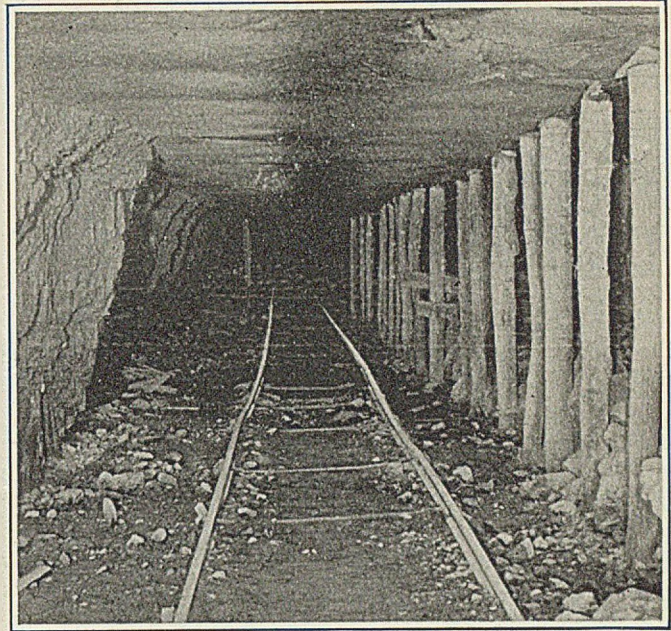
The feeder is a 4-in. screw which so revolves as to force dust into a blower. Above it rotates a shaft carrying projecting arms which serve to break any arching of dust above the screw. The dust is fed through a pipe into a two-compartment blower. This pipe is provided with two slot regulators, by the opening or closing of which the feed may be equalized between the two compartments. By the blower the dust is thoroughly mixed with the air and carried to two outlets, one on the right and the other on the left side of the fan housing.

Telescoping over and projecting from these two outlets are two branched ducts 135 deg. apart. Thus a split nozzle, in the shape of a Y is formed. The dust is applied to ribs and roof by a rocking motion of the blower housing and the attached double-outlet ducts, through an angular displacement of 45 deg.

The blower is direct-driven by a 5-hp., dustproof motor at a speed of 1,700 r.p.m. The fan and motor armature are mounted on a single shaft in a triple ball-bearing suspension, doing away with undue vibration and heating.

The rocking motion is imparted to the nozzles by a crank, connecting rod and rocker arm arrangement, as shown in one illustration. On the side of the hopper and parallel with its major axis is a shaft which is chain-driven from the screw-feed shaft. This drives a pair of gears on one of which is mounted a crank. A connecting rod joins this crank to the short arm of a bell crank pivoted at the knuckle. The long arm of this bell crank rocks the blower housing and nozzles back and forth through an arc of 45 deg.

The feed-screw shaft is driven by a chain from a 1-hp. dustproof motor. This shaft also carries a pinion engaging with a gear which drives the agitator.



A Rock-Dusted Room

Rooms as well as entries are dusted in the Harmar mine; in fact the management believes that the dusting of room and entry falls is more important than the treatment of entries themselves, for it is at these places that most explosions originate. The roof here shown is much better than the average found in this mine.

A 6-hp. motor propels this machine which will haul two or three cars of dust if desired. The drive is by a 6 to 1 reduction from the motor to a countershaft and by a 3 to 1 reduction from there to the axles of the truck. By resistance control this machine can be made to travel at speeds ranging from 6 miles to 660 ft. per hour. As may be seen in one of the accompanying illustrations a mining-machine type of friction-driven reel capable of holding 500 ft. of No. 6 duplex cable may be attached to the rear of this machine.

Two men in 8 hr. can apply 125 to 150 sacks (80 lb. each) of rock dust, including the time required for back-tracking and filling the hopper.

An Explanation

George R. Pratt, Alberta government fuel engineer, whose paper before the Canadian Mining Institute was abstracted for an article on page 700 of the Nov. 19 issue of *Coal Age* under the headline "Beating Anthracite Is Difficult in Winnipeg," feels that the article misinterpreted what he said. He has wired *Coal Age* this message: "What we have done to take the anthracite market in Winnipeg is common knowledge to Institute members, consequently it was not stressed in my paper. This led to your misconception as shown by the title. The intention of the paper was to show what must be done to stabilize the industry. Six years ago Winnipeg fuel was 90 per cent anthracite; three years ago 10 per cent. Now we ignore anthracite as a competitor. Alberta competition comes from soft coal from other sources."

There was no misconception of Mr. Pratt's intentions by the editors. Because so large a part of the United States is now trying to "beat anthracite" with soft coal—and with some success—only those parts of Mr. Pratt's paper which dwelt upon Alberta's experience in this regard were used. It is regretted that there was not space available for printing all of Mr. Pratt's paper.—Editor.

Million-Dollar Tunnel Puts Mine Nearer Seattle

Mile-Long Drift Under Cedar Mountain Gives Old Black Diamond Operation an Outlet Only 17 Miles from City for 2,000-Ton Output

THE LAST PIECE OR ROCK separating the ends of the Pacific Coast Coal Co.'s tunnel under Cedar Mountain was blasted through on Oct. 16, thus completing an underground passage over a mile in length through which coal from the new Black Diamond mine will be delivered to the tipple on the Pacific Coast R.R. Completion of this tunnel—the two ends met fairly—is an engineering feat of no mean importance. One end of this passage was driven from daylight while the other started in the mine workings on the other side of the mountain. Junction of the two sections was effected almost exactly midway between their starting points. The project cost a million dollars but it brings out coal much cheaper and in better condition than that from the company's older operation at Black Diamond while reducing the distance from the mine to Seattle from 33 miles to 17 miles.

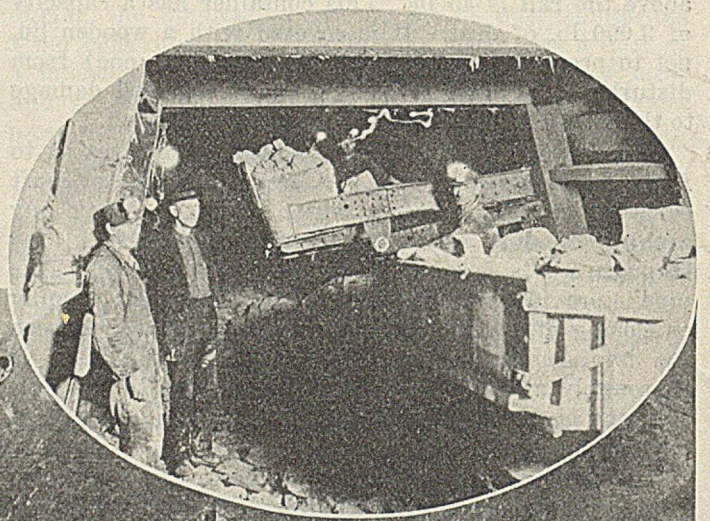
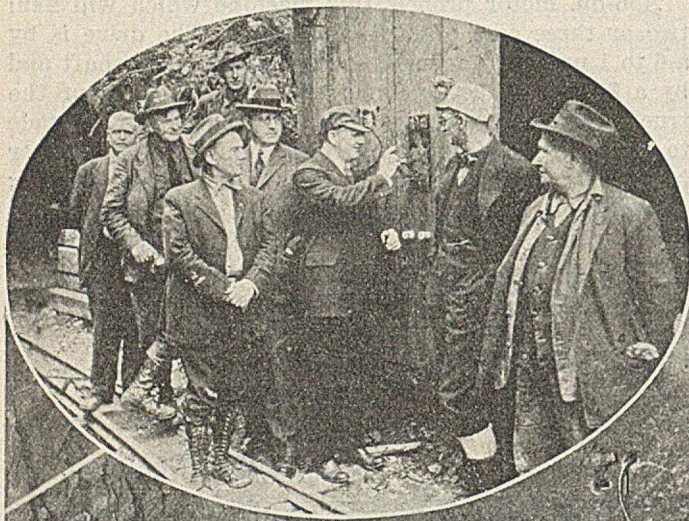
In the driving of this tunnel many formidable difficulties were encountered and overcome. Thus the course

of this passage lay through a fault of considerable width and displacement, also through the buried bed of an ancient river, now several hundred feet beneath the surface and filled with loose material and detritus. These difficulties, however, were all surmounted and the tunnel pushed to completion.

The new Black Diamond mine lies in the McKay coal bed. Its extent is such that it is calculated that 2,000 tons can be extracted each day for 50 years before the mine will be worked out. Modern equipment only is installed and although the delivery tunnel just completed was expensive it is estimated that the cost of coal from this mine will be much less than from others in its vicinity. Location of the tipple within 17 miles of the business center of Seattle, Wash., assures an excellent market.

EXPECT MORE LUMP

The coal produced will be of the same grade as that mined at the company's older Black Diamond operation, which will be worked out in the course of a few more years. A tipple and screening plant at the new opening is now under process of construction. It is believed that a much larger percentage of lump will be realized from the new mine than was obtained from the older one. This will be because of the lesser thickness of overburden above the new operation and the consequent



Bringing the Mine to the Tipple Cuts Cost of Coal

The large illustration shows the face of the last barrier, 9 ft. thick, the blasting down of which joined the two sections or ends of the tunnel under Cedar Mountain. The two sections of the underground passageway met almost exactly, thus completing a direct and unobstructed passage between the mine and the tipple on the opposite side of the mountain, and one

that will be entirely unaffected by weather. In the illustration in the upper left-hand corner N. D. Moore, vice-president of the Pacific Coast Coal Co., surrounded by other officials is shown throwing the switch that fired the loading in the last barrier of the tunnel. Although this barrier was half a mile away, it was completely shattered by the closure of this switch on the surface.

In the illustration in the upper right-hand corner is shown one of the little Hoar shovels cleaning up the remains of the last barrier and uniting the two halves of the haulage tunnel. In driving this passage these little shovels gave an excellent account of themselves and will now be put to work in loading coal cars in the mine proper, thus cheapening production.

lighter pressure to which the coal face is subjected. In the older mine neither undercutting nor explosives are necessary, the coal coming away from the face, sometimes with appreciable force, under slight action of the miner's pick. This condition is not conducive to a yield of large coal.

In the newer operation, on the other hand, both undercutting and explosives will be employed as the depth of cover encountered is only a fraction of that found in the older mine. A goodly percentage of lump can thus be obtained. The modern screening and preparation equipment installed on the new tippie will enable the company to take full advantage of this fact and market a product of excellent quality and grade.

In this operation modern methods and equipment will not be confined to the tippie and preparation plant. The mine itself will be electrically lighted, at least along the main gangways. Electric locomotives will be employed for haulage and revolving mechanical shovels will be used in loading out the coal. Machines of this kind gave an excellent account of themselves in mucking operations in the tunnel.

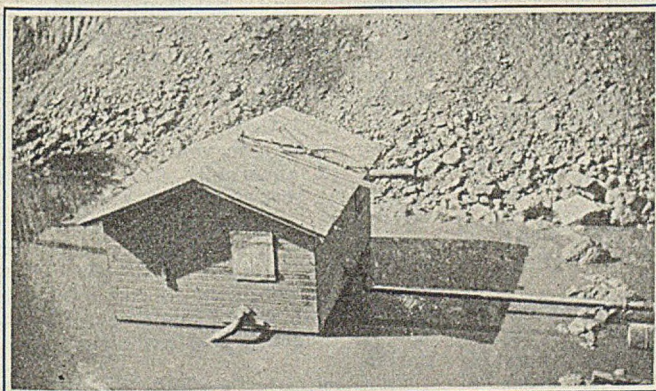
Mine pumping

Floating Pump Scow Quickly Drains Surface Pit

Equipment Assembled with Small Cost Put in Operation in Minnesota Mine—Easily Moved About by Big Pit Shovel

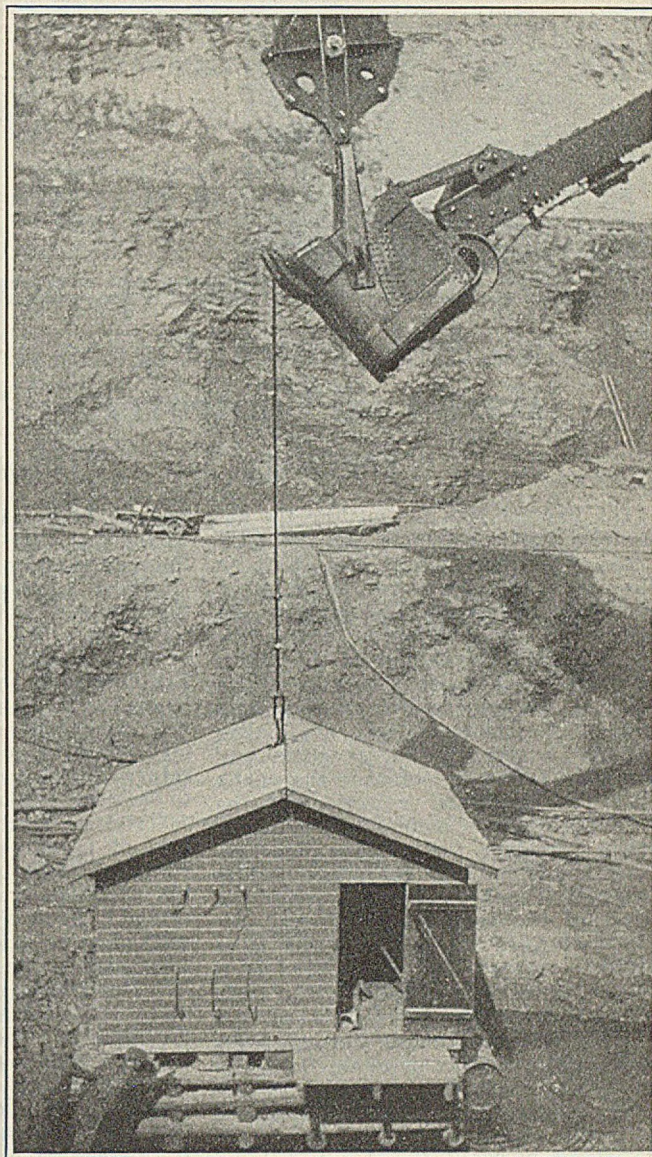
Same as 017p (2nd)

An inexpensive equipment to keep an open pit free from water and to prevent any danger of submerging the pumping equipment, says L. C. Moore in *Engineering and Mining Journal-Press*, was designed and put into service at the Boeing mine, Hibbing, Minn. Eight-inch poles, 16 ft. long, were used in the construction of a square crib, openings being left to fit 50-gal. empty, steel oil barrels. Thirty-four barrels were placed in the cribbing and fourteen additional barrels were lashed to the sides with discarded $\frac{3}{4}$ -in. steel cable. Timbers 8x16 in. in section were bolted on top to support the pumps, and a pump house, built in sections, was set on the top of the scow thus formed. Two 1,000-g.p.m. centrifugal pumps, 175-ft. and 350-ft. head respectively were available and were placed on the scow. A 2,300-volt, three-conductor, steel-armored power cable connected the pump motors to the transmission line.



Pumping Station Afloat in the Pit

The discharge piping from this station was provided with swing joints permitting a variation of several feet in the pumping level. When the pit became flooded from a cloudburst this station pumped the water out in a few hours and stranded itself.



Swinging Pump House Into Place

Sectional construction was employed in building the pump house and the raft or scow upon which it rests is of what might be termed a "semi-knockdown" type, that is, when not in use the various pieces may be separated and stored or put into other service. The whole plant can be moved about in the pit by the stripping shovel.

As the pumps operated under a head of only 30 ft., a gate valve on the discharge line was necessary to prevent overloading the motors. The discharge line was provided with swing joints admitting of a variation of 12 ft. in the elevation of the scow. The complete outfit weighed eight tons. It was built upon a flat car and was shifted by means of the 350-ton shovel used in the pit. Four $\frac{3}{4}$ -in. cables were attached to the corners and connected to a clevis at the center. A short wire rope sling was attached, the other end being looped over the bucket teeth.

The equipment was tested out in August when a small cloudburst filled the pit sufficiently to float the scow. The shovel trucks were submerged but in seven hours the water was out and the shovel at work. The outfit, as designed, can be dismantled readily, the equipment and sectional pump house can be used separately and the oil barrels after cleaning and painting are ready for further service. The timber employed in the construction of the scow had been discarded and was of little value.



News Of the Industry

Pinchot Still Central Figure in Hard-Coal Controversy; Operators Declare for "Stronger Union"

at strike 1925

The Pinchot plan for settling the anthracite strike, submitted by the Governor of Pennsylvania at Harrisburg on Nov. 28, is still the storm center in the hard-coal situation. The business interests of the anthracite region who tried to stop the calling of the strike of Sept. 1 are again active in efforts to bring the miners and the operators together. Union officials are ballyhooing for the Pinchot program and are endeavoring to persuade the public that the operators' rejection of the Governor's eleven points—one of which (that providing for an immediate resumption of mining) the union leaders themselves kicked into the discard—is proof of the employers' contempt for the consumers' necessities. The mine owners, on the other hand, have been busy reiterating the reasons for their position and, as the details of the Pinchot program become better understood, public opinion is again lining up behind the operators.

That the rejection of the Governor's proposals has closed the door to negotiations was vigorously denied by Major W. W. Inglis, spokesman for the producers. On the contrary, he asserted, the Pinchot plan had been turned down because it did not promise permanent peace and justice. The cry of the miners that the operators were leagued together in a conspiracy to wreck the union was met with the statement that the employers would like to see an even stronger labor organization than the one now functioning.

Operators Are Receptive

"The door has not been closed to negotiations," said Major Inglis. "Quite the contrary. We are anxious to secure a real and lasting peace, and negotiations to that end cannot be begun too quickly. The difficulty with the Pinchot proposals is that they do not pave the way even for peace, much less a lasting one.

"As to arbitration, we are willing to accept any plan or scheme that will provide for reasonable, fair and impartial determination of the conditions and make awards in accordance with such determination. Governor Pinchot has not proposed arbitration. What he proposed is to be the index to wages and prices for five years. No person knows what changes will come in that time and no sane business man will make a contract that he is not certain

he can keep. The contract proposed would in the end be bad for all and for the men most of all.

"There is no desire on the part of the operators to break down or weaken the union. We want a strong union, even a stronger one than we now have. The trouble is the union is not strong enough. It is strong politically but not constructively. Absolutely the last thing we would wish would be a return to the conditions existing prior to the coming of the union."

Governor Pinchot accused the operators of rejecting peace for industrial war, but still expressed the hope that his program eventually would be accepted. Something of this last hope seemed to be in the minds of the scale committee of the miners as its members left Harrisburg. President Lewis, who seized upon the new deadlock as an opportunity to revisit his family, was less bellicose than usual in his condemnation of his opponents. "The fight is now between the public and the operators," was his statement before departing for Springfield, Ill.

Father Curran Still Active

Other figures in the controversy were less restrained in their comments. Thomas Kennedy, international secretary-treasurer of the United Mine Workers, declared that the operators "have now come out in the open and are out to smash the union and to force wage reductions." Father Curran, of Wilkes-Barre, again criticized the attitude of the operators, but renewed his efforts to win acceptance to his proposal for a 5-per cent increase and a modified check-off. Some of the local unions in the region, particularly in District No. 1, demanded that the maintenance men be withdrawn in reprisal for the operators' refusal to accept the Pinchot terms. Certain workers in the southern end of the field also took a similar stand, but the higher officials of the organization have declined to sanction the demand.

First reactions to the operators' rejection among the men were favorable to the union. Morale was strengthened. Underneath, however, were signs of growing dissatisfaction with the continued suspension and despair over shattered hopes. Observers in the region noted a more intensive program of economy, the disappearance of the holiday spirit with which the strike was

welcomed. The movies so far have survived the general depression, but merchants in the region are gloomy because of the marked curtailment in buying and the outlook for a slim Christmas business.

These unfavorable prospects spurred the business interests of the anthracite region to fresh efforts to effect a resumption of mining. The Chambers of Commerce of Scranton, Wilkes-Barre and Hazleton took the lead in this movement. The Pinchot program, reported to have had their indorsement at the time it was submitted to the operators, was scored and the report of indorsement repudiated. Commercial interests denounced the program as a political maneuver designed to further the Senatorial aspirations of the Governor. The immediate upshot of this "rebellion" against political interference was the invitation of the Governor to the business leaders to confer with him in Harrisburg on Tuesday of this week.

Round-Robin Advises Industry

Establishment of a "continuing joint agency" to study the underlying "economic and technical facts" of the industry was offered as the only permanent solution of the troubles besetting anthracite, in a round-robin to Major Inglis and Mr. Lewis signed by forty-one engineers and economists at a meeting in New York on Dec. 4. The signatories, including a number of well-known college professors and past presidents of engineering societies, declared their belief that no agreement will insure continuity of production and distribution in the future which did not set up the agency suggested.

"Observation and experience convince us," asserted the forty-one, "that joint effort on the part of management and workers in improving methods of production and distribution can increase wages and lift and stabilize earnings at the same time that they lower the price to the consumer. The constructive results of such joint effort would, we believe, be of far larger importance both to you and to the consumers of anthracite than the mere temporary settlement of symptomatic grievances. We submit that the present price of anthracite and the recurring interruptions to its production constitute a challenge to you jointly to grapple with these fundamental problems of economic and technical organization."

"We entirely agree," replied the Anthracite Operators' Conference on Dec. 7, "that so far as our industry is concerned, the need is for 'constructive consideration of the underlying economic and technical facts by which all questions of wages, working conditions

and earnings must, in the end, be determined.'

"The basis of consideration you propose, namely, one of facts, and which will take into account all economic, industrial and commercial factors, has our hearty assent. The ideas you express are upheld by the findings of the U. S. Coal Commission which said in effect that what was needed was more dependence on facts and less on force. It is for the maintenance of this principle that we have been contending from the beginning of the present dispute."

Although on the surface operators and miners are still far apart on the key issue of arbitration, there are some who privately take a more optimistic view of the situation than they are willing to acknowledge publicly. They feel that the men themselves are anxious to get back to work and that the union leaders would like to find a way out of a tight corner. In support of this view they point out that the union in its dubious acceptance of the Pinchot program agreed to a limited arbitration of wage issues despite earlier fulminations against anything smacking of such determination. They are confident that the more the public comes to understand that the operators are willing to submit the whole dispute to unrestricted arbitration, the less the union will be able to resist the pressure for settlement.

The greatest danger spot is Congress. Senator Borah undoubtedly will lean upon the anthracite strike to support his plea for favorable consideration of his legislative program on coal. Senator Oddie may be expected to do likewise. Radicals like Representative Berger of Wisconsin will see in the situation an opportunity to press their doctrines; other members of Congress who are disposed to make political capital out of the suspension will not be silent.

Jersey Names Coal Board

A coal commission of twelve members was appointed last week by the New Jersey State Chamber of Commerce to act to protect the fuel requirements of the state under the conditions created by the anthracite strike. The members of the commission are:

James Wilson, Paterson (chairman), vice-president, State Chamber of Commerce, Paterson Coal Dealers' Association; James C. Tattersall, Trenton, director, National Retail Coal Merchants' Association; C. B. Ace, Hoboken, president, Hudson Coal Credit Association; Richard McAllister, Jr., Camden, representing coal dealers in southern New Jersey; A. E. Broadbent, Newark, acting secretary, New Jersey Coal Dealers' Association; F. C. Conkey, Elizabeth, acting secretary, Central New Jersey Coal Exchange; J. J. Mantell, vice-president, Erie R.R.; R. M. White, superintendent, Delaware, Lackawanna & Western R.R.; C. H. Stine, general manager, Central R.R. of New Jersey; F. H. Moser, coal freight agent, Lehigh Valley R.R.; Frank A. Keys, coal freight agent, Baltimore & Ohio R.R., and J. W. Warwick, special operating agent, Pennsylvania R.R.

Act on Commission Report to Meet Emergencies, Says Coolidge

In his message to Congress, delivered at Washington Dec. 8, President Coolidge made the following comment and recommendations in regard to coal:

"The perennial conflict in the coal industry is still going on to the great detriment of the wage earners, the owners, and especially to the public. With deposits of coal in this country capable of supplying its needs for hundreds of years, inability to manage and control this great resource for the benefit of all concerned is very close to a national economic failure. It has been the subject of repeated investigation and reiterated recommendation. Yet the industry seems never to have accepted modern methods of adjusting differences between employers and employees. The industry could serve the public much better and become subject to a much more effective method of control if regional consolidations and more freedom in the

formation of marketing associations, under the supervision of the Department of Commerce, were permitted.

"At the present time the national government has little or no authority to deal with this vital necessity of the life of the country. It has permitted itself to remain so powerless that its only attitude must be humble supplication. Authority should be lodged with the President and the departments of Commerce and Labor, giving them power to deal with an emergency. They should be able to appoint temporary boards with authority to call for witnesses and documents, conciliate differences, encourage arbitration, and in case of threatened scarcity exercise control over distribution. Making the facts public under these circumstances through a statement from an authoritative source would be of great public benefit. The report of the last coal commission should be brought forward, reconsidered, and acted upon."

Says Real Secret of Safety Is Co-operation

Phil Penna, secretary of the Indiana Coal Operators' Association, expressed the predominating thought of the safety conference called recently by the Indiana mining board when at the end of the meeting he said: "The sooner operators and miners forget politics and their differences and go into co-operative efforts in safety promotion the better for all of us. If safety precautions and safe practices cannot be enforced by co-operation, it can't be done."

More than a score of delegates representing coal mine operators, miners, insurance companies, the state department and the U. S. Bureau of Mines attended the meeting. William Johnson, president of the state mining board, presided at the conference.

Francis Feehan, mine safety commissioner of the U. S. Bureau of Mines, explained what had been accomplished along safety promotion as a result of co-operation in several districts around Pittsburgh. He said some states had laws regulating the miners in taking proper precautionary measures for their own safety that he would recommend for Indiana. He explained the suspension system now employed in some fields. He also said that Indiana mines were violating one of the most necessary precautionary measures in continuing to use the open-flame lamp instead of the electric torch.

J. H. Gritner of Illinois, representing the Associated Insurance Companies, in summing up the results of the conference, said it was evident that co-operation was the fundamental need, that there was an obvious need for law revision in Indiana and that supervision should be clothed with the authority to inflicting penalties.

Court Remands Utah Land Case to Trial

Carbon County, Utah, has been adjudged not implicated in the proceedings brought by the government to recover title to coal deposits assigned to individuals through alleged fraudulent means. The decision was rendered by the U. S. Court of Appeals sitting at St. Louis. The Carbon County Land Co. made use of the state as a mere conduit through which the lands were fraudulently acquired, the court decided. It is believed that the case will go to the U. S. Supreme Court for final decision.

The federal government brought suit to try to disprove title of the Carbon County Land Co. and the Independent Coal & Coke Co., and the defendant moved for a non-suit on the ground that the government was barred by the statute of limitations. Federal Judge Johnson upheld the plea for a non-suit, and the Circuit Court of Appeals has now reversed his decision, remanding the case for trial and requiring the defendants to answer. It is said that the importance of the case is found in Utah's fight against the federal government's policy of centralizing power and depriving the state of valuable land granted under the enabling act. The land grants were selected by the state between 1900 and 1904 and were classified at that time as non-mineral. The classification was based on the ruling of the Interior Department which was to the effect that no coal land was mineral in character unless coal in commercial quantities was exposed in each 40-acre tract. This classification is alleged to have been approved by the Secretary of the Interior.

Hard-Coal Control in Borah Bill Opposed by New York Business Men

Opposition to government control of anthracite such as Senator Borah is expected to propose at the present session of Congress was registered Dec. 3 by the New York State Chamber of Commerce at a monthly meeting in New York. This action was taken without discussion, beyond a few remarks by former Senator Calder, who wished that the Chamber would propose something constructive looking toward the correction of coal ills instead of merely opposing legislation. Senator Calder, however, is against the Borah bill.

The Chamber's committee on internal trade and improvements, in its report, summarized the Borah bill—as it was once before prepared—and the arguments against it thus:

The Borah bill creates an anthracite coal division of the Interstate Commerce Commission. Its many provisions comprise 633 lines, indicating the great details into which it goes and the endless amount of interference with the anthracite industry.

We consider this measure one of the most dangerous ever introduced into Congress. It goes farther toward putting the government into business than anything heretofore attempted. It not only declared "the production and distribution of anthracite coal are services indispensable to the health, comfort and welfare of the people of the United States," which is not true, but it proceeds to convict everyone connected with the industry through its assertion that these services "are subject to exorbitant charges and arbitrary control."

This measure not only gives the division of the Interstate Commerce Commission which it creates the right to investigate the ownership and title of the mines, but also "the persons connected with the anthracite coal industry directly and indirectly." The opportunities under this inquisition probably are without precedent in this country. It gives the Commission power to compel persons engaged in commerce in anthracite coal to secure licenses from it and to suspend or revoke such licenses. In other words, it may say just who shall and who shall not engage in the coal business. It is to prescribe standards of weight, size and purity of anthracite and has even the power to issue mandatory orders with regard to the rents and royalties paid by operators and the prices for which coal is to be sold.

A point which requires special emphasis is that which authorizes the coal commission to serve as part of the main Interstate Commerce Commission in the hearing and determination of all cases involving anthracite freight rates, car distribution to anthracite mines and regulations of carriers affecting the anthracite coal industry.

Opposes Super-Regulation

Under this provision, the coal product of only eight counties in the State of Pennsylvania would be singled out for a closer measure of government scrutiny and interference than any other industry in the country. The railroads which serve this industry would have imposed upon them a super-regulation far in excess of that of carriers which do not handle anthracite as a major part of their traffic. This super-regulation would compel the affected railroads to make a volume of special reports, as the Commission may require, regarding their "organization, business, conduct, practices, management and relations to other persons."

Obviously the adoption of any legislation of the sort proposed must necessarily serve to make a continuance of the anthracite industry even more difficult than it has been made as a result of the frequent strikes of the miners.

At the same time it is not desirable that new regulations be imposed on the railroads. Such a step could very easily break down once more the credit they have so laboriously built up since the government's experiment in operating them during the war.

The anthracite labor situation is complicated by the miners' license law, which makes it unlawful for any miner, no matter



William H. Woodin
P. & A. Photos

Elected president of the American Locomotive Co. last week. He also will retain his position as president of the American Car & Foundry Co., with which he has been identified since its inception, in 1899. He was Fuel Administrator of New York State during the latter part of 1922, following the general coal strike.

what his experience or competence, to work as such in Pennsylvania unless he has been employed in that state for at least two years as an anthracite miner's helper, and has been granted a certificate by a state board of examiners composed of practical miners. Many important business interests in the State of Pennsylvania believe this law is unreasonable and discriminatory. It has had much to do with the serious trouble with which the anthracite industry has suffered since its passage in 1897.

Your committee on internal trade and improvements believes there is no more reason for congressional action looking to the regulation of the production and sale of anthracite coal than for similar legislation as to copper, wool, oil, wheat, sugar, or any other staple commodity.

Mines Co-operate to Fight Oil Competition

A unique plan has been worked out by coal mining companies of western Washington to combat the competition of fuel oil, particularly in heating dwellings. The Pacific Coast Coal Co., Seattle; Bellingham Coal Co., Bellingham, and Wilkeson Coal & Coke Co., Wilkeson, have formed a corporation known as the Automatic Coal Burner Co., of Seattle, and through this agency are marketing a new type of automatic coal stoker, which has been installed by apartment-house and dwelling owners to replace fuel-oil systems, and greater efficiency is claimed for the new device.

The new automatic coal stoker consists of a hopper, which is filled with sufficient fine coal for a day's requirements, and a motor with a screw drive which feeds the fuel into the firebox under thermostatic control. The owner sets the thermostat and the stoker automatically keeps the heat within two degrees of the temperature indicated. Besides utilizing a cheap grade of fuel, less coal is used and there is no loss in handling or storage. The most outstanding advantage pointed out by the users of the device is elimination of the explosion hazard attendant upon using automatically controlled fuel-oil burners.

Vandalism Renewed in W. Va. Strike Zone; Union Builds Barracks

Violence broke out in the northern West Virginia coal fields again last week, when vandals tried to burn down the wagon-mine tippie of W. F. Shafer early Dec. 3 at Brummage mine, near the city limits of Fairmont. The tippie, which is small, was saved from ruin by the city fire department.

Three alleged union miners tried, Dec. 1, in the Harrison County Criminal Court at Clarksburg for burning down the tippie of the Consolidation Coal Co. at mine No. 55, at Meadowbrook, Harrison County, on Aug. 29, were acquitted.

The Consolidation Coal Co. has 200 or more miners at work in the Monongah mine and substantial progress is being made at the three mines of the company at Wyatt.

Coal production at non-union mines in the 12½ counties of northern West Virginia totaled 7,185 cars in the first four days of last week compared to 5,887 cars for the corresponding period of the previous week, which was low because of the observance of Thanksgiving Day. Union mines in the first four days of last week loaded 1,173 cars of coal compared to 886 cars in the corresponding period of the previous week.

On an average 220 non-union mines were at work in the region during the first four days of last week. Fourteen union mines worked daily on the average in the region in the same period. The largest number to work was 16, on Nov. 30 and Dec. 1. Since then the two union mines on the Monongah Division, B. & O., have closed down.

Officials of the United Mine Workers said early last week that they will be obliged to care for 1,400 families of striking union miners by Feb. 1, due to evictions which various coal companies will exercise. The work of erecting additional barracks was well under way last week.

It is reported that approximately \$100,000 a month is being spent in the Fairmont field for relief at present.

65 per Cent of Bay State's Hard Coal Needs In

Stocks of domestic anthracite in dealers' yards in the State of Massachusetts on Nov. 1, 1925, according to the Special Commission on the Necessaries of Life, totaled 336,908 net tons. As stocks on hand April 1 were 725,558 tons and receipts from April 1 to Oct. 31 inclusive were 2,952,744 tons a total of 3,678,332 tons has been available for distribution, or approximately 72 per cent of the state's coal-year requirements based on deliveries between April 1, 1924, and March 31, 1925. Deliveries to consumers for the seven months April to October inclusive were 3,341,424 net tons, or 65 per cent of the year's requirements. Stocks in the metropolitan Boston district on Nov. 1 were 142,097 net tons; deliveries, April to October inclusive, 1,335,990 tons; deliveries, coal year, 1924-25, 2,053,630 tons.

Crisis in Hard-Coal Strike at Hand, Washington Sees Lasting Settlement Or Makeshift Peace in Public Hands

By Paul Wooton

Washington Correspondent of *Coal Age*

Whether this anthracite strike settles anything or whether it is to be just one more patchwork compromise is largely in the hands of the public now. The critical period of the struggle seems to have arrived. If the public sustains the anthracite operators in their refusal to have any of Governor Pinchot's tinkering, the suffering they have undergone thus far will not have been in vain, many think.

The hard-coal producers have done all they can do. They are holding fast for the principle of arbitration. They have nailed their colors to the mast, but public support is necessary or they will be torn down and a settlement that does not settle will be forced. If the public allows itself to be deceived by Mr. Lewis' claim that the miners are for peace while the operators have declared for a continuance of war, the odds may be swung against the operators and there will be another evasion of fundamental issues that will not do down.

Two things are demanded of the public at this time if it wishes to avoid frequent recurrence of the experiences of the past three months. One of these things is to continue to accept cheerfully the inconvenience of substitutes. All that is necessary is for anthracite consumers in other states to emulate the example of the New England Yankees, who have pointed the way to independence from biennial coal strikes. They believe the sacrifice of convenience is not too much to pay for the cure of an ill that has become a running sore on the body politic.

Stack Cards Against Operators

The other thing which the public may do to protect its own best interest in this situation, competent observers assert, is to take care to distinguish between camouflage and reality. Governor Pinchot and Mr. Lewis have camouflaged compromise and are parading it as arbitration. What they really are offering is a stacked deck of cards—stacked against the public and against the operators in favor of the mine workers. The results of the brand of alleged arbitration which they are sponsoring can favor only one party to the controversy. The need of economy and increased efficiency is stressed, but the sole beneficiaries are to be the miners. If the impartial tribunal discovers that profits are needlessly large or if it finds a way of cutting costs, the entire surplus, the whole saving, is to go to wages. That the operators rejected such a clumsy semblance of arbitration causes no surprise in Washington.

Real arbitration, it is pointed out, does not prejudge the verdict. By agreement arbitration may limit the subject to be considered but would not direct arbitrators to find for one side.

The great need of the hour, public-spirited observers say, is that the public recognize the spurious character of the Pinchot settlement.

Some newspapers are condemning the operators for prolonging the strike. It is notable, however, that such a reaction comes largely from newspapers that frequently express half-baked and superficial editorial opinions or from newspapers that are notoriously demagogic. The well-informed and profound thinkers among the editorial writers will be found supporting the position of the operators.

The real need of the situation would appear to be, however, a mandate from the consumers of anthracite that no settlement be accepted until there shall have been written into the terms of the contract a provision for keeping the mines in operation during negotiations and for the submission to arbitration of all points on which agreement cannot be reached.

Glance Bay Living Conditions Worst Ever, Says Doctor

At the session of the Nova Scotia Coal Commission at Sydney, C. B., on Nov. 18 James B. McLachlan, former secretary-treasurer of district No. 26, United Mine Workers, and a prominent Communist, asserted that the object of the British Empire Steel Corporation in fixing wages was to make operations pay dividends on idle assets.

When the examination of McLachlan was continued on the 19th, he stated at some length his views on labor conditions and education. He said he believed that there would be no end to the unrest until the men had enough to live on and the fear of unemployment was removed. The Communist party, he said, had changed from a territorial body to a factory organization. Several miners testified as to unfavorable working conditions at Colliery No. 22, where men from Birch Grove and Port Morien were employed. Not enough working places were provided.

Dr. A. S. Kendall, county health officer, testifying Nov. 20, stated that the water supply was inadequate and the sewerage system defective. Many of the houses were unsanitary and some that had been recently built ought to be torn down. The provincial and municipal governments, he said, should join with the coal company to bring about more modern conditions.

Dr. McAvoy stated that he believed that living conditions on the average in Glance Bay were the worst of any place he had seen. The issue of the last strike was clearly defined as to whether the wages should be cut. Dr. D. J. Hartigan, of New Waterford, testified that sanitary conditions were not good, the open drains being a menace to public health.

Test Coming on Fines For Illegal Strikes

A strike of miners employed at No. 2 shaft of the Buffalo & Susquehanna Coal & Coke Co., at DuBois, Pa., promises to develop a case that will test the fining clauses of wage agreements. This company had imposed a fine of \$1 per day on miners for violating the agreement in striking and thus shutting down the mine. The fines amounted to approximately \$29 each on 400 miners.

The United Mine Workers had two men bring suit against the company for a refund of the money. The action was brought before a justice of the peace in Sandy township. The company did not appear and judgment was entered by default. The case will be appealed to the Clearfield County Court. The provision for the fine was first put into the wage agreement in 1917 by the U. S. Fuel Administration as a disciplinary measure to prevent outlaw strikes and this is the first time the United Mine Workers has resorted to legal action to resist the collection of such fines.

Mining Congress Studies Output and Distribution

Secretary of Labor James J. Davis, Secretary of Commerce Herbert Hoover, Federal Trade Commissioner William E. Humphreys, Representative Joe J. Manlove of Missouri, James Murdock, former Minister of Labor of Canada, and leading mining men from all parts of the United States were scheduled to discuss important questions affecting the production and distribution of mine products at the twenty-eighth annual convention of the American Mining Congress at the New Willard Hotel, Washington, Dec. 9, 10 and 11. The convention was to consider a national labor policy, mine taxation, joint selling agencies in the distribution of mine products and other important mining problems.

Among those who were to outline the requirements of the mining industry in the various mining districts of the country were M. L. Gould, of Indianapolis, Ind., president of the National Coal Association; S. D. Warriner, of the Lehigh Coal & Navigation Co., Philadelphia, and Harry N. Taylor, president of the United States Distributing Corporation, New York.

Russian Coal Output Lags Below 1913 Level

During the first nine months of 1925 the total production of coal in Russia was 16,107,000 tons. Of this quantity the Donetz district produced 12,328,000 tons; the Ural district, 1,300,000 tons; Siberia, 1,070,000 tons; the Far East, 700,000 tons; the Moscow district, 556,000 tons, and other districts, 153,000 tons. The output was 56.8 per cent of that of 1913.

Of 86,000 Killed Annually Less Than 2,400 Perish In Coal-Mine Accidents

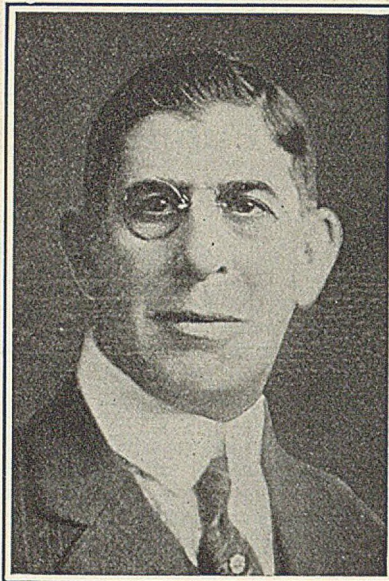
Eight times as many men are killed by automobiles as by all causes in coal mines, according to J. V. W. Reynders, president, American Institute of Mining & Metallurgical Engineers, at the joint safety conference in New York City which was fostered by the American Society of Safety Engineers—Engineering Section, National Safety Council and the four "parent" societies, the American Institute of Mining & Metallurgical Engineers, the American Society of Mechanical Engineers, the American Society of Civil Engineers and the American Institute of Electrical Engineers.

Mr. Reynders said that the dangers of coal mining had been greatly overestimated by the public. There were 18,000 fatalities yearly from automobiles and in 1924 only 2,381 fatalities in coal mines. The public, impressed by disasters that gave opportunity for sensational headlines, had become obsessed with the idea that the hazards of the coal industry were much greater than they actually are. So needful had it been to make sensational appeals to Congress in order to obtain funds that the training cars of the bureau had been named mine-rescue cars, though that was only a part of the work that such cars performed.

The death rate in the coal-mining industry figures out so that a 1,000-ton mine, which is quite a sizable operation, averages only about one fatality per year. Mr. Reynders, who is presiding officer of the Advisory Board to the Bureau of Mines, did not, however, regard this as any reason for curtailing the activity of the bureau in the work of safety. Ten cents per ton would not, he said, be an expenditure in the minds of most mining men too large for the promotion of safety in mines. That would be an appropriation of \$60,000,000. Instead the bureau receives barely 1c. for every ton mined. He considered the investment a most excellent one.

Annual Loss, \$2,390,000,000

Another interesting paper at that meeting was read by W. C. Dickerman, vice-president of the American Car & Foundry Co., New York City. Mr. Dickerman declared that there were 86,000 deaths from accidents annually and more than 2,000,000 persons were injured. He added that the loss due to accidents was \$2,390,000,000 annually. He said that his company had in 14 years spent about \$1,000,000 in safety and had saved thereby \$2,700,000. He mentioned a brick company whose accident costs were 18.3c. per thousand which had cut the cost to 5c. per thousand, and a construction company that had reduced its accidents 76 per cent. He recalled also the record of the United States Steel Corporation. It had spent \$9,700,000 in safety and saved \$14,500,000 thereby. He declared that safety work decreased turnover, bettered and increased product and improved morale. Harry Schulze, who spoke later, said that the United States Steel Corpora-



E. B. Jermyn

After a close and bitter contest, Mr. Jermyn was declared elected Mayor of Scranton, Pa., in a court opinion delivered Nov. 25 by Judge H. A. Fuller, who had been named by the state Supreme Court to act as umpire. Mr. Jermyn, who ran on the Republican ticket, won over his Democratic opponent, M. J. McHugh, at present Chief of Police, by the narrow margin of 109 votes. The Mayor-elect served as the city's chief executive from 1914 to 1918. He formerly owned the Langcliffe colliery, near Avoca, Pa., which he operated for a little more than a year.

tion had cut fatalities 61 per cent and accidents 79 per cent. However, the company regarded the economies of its safety work as the least of its returns. The satisfaction of reducing hazards was greater than any attained by reason of the economies effected.

Walter Rautenstrauch, professor, Columbia University, New York City, declared that ten fatalities occurred in the United States for every hour of the day and night and that, estimating the wages of industrial workers at \$40,000,000, the loss from accidents was 5 per cent of that sum.

E. A. Holbrook, dean of the School of Mines, Pennsylvania State College, State College, Pa., spoke in favor of the recognition by colleges of the importance of safety and stressed the greater activity shown by mining colleges in this needful portion of the curriculum.

S. D. Keller, professor of industrial management, of the same college, discussed the same subject and declared that only 5 per cent of all accidents were industrial, 25 per cent occurred in the home and 50 per cent occurred in public places, two-thirds of these last being traffic accidents.

Harold Seagrove gave a demonstration of the use of a mixture of 5 per cent carbon dioxide and 95 per cent oxygen in resuscitation, showing that with normal breathing, breathing induced by the prone-pressure method and breathing intensified by the aforementioned mixture the relative volumes of air expired were 0.41, 1.60 and 1.74 respectively.

The three sessions were presided over by Kingsley Martin, chairman, Metropolitan Section, A.S.M.E.; Robert Ridgeway, president, A.S.C.E., and Michael Pupin, president, A.I.E.E.

Alberta Coal Control Urged by Stutchbury At Canadian Institute

Remedies for some of the ills of the western Canada coal-producing regions were proposed by Howard Stutchbury, trade commissioner for the province of Alberta, at the seventh annual western meeting of the Canadian Institute of Mining and Metallurgy in Winnipeg, which was held Nov. 3, 4 and 5. The coal session of the convention occupied one day and was presided over by J. A. Richards, inspector of mines. Several addresses were made.

Mr. Stutchbury, in his paper, held out for a stronger anti-dumping law against foreign coals, urged lower freight rates on Alberta coal for the East and suggested a method of reducing the number of "gopher-hole" mines by commission control of all crown lands.

The problem of the "gopher hole" mine is a very serious one to the Alberta operators, being caused in the speaker's estimation by the present regulations affecting coal mining in that province. In 1924 there were 399 producing mines in Alberta, 322 of which produced only 5.66 per cent of the coal mined. Alberta is dotted with abandoned mines of this variety, said Mr. Stutchbury, and "in my belief, it would be in the interests of economy and conservation if many of these mines were consolidated."

A certain section of the coal operators felt that the suggestions were too drastic and would prevent proper prospecting and exploration work, and would entail a great hardship on certain small operators. Mr. Stutchbury refused to enter into any discussion on his paper, stating that the questions involved were too momentous to the coal trade generally to be lightly discussed and that the time was too short to even touch on the subjects.

George R. Pratt, Alberta government fuel engineer, of Winnipeg, read a paper on "The Winnipeg Market for Alberta Coal." In an interesting paper on "The Steam Coal Situation in Manitoba," George B. Saunders, manager of the Consumers Coal Co., declared that the Western mines producing steam coal will find a better market this year in Winnipeg than formerly because lower wage schedules have been signed by the mine workers and because the duty on slack coal coming in from the United States has been raised to 50c. per ton.

Southern Ry. Denied Permit for Kentucky Extension

The Interstate Commerce Commission has denied an application of the Southern Ry. for privilege to build 20 miles of road from one of its Virginia points into the Harlan County coal fields of southeastern Kentucky. It was held that the Louisville & Nashville R.R. is adequately serving the territory and that it has surveys and plans for extensions and lines connecting with the Carolina, Clinchfield & Ohio R.R., which are now pending before the Commission. Commissioner McChord dissented in the opinion.

Senator Oddie Reintroduces Coal Bill In Modified Form

Tasker L. Oddie, chairman of the Mines and Mining Committee of the Senate, has reintroduced his coal bill, with important changes.

The provisions for withholding cars from those who fail to report basic facts has been eliminated. The legislation has been divorced from the Department of Mines bill. The Bureau of Coal Economics which it proposes now is placed in the Department of Commerce. The bill also proposes the creation of an "under secretary of Commerce" who would be in immediate charge of a major subdivision of the department, under which all its mining activities would be concentrated.

The bill calls for the creation of advisory committees, one for the bituminous and one for the anthracite industry, who are to confer with the Secretary of Commerce to discuss plans for "storage of coal by the consumer; supply and distribution of coal in times of emergency; equitable adjustment of royalty rates; taxation policies; prevention of waste; improvements in underground management; removal of restrictions on output; the free introduction of machinery in the coal mines under safeguards that will protect the rights of employees; relief from irregular operation and overdevelopment; integration of the industry into larger productive units; improvements in the preparation of coal for market; the training of mining engineers and foremen; the prevention of accidents and compensation for the same; the improvement of housing, sanitation and living conditions in mining communities; improvements in the transporta-

tion of coal, including methods of mine rating and car distribution; elimination of needless cross hauls and long hauls, and bulk handling at yards, terminals and ports; improvement in marketing, including standardization of contracts, inspection and grading, wholesale methods, retail costs and methods, and co-operative marketing and buying; promotion of the export coal trade; standardization and simplification of accounts and reports; development of trade statistics; constructive activities of coal trade associations; economy in the use of fuel and power through better combustion, electrification and improvements in gas and coke manufacture; increase in available supplies of household fuel; improvement in labor relations, including reduction of absenteeism and labor turnover, personal management, improved machinery for the adjustment of grievances and the negotiations of wage agreements; and such other possible improvements in the methods and practices of the mining, transportation, distribution and use of coal as will foster the growth and prosperity of the industry and the welfare of the mine workers, and as will insure the public a steady supply of fuel at minimum prices."

The bill also provides for the inspection and grading of coal which, however, is to be on a voluntary basis. It provides for the adoption of an export certificate, if and when the producer desires that such a certificate be extended. It directs the Secretary of Commerce to formulate, with the advisory committees, a plan for distribution of coal during emergencies.

Attack Non-Union Miners at Pittsburgh Coal Co. Mine

Two negro miners were beaten severely, two deputy sheriffs were slightly injured and considerable excitement resulted at Library, Pa., Sunday, Dec. 6, when a mob believed to include members of the United Mine Workers and their wives attacked employees of the Pittsburgh Coal Co. The attack followed a mass meeting held by the union miners at Library, where the coal company is operating Montour No. 10 mine on the 1917 scale.

The tippie was stoned by the mob and the two deputies were injured by missiles. The negroes were attacked as they alighted from interurban street cars. One man was imprisoned in an automobile and carted from one point to another, being beaten at each stop.

The Pittsburgh Coal Co. set a new production record for the five mines working in western Pennsylvania under the 1917 scale in the week ended Dec. 5, when 19,755 tons of coal was produced. The amount loaded by each mine was Banning No. 2, Youghiogheny River, 6,378 tons; Banning No. 1, 4,503 tons; Midland mine, near Canonsburg, 5,300 tons; Montour No. 10, Library, 3,059 tons, and Mansfield mine, at Carnegie, 515 tons. The number of men at work by the end of the week was 1,040, a new maximum.

To Discuss Economic Branch Of Mine Bureau

An important meeting of the Bureau of Mines advisory committee will be held Dec. 12 in Washington. Final reports of the sub-committees will be submitted at that time and the organization of the new economic branch discussed. The broad outline of organization has been approved but much remains to be done in the way of subdivision and in the selection of personnel to head up the commodity sections. C. P. White, in addition to his duties as assistant director, will continue to direct the coal work, which is expected to absorb one-half of the appropriations that will be available for use in the economic branch.

It is expected that most of the commodity places can be filled from the present staff of the Bureau, but one requirement will be a first-hand knowledge of the industrial side of mineral commodities.

Brings Contempt Verdict For Stream Pollution

Seven coal companies and four individual operators were adjudged in contempt of court following a hearing in Fayette County (Pa.) Court Dec. 3 in the Indian Creek water case. The case resulted from an order in which the coal companies were directed to abate the pollution of water in Indian Creek from mine workings. The Rogers Coal Co., Warwick Coal Co., Mill Run Coal Co., Charles Rose, John W. Barger, trading as Rice & Watkins Coal Co., Laurel Run Coal Co., Indian Ridge Coal Co., Ralph Ritenour, Simon Snyder and the Wingrove Coal Co. were the parties haled to court.

Real Earnings of Contract Miners In Anthracite Fields

Are contract miners in the anthracite fields underpaid?

John L. Lewis, international president of the United Mine Workers, insists that they are. He has repeatedly drawn upon the reports of the Coal Commission, with their misleading figures basing earnings upon the number of starts made, to support his assertion. In a statement published in the Sept. 15 issue of the *United Mine Workers' Journal*, Mr. Lewis declared that the average was \$1,700 per year, from which "there must be deducted over \$200" for supplies.

Check of actual payrolls, however, tells a far different story.

For example, in 1924, the West End Coal Co. worked 292 days and employed 289 miners. Although full-time work was offered to all, only 174 men, or 60 per cent, worked regularly enough to appear on each of the 24 semi-monthly payrolls. Those that took full advantage of their opportunities earned over \$4,000 net and averaged less than

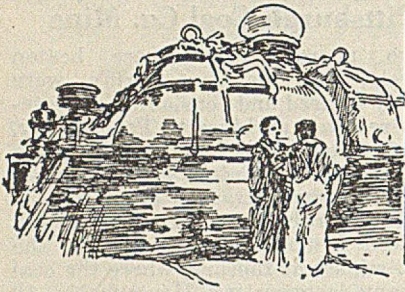
6½ hours per day. The average earnings by \$100 groups for the 174 were as follows:

Miners	Average Annual Earnings	Miners	Average Annual Earnings
12	\$4,161	12	2,561
1	3,445	11	2,448
5	3,358	8	2,334
5	3,241	18	2,255
4	3,160	12	2,165
6	3,034	9	2,037
10	2,969	12	1,957
9	2,853	11	1,846
13	2,754	1	1,733
13	2,674	3	1,680

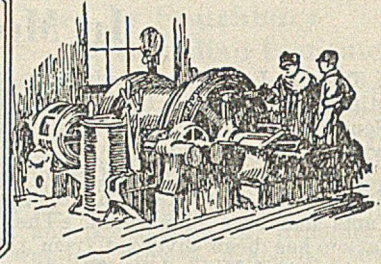
The average per man for the entire group was \$2,613. Over 50 per cent of the group earned more than \$2,500 per annum. Less than 16 per cent of the group received under \$2,000. Only 24 of the 174 worked every day the mine was in operation. The three men in the lowest rated group (\$1,680 per annum) worked only 249 days.

Unskilled labor in this colliery was paid 58c. per hour, as compared with rates of 25 to 45c. per hour in other industries.

Coal-miners
cont
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Practical Pointers For Electrical And Mechanical Men



Portable Cord Serving as Cable For Underground Power

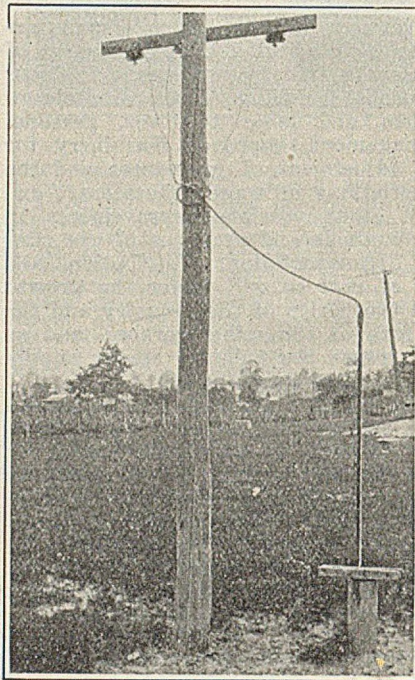
Coal cutters and loading machines used in Mine A of the Pike County Coal Corporation, Petersburg, Ind., are operated by 220-volt induction motors. The use of this type of motor requires that the voltage be held close to normal. This means that power must be taken into the mine at a voltage of 2,300 or more, and that the step-down transformers should be kept close to the motors.

It would be an expensive proposition to distribute the alternating-current energy from a centrally-located entrance, especially to motors which have no permanently-fixed location. At Mine A the 2,300-volt energy is distributed on pole lines along the surface and taken down through boreholes. The cover over the coal is fairly uniform in thickness, averaging about 100 ft. To this depth it is not expensive to drill a 6-in. borehole which is the size used for the 2,300-volt cables.

A feature of the borehole installations is the inexpensive electrical construction. This is indicated by the accompanying photograph. A No. 10 three-conductor rubber-sheathed cord is used. Each conductor is made up of 81 wires covered by a $\frac{1}{8}$ -in. wall of rubber. The outer sheath consists of $\frac{3}{8}$ in. of rubber and the overall diameter of the cord is approximately $\frac{3}{8}$ in. The weight is only about 35 lb. per 100 ft.

The cord is carried down through the borehole in a $\frac{3}{4}$ -in. iron conduit, which is supported at the top of the hole by a clamp resting on the end of the 6-in. borehole casing. The cord is so light in weight that it is supported by a firm wrapping of tape at the top of the conduit. A means of opening the circuit, and protection in case of trouble, is afforded by fused cutouts on the pole.

At the bottom of the borehole the $\frac{3}{4}$ -in. conduit and No. 10 cord both end at a junction box from which a



A Small Cable for a Big Job

This No. 10, three-conductor, rubber-sheathed cord, approximately $\frac{3}{8}$ in. in diameter, carries 2,300-volt energy through the borehole to a connected load of 195 hp., but shows no sign of overload.

standard 2,300-volt rubber cable extends to the transformers. The maximum distance that the transformers are allowed to be located from the borehole is approximately 1,300 ft. When the mine development gets beyond that limit, a new borehole is drilled. The transformers, three in number and each of 37.5-kva. capacity are mounted on a mine-car.

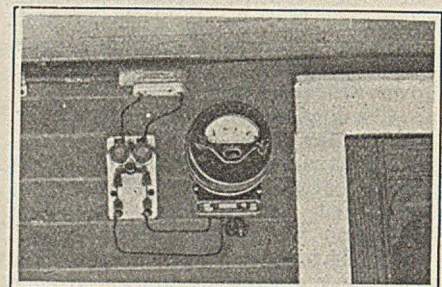
The connected load on each bank of transformers consists of a 125-hp. motor driving the hoist of a loading machine, a 15-hp. motor driving the dumping platform, a 5-hp. motor driving the car spotter, and a 50-hp. motor driving the mining machine. The fact that the mining machine is not used while the loading machine is in operation, and that the load is intermittent on the hoist, makes possible the use of the small conductor through the borehole.

300 Kw. Cut from Load by Metering Houses

When electric light lines to company-owned houses in coal towns are not metered it is the common practice to charge the house occupant 25c. per lamp per month and to maintain 24-hr. service. Most coal companies operating with this arrangement lose money on their house lighting. The plan also encourages the theft of headlight lamps and of other high-wattage lamps from the mines and company buildings. In certain instances there are other disadvantages of a flat rate. Metering usually is preferable. A specific case is that at the Stone division of the Fordson Coal Co. in Kentucky.

At Stone a reduction of 300 kw. in the power plant load resulted from the installation of meters in all houses and company buildings. This reduction was desirable because of the overloaded condition of the power plant equipment.

The accompanying photograph of a meter on the front of a miner's home at Hardy, Ky., is typical of all of those on the Fordson houses. Approximately 1,200 meters were installed at mines of the Stone division. The rate now charged is 8c. for the first 25 kw.-hr., and 5c. for all energy more than this amount. It is the intention to lower the rate to 5c. and 3c. as soon as certain improvements have been completed.



Meter on House at Hardy, Ky.

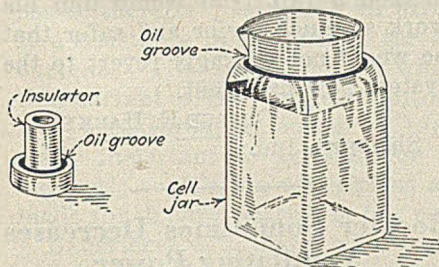
The meter is located on the porch close to the ceiling. This installation is typical of all of those on the Fordson houses. About 1,200 meters were installed at the Stone division.

in the power plant, for taking care of additional load.

The care and reading of the 1,200 meters takes about one half of one man's time. The cost of power used in company buildings such as commissaries, recreation halls, and club houses is charged each month against the respective departments. This practice encourages the turning out of unnecessary lights. The application of meters to double houses necessitated splitting of the wiring into two circuits. In most cases this practically meant that one side of the house had to be rewired.

Oil Ring Prevents Current Leakage from Cells

Anyone who has been in charge of mine electrical equipment is familiar with the leakage which invariably takes place from cells used for signaling. These cells usually are of either Leclanche or bichromate type. Mining conditions, especially below ground, are often damp and it is difficult to prevent leakage due



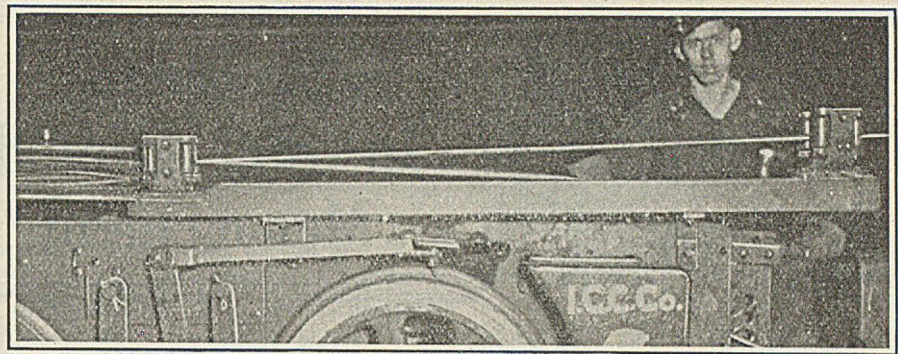
Oil Grooves Stop Leaks

A ring of oil formed by a recess in the insulator (left) prevents surface leakage to ground. Cell jars (right) can be made so that an oil groove around the neck stops current from passing down the side of the jar.

to the moisture-laden atmosphere causing a conducting surface over the cell jars and about the boxes in which they are placed.

ACID CAUSES LEAKAGE

Leakage is to some extent counteracted by a coating of shellac or paraffin placed around the necks of the cell jars during the process of manufacture. This, however, is not sufficient to prevent the acid creeping by capillary attraction down the outside of the cells to the box and setting up leakage which prematurely discharges the whole battery, causing increased maintenance costs and interfering with the efficient operation of the cells. This trouble is often aggravated by operators allowing water or acid to spill when the cells are being recharged.



These Cable Guides Are Safe

When they are not insulated the combination of a bad cable and a worn roller results in a short circuit close to the motorman's eyes. With the arrangement shown here there is little chance of the cable touching any part of the locomotive and becoming grounded. The guide unit can be changed by removing two bolts.

Much of this leakage can be overcome by dividing the cells into small groups placing each on a board supported on insulators. A better plan is to employ insulators provided with a groove for carrying a small quantity of heavy insulating oil or grease as shown at the left in the accompanying drawing. An alternative is to have the cell jars made with an oil groove just below the lip as shown at the right in the sketch. The advantage of this method is that each cell is provided with its own insulation ring, which effectively prevents creeping of acid, and insures protection against leakage.

L. FOKES.

England.

Grounds Are Reduced by Insulated Guides

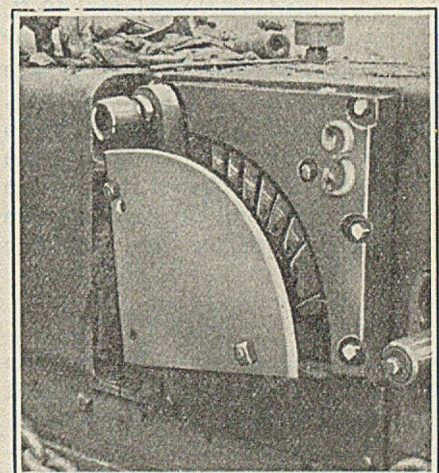
Several years ago the Island Creek Coal Co. found that it is worth while to insulate cable reels from the frame of the locomotives. A comparatively recent practice of the same order is that of insulating the cable guides. This not only reduces delays and repair costs, but also is a safety feature of importance.

In time, reel cable becomes frayed and likewise the wooden rollers of the guides wear or break, thus exposing the metal parts. When the body of the guide is not insulated from the locomotive frame, the combination of a bad cable and a worn roller will result in a ground which forms a short circuit from the trolley to the rail through the cable. The common result is a severed cable and an interruption of power to that section or to the whole mine by the opening of a circuit breaker. Far more serious results are injury to the motorman by the arc, and a wreck caused by his falling or jumping off the locomotive.

The method used at the Island

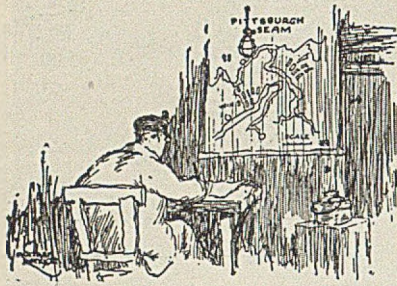
Creek mines to insulate the cable guide from the locomotive is shown in the accompanying illustration. The two guides are mounted at the ends of a piece of 3x4-in. oak plank, the use of which brings one guide beyond the end of the top of the locomotive. This, and the fact that the wood is continuous between the two guides minimizes the chance of the cable touching any of the grounded parts of the machine.

All of the gathering locomotives of the Island Creek company are equipped with wood supports. Extra mountings complete with cable guides are kept at each mine. The fact that but two bolts hold the support in place makes the changing of a guide unit an easy matter. The locomotive shown in the picture is one of the oldest in use at the Island Creek mines. It was purchased about 1910 and recently was entirely rebuilt; this included the renewal of all rivets, and it is again practically as good as new.

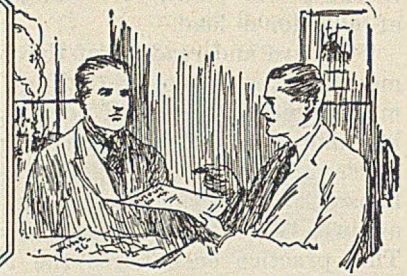


Controllers are Guarded

This electric undercutting machine, No. 3, was "snapped" while being repaired, at No. 8 mine, Stone, Ky. The old type of open controller, with which the machine is equipped, has been guarded by the addition of a sheet of 3-in. fibre, thus minimizing the chance of burns or shock.



Problems In Underground Management



"Slab System" Increases Percentage of Lump and Lessens Labor

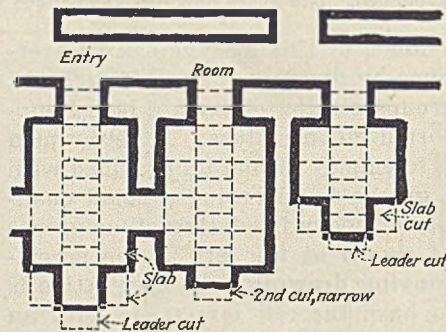
Various methods for increasing the proportion of lump coal produced in mining have been suggested from time to time. Most or all of these schemes have tended either to increase the labor necessarily expended or the cost per ton. Under the plan of working about to be outlined, however, and which I shall term the "slab system," the cost should not be increased and the labor expended should be appreciably lessened while a larger percentage of lump should be obtained.

Under the present usual plan of mine operation a room is necked off the entry or heading. After a certain depth has been attained it is widened out to the full width desired, after which it is driven to the depth limit by a succession of cuts under a straight face.

By the slab system the room would be turned narrow as before, that is, with a width of, say, 12 ft. After this width had been carried in for about 36 ft. a slab cut 12 ft. long is made to the full depth of the cutterbar upon each side of the room thus widening it. On the same shift a face cut is made of the original 12-ft. width. Thereafter two face cuts, or one leader and one finishing cut, are made to each pair of side or slab cuts, the idea being to successively develop 12-ft. slab cuts. To this end, if the cutterbar is more than 6 ft. long the second or finishing face cut may be made of less depth than full bar length.

ORDER OF UNDERCUTTING

After the first two slab cuts (one on either side) have been removed all succeeding slab cuts are left with loose ends. Coal from such cuts requires appreciably less explosive to bring it down than does that for ordinary cuts with tight ends. The order of undercutting would be: On one shift, a leader face cut and two slab cuts would be made; on the next



Section of Mine Worked by Slabbing.

Rooms are turned narrow as in the ordinary method, but after a suitable width of entry pillar has been penetrated, slab cuts are made on each side of the room, thus widening it out to both right and left. Thereafter two slab cuts and one face cut alternate with a single face cut. All slab cuts have a loose end and, consequently, do not require as much explosive to bring them down and the proportion of lump is higher than that obtained from faces merely undermined in the ordinary manner.

cutting shift, the second or finishing face cut only would be made. This cutting sequence would be followed until the room had attained its full depth limit. The appearance of a mine section operated on this plan may be seen in the accompanying illustration. Naturally, breakthroughs will be driven between rooms at the required intervals and in the ordinary manner.

SYSTEM AIDS SAFETY

From the standpoint of safety this system offers many advantages. The method of operation outlined affords an excellent opportunity to support bad roof for the reason that the slab on one side can be shot down, loaded out and the roof timbered even before that on the other side is drilled. The powder consumed per ton of coal produced would be somewhat less than is necessary under the present system, but the proportion of lump would be appreciably increased because of the loose ends of the slab cuts. The drilling required would be exactly the same as under present conditions. The coal brought down, however, would be easier to load be-

cause it would naturally fall and roll out toward the track. Impurities could be separated from the coal with greater ease because the pieces would be larger and would not have to be thrown so far to reach the gob. Plenty of coal would always be available for loading because the finishing cut could be made before the slab cuts had been entirely cleaned up.

Opposition from the miners could be anticipated if an attempt were made to introduce this system of working. This is always the case with any improvement. Such opposition would probably center on the narrow work at the face, but I believe that any miner after giving this method a fair trial would find his work so much easier and safer that he would not willingly revert to the system now prevalent.

GEORGE E. HARKESS.

Shelburn, Ind.

Booster Sometimes Decreases Ventilating Power

BY F. C. CORNET
Brussels, Belgium

It often happens, when developing a mine, where nothing but coal of a certain height is thought to exist, that the entries eventually penetrate a region that is lower than expected, thus choking ventilation and creating opportunities for the use of booster fans. This low-coal area is connected with the shaft or other mine opening by passages through higher coal. The area of high coal already proved may be sufficiently extensive to permit of attaining a large output but the entries in low coal, or some of them, will be driven on in order to ascertain what conditions lie ahead and plans made accordingly.

Headings and air courses in low coal must, of course, be ventilated, and when driving require a water gage higher than places of the same width driving in high coal. If such passages are widened out their resistance to air flow would be lessened. The reverse of this, however, is what occurs in most cases, for as

James, mine

soon as a mine foreman discovers that the coal taken out of an entry ceases to pay the cost of driving he generally reduces the width of the place to just what is necessary to allow the cars and locomotives to pass. The coal may be so low, in places, that the top or bottom, or both, must be cut into, in order to provide sufficient headroom. But slate work is costly and the foreman, consequently, will reduce it to what is strictly necessary. The increase in cross-sectional area resulting from increased height, consequently, will afford but small relief so far as ventilation is concerned.

TO REDUCE CROSSCUTS

Crosscuts, probably, will be spaced according to law, but certainly they will be reduced throughout a portion of their lengths, to a hole just large enough to allow a man to pass through. Holes of this kind have the undeniable advantage of reducing the cost of the stoppings. Unfortunately, their cross-sectional area is but a fraction of that of the heading, which is already small. Such passages, therefore, interpose an excessive resistance in the path of the air current. The throttling to which this current is thus subjected in the last breakthroughs makes it especially important to arrange for an energetic ventilation when plans are made for driving entries in low coal.

Experience with this kind of work, mostly in Tucker and Randolph counties, West Virginia, has convinced me that one must not base his provisions for ventilating air on what the coal height actually is, nor on what other conditions may appear to be when so-called low coal is encountered, for in all probability things will get worse before they show any sign of improvement. One may be certain in advance that, before the worst is passed, a ventilating water gage higher than that found to be adequate in the contiguous high-coal workings will be necessary. This higher water gage might well be provided for from the beginning.

WOULD WASTE POWER

Even though the fan ventilating the contiguous high-coal workings may be capable of furnishing the increased water gage necessary this pressure cannot be obtained except by subjecting the entire volume of air handled to this same increased head. In other words, the water

gage affecting a comparatively large volume of air would have to be raised unnecessarily for the sake of furnishing a small ventilating current to the low places. I say "unnecessarily," for if the workings in high coal are well ventilated under a given water gage, it is a waste of power and money, to run the fan at a speed greater than that necessary to develop this pressure. The power waste would be proportional to the difference between the volumes required respectively by the high- and low-coal workings. This difference, under most circumstances, would be large.

Suppose the high-coal operation requires 150,000 cu.ft. of air per minute, under a water gage of 1 in. Suppose also, that three pairs of headings in low coal need altogether 3,000 cu.ft. of air per minute, which a water gage of 3 in. is required to insure. Would it be economical to treble the water gage on the whole 153,000 cu.ft. when the result desired could be attained by making the increased pressure affect only 3,000 cu.ft., which could be done with the help of a small booster fan?

BOOSTER SAVES ENERGY

In the first case, the power necessary to impel the 153,000 cu.ft. of air would be 72 hp. In the second, the corresponding power would be 24 hp., to which must be added 1.4 hp. or that expended on the air handled by the booster. This makes a total of 25.4 hp. The saving in energy resulting from the use of the booster, would thus amount to 65 per cent.

Whether or not the use of a booster would be advisable in this case probably would depend on its purchase price, its cost of installation and on the length of time it would be needed. The latter factor, in most cases, would be unknown.

WHERE RESISTANCE IS SMALL

However, one other consideration must be taken into account. Where mine workings offer so little resistance to ventilation that such a small water gage as 1 in. is capable of keeping in circulation a volume of more than 150,000 cu.ft. of air per minute, it would be necessary to create an artificial resistance of some kind, somewhere in the path of the air current, before undertaking to drive the fan, which must obviously be large, to a speed capable of generating the desired water

gage of 3 in. Otherwise, two new factors will surely come into play that will raise the power consumption well above the 72 hp. mentioned previously. The new factors are an increase in both the volume and the velocity of the air circulating through the high-coal workings. Power consumption varies directly with the volume of air driven, but as the square of the velocity at which this volume travels.

Another contingency that must be considered is that the stoppings and air bridges which, perhaps, were lightly built, may crack and leak under the new conditions that would prevail in the atmosphere of the high-coal workings, due to the trebling of the water gage. Operators, therefore, will do well to think twice before placing artificial obstacles in the path of the air current ventilating their mines. When confronted with conditions similar to those assumed above, most men would probably go the booster way.

Runaway Switch Saves Time and Money

In the Aug. 6 issue of *Coal Age* on page 195 was a sketch of a double-track runaway switch which is in operation at No. 2 Mine of the Union Pacific Coal Co., at Rock Springs, Wyo. This double track is about 500 ft. long, starting from the mine opening to the first entry on a grade of about 10 per cent.

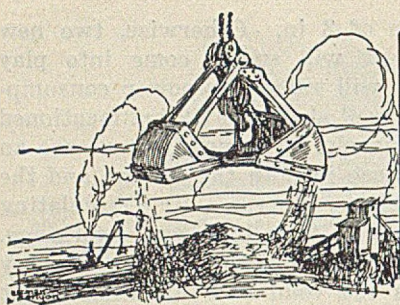
On Oct. 13 it certainly proved itself worthy of mention. A coupling broke near the top, letting eleven cars go back. The runaway cars didn't go far. They were derailed within 100 ft., rubbing against the rib and causing no damage whatever. The other part of the trip was brought back, coupled onto the runaway cars, pulled onto the track again and operation started within 30 min.

CARS SPILLED LITTLE

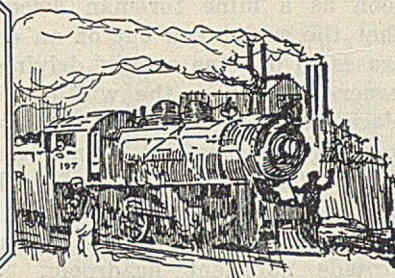
The cars are loaded with about a 12-in. top and some were not even broken down. Not more than a ton of coal was thrown off the cars.

Prior to the time this switch was put into operation a runaway of that kind usually caused a delay of from 4 to 16 hr., broken cars and track, and knocked out timber that caused caves. Another feature, no dust was noticed. Does it work? We'll say it does!

CHAS. GREGORY,
Mine Foreman.



Production And the Market



Politics Holds Commanding Place in Coal Trade; Mild Weather Handicaps Business

Having taken the stage in the hard-coal controversy, Governor Pinchot of Pennsylvania seems disposed to stick until something tangible has been accomplished—like Mrs. Wiggs, when one plan fails to work he promptly gets to work on another—but whether anything approaching a lasting settlement will result from the Governor's meeting in Harrisburg this week remains to be seen. Some observers profess to see an early end to the strike in the fact that the miners' leaders are at all receptive to plans, but there is nothing surprising about their interest when one remembers—as the operators do—the terms of the Pennsylvania executive's adjustment in 1923.

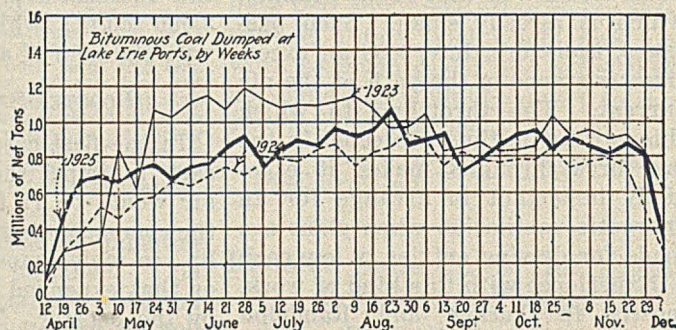
In most quarters the portions of President Coolidge's message to Congress devoted to coal were considered unusually mild, lacking the specific recommendations for putting the industry in order that many expected. The opening of Congress, however, is fraught with far-reaching possibilities.

Maintenance of bituminous coal production at almost a record rate and the continuance of mild weather have caused symptoms of weakness in the market, though price levels on the whole are being fairly well maintained. Trade in domestic grades is somewhat quieter, steam business pursuing a comparatively even course. The cessation of shipments to the lakes has brought about the usual readjustment, as a result of which there has been a cut in the output of lump and a corresponding falling off in the supply of slack and screenings, with higher prices on the latter.

Talk of peace plans in connection with the anthracite situation has made inroads in the market for hard-coal substitutes, consumers showing a disposition to hold back and see what happens. As a result cancellations of orders have been common. There is little doubt, how-

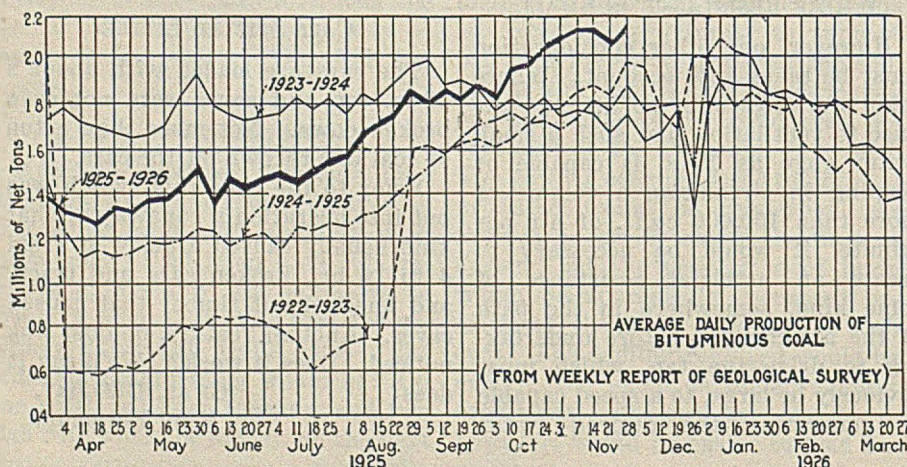
ever, that there will be a shortage of hard coal lasting throughout the winter even if Governor Pinchot's efforts should bring about a settlement, and many dealers are of the opinion that heavy buying of coke will continue even when the suspension ends.

Bituminous coal output in the week ended Nov. 28 is estimated by the Bureau of Mines at 11,600,000 net tons, compared with 12,596,000 tons in the previous week. The decline was due to the observance of the Thanksgiving Day holiday. Anthracite production in the week ended Nov. 28 was 36,000 net tons, a decline of 10,000 tons from the week before.



Coal Age Index of spot prices of bituminous coal on Dec. 7 stood at 184, the corresponding price being \$2.22, compared with 187 and \$2.26 on Nov. 30.

Dumpings of coal at Lake Erie ports during the week ended Dec. 6, according to the Ore & Coal Exchange, were: Cargo, 347,329 net tons; steamship fuel, 15,896 tons—a total of 363,225 net tons, compared with 805,424 tons in the preceding week. Hampton Roads dumpings in the week ended Dec. 3 totaled 464,217 net tons, against 483,234 tons in the previous week.



Estimates of Production (Net Tons)		
BITUMINOUS		
	1924	1925
Nov. 14.....	10,466,000	12,167,000
Nov. 21 (a).....	10,910,000	12,596,000
Nov. 28 (b).....	9,885,000	11,600,000
Daily average.....	1,912,000	2,189,000
Cal. yr. to date..... (c)	433,150,000	467,911,000
Daily av. to date.....	1,551,000	1,669,000
ANTHRACITE		
Nov. 14.....	1,674,000	32,000
Nov. 21.....	1,827,000	46,000
Nov. 28.....	1,611,000	36,000
Cal. yr. to date..... (c)	82,358,000	61,883,000
COKE		
Nov. 21 (a).....	158,000	284,000
Nov. 28 (b).....	160,000	293,000
Cal. yr. to date..... (c)	8,691,000	9,357,000

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

Weak Symptoms Appear in Middle West

The Midwestern market during the last week has shown symptoms of weakness, principally because the weather has been mild. Domestic coals have suffered most in the decline in prices. Western Kentucky lump, which had been moving at around \$2.50, fell as low as \$1.85 for a few cars in distress, with the average around \$2@\$.15. High grade 6-in. lump coals from southern Illinois are holding firm at \$3.50, principally because the operators are still working on a large number of orders that accumulated at \$3.25 before they raised their price last November. Eastern Kentucky and West Virginia high-volatile coals are very weak now. Prices vary all the way from \$2.25 for 4-in. block up to \$3.75. In short, there is no price, as operators and sales agencies are quoting in accordance with the state of their order books and with the idea of keeping their mines on full running time.

Nobody is interested in hard coal. There is no fuel shortage and the demand for coke continues to be satisfactory. Coke prices remain steady as no demand has developed sufficient to increase current quotations. Nobody appears to take much interest in the hard-coal strike situation.

Steam coals are uniformly stronger. Enough talk has gone around that there is danger of a bituminous strike to stimulate purchases, though no sharp advances in prices can be noted. The industries buying are the larger organi-

zations who consume ten to twelve cars a day and more.

Business is not good in the high-grade field of Williamson and Franklin counties nor is it as good as might be in the Herrin field except on lump, and even some mines have some lump "no bills" while others are a couple of weeks behind, but egg and nut and smaller sizes are slow and hard to move and the circular is not always adhered to. The mines that are working are getting from three to five days a week and railroad tonnage is fairly good. Car shortage shows up here and there and the movement of coal is slow, presaging trouble when severe weather comes. Strip-mine operations show good working time although it has been retarded by quiet weather. Their prices are made to meet competition and competition in Illinois coal is bad when Kentucky coal sells from \$1.50 to \$2 under Illinois prices with the freight rate 25c. higher on Kentucky than Illinois, and in the face of this, Illinois operators raise their prices.

In the Duquoin field there is not a ready market. Strip mines in this field are doing fairly well while shaft mines are getting four and five days a week. In the Mt. Olive field working time is fairly good. This field enjoys rates to points that beat Kentucky coal out. Steam is slow and railroad tonnage fell off sharply Dec. 1. Prices apparently are maintained in spots. Working time is three to four days. In the Standard field it is a hand to mouth existence with prices about at cost of production and plenty of "no bills" of all sizes except 6-in. lump. Prices vary as much

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

Low-Volatile, Eastern	Market Quoted	Dec. 8 1924	Nov. 23 1925	Nov. 30 1925	Dec. 7 1925†
Smokeless lump.....	Columbus....	\$4.10	\$5.25	\$5.25	\$5.00@ \$5.50
Smokeless mine run.....	Columbus....	2.00	3.10	3.10	3.00@ 3.25
Smokeless screenings.....	Columbus....	1.25	2.60	2.60	2.50@ 2.75
Smokeless lump.....	Chicago....	3.85	5.10	5.00	4.25@ 4.75
Smokeless mine run.....	Chicago....	1.85	2.50	2.50	2.25@ 2.50
Smokeless lump.....	Cincinnati..	3.85	5.25	5.10	4.75@ 5.50
Smokeless mine run.....	Cincinnati..	1.85	2.35	2.35	2.25@ 2.50
Smokeless screenings.....	Cincinnati..	.95	1.85	1.90	1.85@ 2.00
*Smokeless mine run.....	Boston.....	4.10	5.35	5.30	5.25@ 5.40
Clearfield mine run.....	Boston.....	2.00	2.15	1.95	1.75@ 2.00
Cambria mine run.....	Boston.....	2.30	2.35	2.25	2.00@ 2.35
Somerset mine run.....	Boston.....	2.15	2.25	2.10	1.85@ 2.15
Pool 1 (Navy Standard).....	New York....	2.80	2.85	2.95	2.75@ 3.15
Pool 1 (Navy Standard).....	Philadelphia..	2.70	2.95	2.95	2.80@ 3.10
Pool 1 (Navy Standard).....	Baltimore....	2.30	2.20	2.20	2.20@ 2.25
Pool 9 (Super. Low Vol.).....	New York....	2.05	2.30	2.30	2.15@ 2.50
Pool 9 (Super. Low Vol.).....	Philadelphia..	2.15	2.30	2.30	2.20@ 2.45
Pool 9 (Super. Low Vol.).....	Baltimore....	1.70	2.00	2.00	2.00@ 2.05
Pool 10 (H.Gr.Low Vol.).....	New York....	1.80	2.00	2.00	1.85@ 2.25
Pool 10 (H.Gr.Low Vol.).....	Philadelphia..	1.75	2.05	2.05	2.00@ 2.15
Pool 10 (H.Gr.Low Vol.).....	Baltimore....	1.55	1.90	1.90	1.90@ 1.95
Pool 11 (Low Vol.).....	New York....	1.60	1.70	1.75	1.65@ 1.85
Pool 11 (Low Vol.).....	Philadelphia..	1.45	1.90	1.90	1.85@ 2.00
Pool 11 (Low Vol.).....	Baltimore....	1.45	1.65	1.65	1.60@ 1.70

Midwest	Market Quoted	Dec. 8 1924	Nov. 23 1925	Nov. 30 1925	Dec. 7 1925†
Franklin, Ill. lump.....	Chicago....	\$3.35	\$3.75	\$3.50	\$3.50
Franklin, Ill. mine run.....	Chicago....	2.35	2.60	2.35	2.35@ 2.65
Franklin, Ill. screenings.....	Chicago....	1.50	1.85	1.60	1.75@ 2.00
Central, Ill. lump.....	Chicago....	2.85	3.00	3.00	3.00
Central, Ill. mine run.....	Chicago....	2.20	2.20	2.30	2.25@ 2.35
Central, Ill. screenings.....	Chicago....	1.35	1.40	1.40	1.35@ 1.50
Ind. 4th Vein lump.....	Chicago....	3.10	3.10	3.10	3.00@ 3.25
Ind. 4th Vein mine run.....	Chicago....	2.35	2.35	2.35	2.35@ 2.50
Ind. 4th Vein screenings.....	Chicago....	1.55	1.80	1.60	1.75@ 2.00
Ind. 5th Vein lump.....	Chicago....	2.75	2.35	2.35	2.35@ 2.65
Ind. 5th Vein mine run.....	Chicago....	2.10	1.95	1.95	1.85@ 2.10
Ind. 5th Vein screenings.....	Chicago....	1.30	1.40	1.40	1.35@ 1.50
Mt. Olive lump.....	St. Louis....	3.00	2.85	2.85	2.75@ 3.00
Mt. Olive mine run.....	St. Louis....	2.35	2.00	2.00	2.00
Mt. Olive screenings.....	St. Louis....	1.10	1.75	1.75	1.75
Standard lump.....	St. Louis....	2.75	2.40	2.40	2.35@ 2.50
Standard mine run.....	St. Louis....	1.95	1.80	1.80	1.75@ 1.90
Standard screenings.....	St. Louis....	1.05	.85	.85	.75@ 1.00
West Ky. block.....	Louisville..	2.60	2.10	2.10	2.00@ 2.25
West Ky. mine run.....	Louisville..	1.60	1.35	1.35	1.25@ 1.50
West Ky. screenings.....	Louisville..	1.10	.80	.80	.75@ 1.00
West Ky. block.....	Chicago....	2.60	2.35	2.35	1.85@ 2.25
West Ky. mine run.....	Chicago....	1.55	1.25	1.25	1.15@ 1.35

High-Volatile, Eastern	Market Quoted	Dec. 8 1924	Nov. 23 1925	Nov. 30 1925	Dec. 7 1925†
Pool 54-64 (Gas and St.)..	New York....	1.50	1.55	1.55	1.45@ 1.70
Pool 54-64 (Gas and St.)..	Philadelphia..	1.50	1.60	1.60	1.55@ 1.70
Pool 54-64 (Gas and St.)..	Baltimore....	1.45	1.65	1.65	1.65@ 1.70
Pittsburgh sc'd gas.....	Pittsburgh..	2.40	2.85	2.85	2.75@ 3.00
Pittsburgh gas mine run.....	Pittsburgh..	2.10	2.35	2.35	2.25@ 2.50
Pittsburgh mine run (St.)..	Pittsburgh..	1.85	2.15	2.15	2.00@ 2.10
Pittsburgh slack (Gas).....	Pittsburgh..	1.20	1.45	1.45	1.50@ 1.60
Kanawha lump.....	Columbus....	2.30	3.10	2.85	2.75@ 3.00
Kanawha mine run.....	Columbus....	1.55	1.70	1.70	1.55@ 1.85
Kanawha screenings.....	Columbus....	.90	1.20	1.20	1.15@ 1.25
W. Va. lump.....	Cincinnati..	2.60	3.25	3.10	2.25@ 3.00
W. Va. gas mine run.....	Cincinnati..	1.45	1.60	1.65	1.60@ 1.75
W. Va. steam mine run.....	Cincinnati..	1.45	1.50	1.55	1.45@ 1.60
W. Va. screenings.....	Cincinnati..	1.00	1.20	1.25	1.10@ 1.25
Hooking lump.....	Columbus....	2.55	3.10	2.85	2.75@ 3.00
Hooking mine run.....	Columbus....	1.60	1.65	1.65	1.65@ 2.00
Hooking screenings.....	Columbus....	.80	1.25	1.25	1.30@ 1.45
Pitts. No. 8 lump.....	Cleveland....	2.45	2.55	2.50	1.95@ 2.75
Pitts. No. 8 mine run.....	Cleveland....	1.85	1.95	1.85	1.80@ 1.90
Pitts. No. 8 screenings.....	Cleveland....	1.20	1.55	1.45	1.50@ 1.65

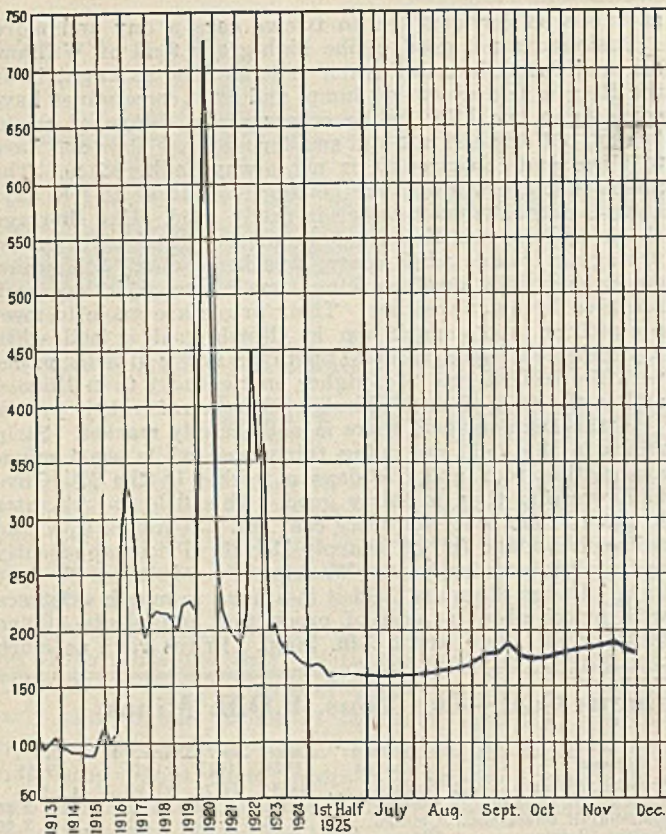
South and Southwest	Market Quoted	Dec. 8 1924	Nov. 23 1925	Nov. 30 1925	Dec. 7 1925†
Big Seam lump.....	Birmingham..	3.10	2.35	2.35	2.50@ 3.00
Big Seam mine run.....	Birmingham..	1.70	1.85	2.00	2.00@ 2.25
Big Seam (washed).....	Birmingham..	1.85	2.10	2.10	2.10@ 2.50
S. E. Ky. block.....	Chicago....	2.75	3.75	3.60	2.75@ 3.75
S. E. Ky. mine run.....	Chicago....	1.60	2.15	2.15	2.00@ 2.35
S. E. Ky. block.....	Louisville..	2.85	3.60	3.50	3.00@ 3.60
S. E. Ky. mine run.....	Louisville..	1.60	1.60	1.60	1.50@ 1.75
S. E. Ky. screenings.....	Louisville..	.95	1.35	1.40	1.25@ 1.60
S. E. Ky. block.....	Cincinnati..	2.85	3.35	3.10	3.00@ 3.50
S. E. Ky. mine run.....	Cincinnati..	1.55	1.55	1.60	1.50@ 1.75
S. E. Ky. screenings.....	Cincinnati..	.95	1.25	1.25	1.10@ 1.35
Kansas lump.....	Kansas City..	4.75	5.00	5.00	5.00
Kansas mine run.....	Kansas City..	3.10	3.25	3.10	3.25
Kansas screenings.....	Kansas City..	2.30	2.30	2.30	2.25@ 2.35

* Gross tons, f.o.b. vessel Hampton Roads.
 † Advances over previous week shown in heavy type; declines in italics.

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

	Market Quoted	Freight Rates	Dec. 8, 1924		Nov. 30, 1925		Dec. 7, 1925†	
			Independent	Company	Independent	Company	Independent	Company
Broken.....	New York....	\$2.34		\$8.00@ \$9.25		\$8.20@ \$8.95		
Broken.....	Philadelphia..	2.39		9.15				
Egg.....	New York....	2.34	\$8.25@ \$8.75	8.75@ 9.25		8.65@ 8.90		
Egg.....	Philadelphia..	2.39	9.45@ 9.75	8.80@ 9.25				
Egg.....	Chicago....	5.06	8.17@ 8.25	8.15@ 8.20	\$9.50@ 10.00	8.03@ 8.25	\$9.50@ 10.00	\$8.03@ \$8.25
Stove.....	New York....	2.34	10.00@ 10.50	9.00@ 9.50		9.15@ 9.40		
Stove.....	Philadelphia..	2.39	10.10@ 10.75	9.15@ 9.50				
Stove.....	Chicago....	5.06	8.63@ 8.75	8.50@ 8.64	10.00@ 11.00	8.48@ 8.80	10.00@ 11.00	8.48@ 8.80
Chestnut.....	New York....	2.34	10.00@ 10.50	8.75@ 9.40		8.65@ 8.95		
Chestnut.....	Philadelphia..	2.39	10.00@ 10.75	9.25@ 9.40				
Chestnut.....	Chicago....	5.06	8.26@ 8.40	8.44@ 8.60	10.00@ 11.00	8.50@ 8.75	10.00@ 11.00	8.50@ 8.75
Pea.....	New York....	2.22	4.75@ 5.50	5.50@ 6.00		5.00@ 6.25		
Pea.....	Philadelphia..	2.14	5.75@ 6.00	6.00				
Pea.....	Chicago....	4.79	5.13@ 5.45	5.36@ 6.20	5.50@ 6.00	5.50@ 6.00	5.50@ 6.00	5.50@ 6.00
Buckwheat No. 1.....	New York....	2.22	2.25@ 2.75	3.00@ 3.15		2.50@ 2.75		
Buckwheat No. 1.....	Philadelphia..	2.14	2.50@ 3.00	3.00		2.50@ 3.00		2.50@ 3.00
Rice.....	New York....	2.22	1.75@ 2.00	2.00@ 2.25		2.25		
Rice.....	Philadelphia..	2.14	2.00@ 2.25	2.25				
Barley.....	New York....	2.22	1.25@ 1.50	1.50		2.25		
Barley.....	Philadelphia..	2.14	1.50	1.50				
Birdseye.....	New York....	2.22	1.40@ 1.60	1.60				

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



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

Index	1925			1924
	Dec. 7	Nov. 30	Nov. 23	Dec. 8
Weighted average price	\$2.22	\$2.26	\$2.32	\$2.07

This diagram shows the relative, not the actual, prices on fourteen coals, representative of nearly 90 per cent of the bituminous output of the United States, weighted first with respect to the proportions each of slack, prepared and run-of-mine normally shipped, and, second, with respect to the tonnage of each normally produced. The average thus obtained was compared with the average for the twelve months ended June, 1924, as 100, after the manner adopted in the report on "Prices of Coal and Coke; 1913-1918," published by the Geological Survey and the War Industries Board.

as 50c. a ton on lump coal at different mines. Indications are strong that a proposed merger will go through. Railroad tonnage is light. Working time is three to four days a week with the usual exception. Several mines are idle and all mines carry "no bills." Prices are unchanged.

There is little change in the situation at St. Louis. Coal is moving fairly well for domestic use locally on middle grades and west Kentucky coals, which are beginning to come in heavily; some dealers have given up southern Illinois coal altogether. There is little call for anthracite or smokeless although coke is holding its own. In a general way domestic business is not good and collections are slow. Local wagonload steam continues to show improvement and carload is fairly good, but there is a surplus of coal in the market at all times at all mines on steam. Country steam is quiet but country domestic is fair—buying cheaper coals principally—and there has been a change from Franklin County coals to western Kentucky non-union. No change in prices.

Kentucky Market Has Possibilities

The Kentucky market is in fair shape, offerings being better on prepared coal, while screenings are tightening up just a trifle. Prices are a little firmer in western Kentucky, where there isn't much shading, but eastern Kentucky prepared sizes have been shaded somewhat on account of larger production, closing down of most of the lake movement and the fact that retailers and other buyers of domestic coal refuse to pay top prices.

Car supply in all sections of the state has improved, loading being faster and cars not being held for long intervals under load at Lake ports awaiting boats.

Domestic consumption is picking up a trifle, although the weather as a whole has been mild over the past ten

days. Retailers' stocks are not large, and severe weather would soon bring an active movement of fuel.

Generally speaking, industrial, heating and utility movements are good. Domestic coal is moving into the North and East in better than normal tonnage.

River movement has been somewhat better due to good boating conditions on the Ohio and the fact that some of the West Virginia river shippers are now hustling for river business to replace the lake movement, which is over.

Some eastern Kentucky block coal is priced as low as \$2.75 a ton, and some as high as \$4, for specialty coal, but the market is around \$3@-\$3.50 for good grade; lump, \$2.75@-\$3.25; egg, \$2.50@-\$2.75; nut, \$2.40@-\$2.60; mine-run, \$1.50@-\$1.75, and screenings, \$1.25@-\$1.50.

In western Kentucky 6-in. block is \$2@-\$2.25; lump and egg, \$1.75@-\$2; nut, \$1.35@-\$1.50; mine-run, \$1.25@-\$1.50; screenings, pea and slack, 75@85c., and nut and slack, 85c.@95c.

Warm Weather Brings Lull in Northwest

Warmer weather over the Northwest has been promptly reflected in somewhat of a lull in shipments from Duluth and Superior docks. Car loadings have fallen off during the last ten days, though they are substantially higher than at this time last year. Buying of steam and gas coals by iron and steel plants is especially active. Substantial shipments are going to the Twin Cities to replace Illinois and Indiana coal, which had pre-empted that market before all-rail freight rates were adjusted upward.

Orders from retailers have been light lately, but as stocks are running low in some districts, buying from that quarter is expected to spurt soon. Demand for Pocahontas and other smokeless substitutes for anthracite continues a feature on the market.

Thirty-three cargoes of bituminous coal were unloaded at the docks last week and eleven were reported en route. Coal stocks on the docks at Duluth and Superior have increased to about 4,750,000 tons, of which approximately 2,000,000 tons is owned by railroads.

Quotations are steady and unchanged for both anthracite and bituminous coals, the trade showing no disposition to take advantage of conditions brought about through the miners' strike in the anthracite fields. Inquiry for domestic coke and briquets is gaining and production is being increased correspondingly.

Milwaukee dock managers and retailers report a weather market for fuel. Buying is in small lots and for immediate needs. There is no change in prices, which are steady. The receipts of cargo coal at Milwaukee up to Dec. 3 total 3,609,333 tons. Last year's total on the same date was 3,322,132 tons. During November the receipts by rail were 4,683 tons of anthracite and 45,086 tons of bituminous coal.

The Twin Cities market has been uncertain and irregular, despite the approach of the time when severe weather may set in at any time. The retail domestic consumption is fairly stable, but the steam trade, of which so much had been expected, is still reluctant to take hold. The price schedule is holding fairly steady.

Supply Catches Demand in Kansas

Continued mild weather has resulted in a light accumulation of lump at Kansas mines. The supply of nut is about equal to the demand, while screenings are a bit short. A little shading is reported, but not as much as in former years under similar conditions. Some operators blame the custom of shading in the mid-season mild-weather slump for the spasmodic market.

In Colorado a sudden rise in temperature has caused a recession in the movement of domestic coal, but few cancellations are coming in. There have been no changes in prices and labor conditions are much improved, with all the mines operating close to capacity.

All sizes of coal are selling in Utah now, but due to weather conditions the demand is not heavy. There is little demand for coal for domestic storage purposes, consumers purchasing in small quantities as they need the fuel. The heating plants are taking coal steadily now, and the demand for steam coal is about normal for the season. Prices are as steady as they ever were; there has been no change since the early fall of last year. Labor conditions are excellent and the car situation is good.

Readjustment On at Cincinnati

The usual readjustments coincident to the closing of the lakes have been responsible for the feeling-out process that has been on for the last two or three weeks at Cincinnati, regardless of the anthracite strike, weather conditions and all the other market influences.

The tensity of the smokeless situation has eased. While some of the standard Pocahontas houses still held out for \$5.50 spot for egg, nut and lump early in the week more of the tonnage was moving between \$5 and \$5.25 than higher. Mine-run smokeless also was a bit easier, with the market between \$2.25@2.50, the low being obtainable by a little bargaining. Screenings, too, were weaker, more because the big furnaces have come to a place where the market can be squeezed through a letdown in buying orders.

The high-volatile market fared no better. There was a drop of 25c. for West Virginia lump, and egg offerings to the trade went as low as \$2.25, where demurrage or "no bills" forced the hand of the seller. A goodly tonnage is still taking as high as \$3 or even 25c. better—coal that was bought a couple of weeks ago or stuff that has created a market for itself.

Kentucky block holds up fairly well, but though the price for the month seemed to be around \$3.25 a week or so ago, some is being offered around \$3 here and there, and a little more warm weather, it is said, would knock it even lower. Because of the Canadian demand for egg the price on this holds up fairly well. Mine-run seems disposed to be the steadiest of the list. A drop in demand for slack has weakened the offerings from both Kentucky and West Virginia another 5c. with \$1.10 as the low. High quality slack, such as the Harlans, which had been selling up to \$1.50, have eased off to \$1.35.

In a retail way there has been little or no change.

River business is at good volume as the tows are favored with a stage that allows an almost regular schedule of discharge.

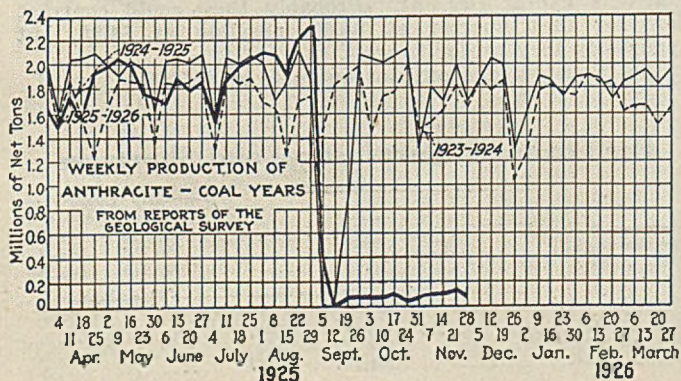
Lake Closing Brings Softness

With the closing of the lake trade, softness has appeared at Columbus in certain grades of coal, mostly in the medium and inferior varieties. This was expected, however, and has caused little concern among producers or distributors. Warmer weather has caused a slowing down of domestic demand, but retail prices have not suffered to any extent. Splints and Kentucky block are most popular, as smokeless prices are too high for the average consumer.

Steam business remains quiet and spotty, buying being mostly for current needs. There is some free coal on the market but not sufficient to cause much concern. A considerable tonnage of distress coal at Detroit and Toledo is affecting prices here. One of the features of the week was the better demand for screenings, which caused prices to be increased 10c.@15c. per ton. Production is holding up well.

With the cessation of shipments from the mines to the lakes and the prevalence of mild weather, stagnation has overtaken the eastern Ohio market, except on slack and nut-and-slack. "Distress" coal has developed during the week and a slowing up in domestic purchases has caused some cancellations of orders. Pocahontas is now offered at \$3.50@3.75 as compared with \$5.50@6.50 six weeks ago. Other West Virginia and eastern Kentucky domestic coals have suffered a like reaction.

In the steam trade the output of lump has been cut drastically and hence a dearth of slack and screenings has developed, with higher spot prices.



During the week ended Nov. 28 the eastern Ohio No. 8 district produced 297,000 tons or at about the same ratio of operations as in the previous week, but an increase of 57,000 tons over the same week a year ago.

Pittsburgh Market Still Slipping

The Pittsburgh market has undergone some further weakening both as to demand and as to prices. Regular customers in Pittsburgh and nearby territory are less disposed to act, not that their requirements are diminished but that they have less fear as to supplies in future, with more competition from West Virginia than in the late weeks of the lake movement.

The price of lump has continued to soften, and 3-in. is now quotable at \$3@3.25, with 2-in. and 1½-in. somewhat easier. There has not been much trading in steam mine-run, but with lower prices for lump the realization is lower and mine-run is affected, being now quotable at \$2@2.10 against \$2.10@2.25 recently. The present market is only a trifle above the level of last summer. Steam slack has now had a second 10c. advance, evidently a reflection of lighter shipments of lump, there being no apparent change in demand. Steam slack is now \$1.40@1.50, gas slack being quotable, as usual, at a 10c. differential above steam.

The market in central Pennsylvania has stiffened noticeably since the anthracite operators rejected Governor Pinchot's peace proposal. Mine-run quotations are as follows: Pool 18, \$1.65@1.75; pool 11, \$1.80@2; pool 10, \$2.15@2.25; pool 9, \$2.25@2.35; pool 71, \$2.40@2.55; pool 1, \$2.65@2.90. Prepared sizes: Lump, \$4; egg, \$4.50@4.75; nut, \$4. Slack is quoted at \$1.50 and prepared coke at \$6. Production in central Pennsylvania in November totaled 74,125 cars, compared with 77,974 cars in October. The shorter month, several holidays and five Sundays are responsible for the falling off.

The straight bituminous market at Buffalo is very dull, and there is not much prospect of a revival soon. Recent anthracite developments have hurt the trade some, and the weather is against a brisk market in any sort of fuel. Gas coal is stronger than steam and sometimes brings a little more than regular quotations, which are \$1.60@1.75 for Fairmont lump, \$1.40@1.50 for mine-run and \$1.25@1.40 for slack; \$2.25@2.50 for Youghiogheny gas lump, \$2@2.25 for Pittsburgh and No. 8 steam lump and \$1.30@1.60 for all slack; \$1.75@2 for Allegheny Valley mine-run.

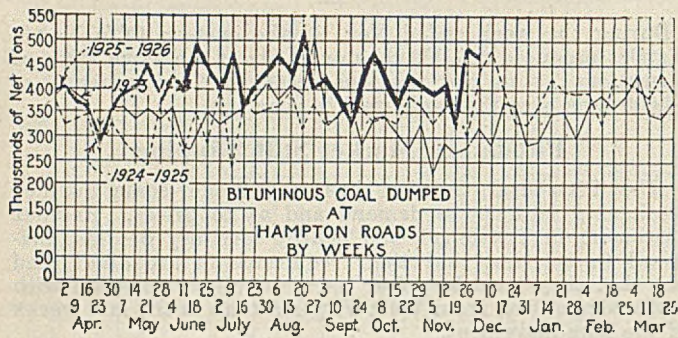
Demand Is Light in New England

The steam coal market in New England drags along with no developments of any consequence. There is only light demand in every direction, and shippers without seasonal contracts are being pressed to move coal. Not only industries but retail dealers are buying in very sparing amounts; the public is frankly not interested, at least for the present, and the quantity of bituminous actually replacing anthracite has not yet reached any large proportion. Most retail dealers are offering a variety of substitutes from cannel, splint and gas coal to Scotch and Westphalian coke. Connellsville furnace coke had a little vogue here for a time, but high prices turned the demand in other directions and it is probable that during the remainder of the anthracite suspension it will hardly be heard from. Factors here who are trying to merchandise foreign metallurgical coke are having their troubles, and even at \$12 on cars the trade is by no means receptive.

At Hampton Roads the volume on cars is heavy and spot sales are only occasional and for relatively small tonnages. Prices range upward from \$5.25 for No. 1 Navy standard, but each possible buyer is closely watched. As high as \$4.75 per gross ton on board vessel is being asked for New River slack, but almost no sales are reported. This figure compares with a basis close to \$4 during the summer.

Shipments all-rail from the smokeless districts to this territory are sloping off, quite contrary to trade expectations. A few operators not in touch with this market have had their fingers burned as a result of sending prepared sizes on consignment. Houses here have been deluged with telegrams asking for offers on coal standing at New England points. With quality grades available from central Pennsylvania at prices less than \$5 per net ton at the mine there is no very wide-open market for Pocahontas and New River at much over \$4.

Retail dealers are noticing that for the most part con-



sumers are not so critical over substitutes as might have been expected. Apparently there is a disposition to help fight the thing out.

Mine-Run Has Call at New York

Mine-run continues to feature the market at New York. Buying is heavy as consumers are increasing their reserve stocks as well as using a large tonnage for current consumption.

The failure of screened bituminous to take the place of anthracite, instead of mine-run, has been a surprise to many coal men. Further efforts to spread the use of the latter by house consumers is to be made by the city authorities, who have appropriated \$25,000 for the establishment of coal-burning demonstration stations.

Trade dullness has had its effect upon the shipping of New River and Pocahontas domestic sizes into this market, although several cars have been shipped to Long Island points and further orders have been placed. Quotations range \$5@5.50.

At Philadelphia demand has further decreased following the efforts of Governor Pinchot to bring the anthracite factions together with the idea of resuming mining. The biggest falling off has been in the sized bituminous coals originating in Pennsylvania. The call now is for the better grades, such as pools 1, 9 and 10. There was a slight increase in demand for railway fuel recently, although the prices received are, as usual, a bit under spot quotations. The situation at tidewater is unchanged, with bunkering constituting the chief interest.

Demand at Baltimore, except for prepared sizes, now used as a substitute for hard coal, is not more than seasonal. Prices continue about on the same range as for several weeks past. Industrial demand generally is not overactive, as the majority of business interests, while reporting fair volume, are by no means in the boom stage, or even near it. Exports of coal during November exhibited a gain of 35 per cent over October.

The problem with the Birmingham trade now is not finding buyers but finding coal to meet the market demands. All mines are well booked up on business and there is very little free coal of any quality to be found. Consumers of most every class are represented in the inquiries received and brokers and sales agents are having difficulty in placing orders—in fact much new business is being turned down. Coking coal is short of requirements, the demand for this being especially strong, and the bunker trade is absorbing an unusually heavy tonnage. Railroads, utilities and manufacturing interests are using an abnormal amount of fuel for current requirements and at the same time are endeavoring to create a reserve supply for the holiday period. All byproduct coke plants are operating at capacity and practically all the beehive ovens in usable condition are now producing coke for commercial use.

Domestic coal is active and the demand for shipments is insistent.

Quotations have shown some increase in the past week, Big Seam ranging \$2@2.25 for mine-run, \$2.10@2.50 for washed, \$2.50@\$3 for lump; Carbon Hill, \$2@2.25 for mine-run, \$2.25@2.50 for washed, \$3.25@\$3.50 for lump; Cahaba mine-run, \$2.25@2.50; washed, \$2.50@\$3; lump, \$4.25@\$5; Black Creek washed, \$2.50@\$3; lump, \$4.50@\$5; Corona mine-run, \$2.50; washed, \$2.75; lump, \$4; Montevallo lump, \$5.75@\$6 mines.

The coke market is strong with foundry grades quoted \$6@6.50; nut and egg sizes, \$4.75@\$5.50 per ton ovens. Demand exceeds the supply.

Coal production is at the rate of approximately 420,000 tons per week. Car supply is reasonably adequate now.

Pinchot's Activity Dulls Hard-Coal Market

"With the domestic sizes of anthracite practically out of the New York market and retail dealers' supplies well-nigh depleted, consumers are inclined to use substitutes in larger volume. Peace rumors, coupled with Governor Pinchot's efforts to settle the strike resulted in some cancellations of orders. Buying during the week has been spasmodic. There has been no steadiness and quotations for the available pea and No. 1 buckwheat fluctuated considerably.

Some British coal arrived during the week and it is reported that another cargo of German product is about due in the New York harbor. The British coal is finding a ready market as a substitute.

Quotations for independent pea coal range \$16@16 alongside; No. 1 buckwheat, \$8@\$8.25; for rice, a small quantity of which was offered, at \$8@\$8.75, alongside.

Coke's place as a substitute is well established and most retail dealers look for a continuance of heavy buying even after the ending of the hard-coal strike. Retail dealers in various parts of the greater city are quoting coke at \$13.50, delivered in bins. An abundance of coke is to be had, but buying is easy. Some grades of crushed beehive coke are quoted at \$6@\$6.50, ovens. Run of oven product is quoted at around \$4.

Governor Pinchot's efforts to end the strike and a continuance of mild weather brought the Philadelphia trade to a standstill. Such buying as is being done by the retail trade is mostly confined to byproduct coke, but buying is so light that there is a plentiful supply. The market for Connellsville and other beehive coke has momentarily disappeared.

Outside of some occasional cars of buckwheat there is very little anthracite moving from company storage yards, and the report is that the largest company has cleaned up all but 50,000 tons of its buckwheat, which is being held in reserve for the local water works and other institutions.

At Baltimore the public is apparently almost uninterested in whether the miners return to work or not as the use of anthracite substitutes grows, and in many cases at less cost than it took to operate heating apparatus with hard coal.

At Buffalo there has been quite an effort to sell bituminous sizes to take the place of the same sizes of anthracite, but the success has not been great. Pea and buckwheat sizes are about all sold out, at \$6.85 and \$10.35 and that leaves the consumer with nothing to depend on but coke and smokeless, both of which are fairly low in price now. Some retailers are laying down coke at the curb for \$12, but the local gas company sticks to \$9.50.

Connellsville Coke Boom Over for Good

Another week has passed without Eastern demand for Connellsville coke reviving and there is no longer any hope that there will be a repetition of the insistent demand, and corresponding prices, that occurred in the latter part of October. Run-of-oven furnace coke then advanced to about \$9 as it topped, but for only a short time. Some ten days ago it dropped to \$4, where it has since been. Iron and steel trade conditions at present would easily warrant a price materially above \$3 and perhaps not far from \$4.

There is much better demand for broken coke, egg coke, etc., than for run-of-oven, which has not taken well, but some of the prepared stuff is not well prepared. Regular crushed coke with a reputation would sell readily at much above \$4.

The blast furnaces using purchased Connellsville coke are no longer seriously concerned as to supplies after present contracts expire Dec. 31. Probably they could contract now for first quarter at \$4.50, possibly at \$4.25, but apparently they prefer to wait.

Spot foundry coke remains quotable at \$5@\$6.

Car Loadings, Surpluses and Shortages

	Cars Loaded	
	All Cars	Coal Cars
Week ended Nov. 21, 1925.....	1,057,674	189,182
Previous week.....	1,050,758	186,416
Week ended Nov. 22, 1924.....	1,009,919	196,346

	Surplus Cars		Car Shortage
	All Cars	Coal Cars	
Nov. 22, 1925.....	124,818	37,007
Nov. 14, 1925.....	112,572	37,041
Nov. 22, 1924.....	166,101	84,367

Foreign Market And Export News

British Coal Trade Reflects Brisk but Irregular Recovery

There is now great loading activity in the Welsh steam coal trade, many steamers having to wait short periods for loading berths at Cardiff and other docks, and there is good prospect of a substantial recovery in shipments for the remainder of the year. The improvement has not been evenly divided, the Monmouthshire market still lagging in demand, although prospects are brightening for that class of coal. Generally speaking the demand has recovered to about the level of twelve months ago but is still far behind the volume of trade of 1923, and until that year's level is reached full activity cannot be restored at the collieries. Prices are now becoming stabilized. In smalls, the tendency is rather firmer for best classes, owing to the increasing bunkering demand in view of the heavier exports.

The strong tone for all sections of the coal market in Newcastle-on-Tyne has been well maintained, for forward and prompt business was easier only because of the difficulty in obtaining tonnage. The general position indicates that the improvement which has set in is more than a passing phase. This is especially the case with coke. The demand has raised values, absorbed heavy stocks and justified the restarting of many ovens in Durham County. Gas coals have the best demand, but all brands of steams move as rapidly as the fuel is turned out. Coking coals have improved with coke.

Production by British coal mines during the week ended Nov. 21, according to a special cable to *Coal Age*, totaled 4,870,000 gross tons, compared with 4,880,000 tons in the preceding week.

Belgian Outlook Brightens

Weakness still pervades the Belgian coal market, but the steps taken by the government to help the collieries through the present critical period seem destined to improve the position of national products in a certain degree.

The decision of the State Railways not to admit indemnity deliveries from Nov. 10 to Dec. 15 will enable the Bel-

gians to furnish about 50,000 tons, but it is said that this tonnage will be taken only from the Borinage district. The government has decided not to grant any import licenses for free German coals for a month and to suppress all deliveries of indemnity coke dating from Dec. 1, which will improve conditions in the Belgian market and bring pressure to bear on the Germans to reduce official prices.

Industrial coal prices are still hotly disputed. In domestic coals the tendency is more favorable, as cold weather has brought forth more orders than for several weeks.

French Market Feels Stimulus Of Industrial Pick-Up

In the French coal market the demand for industrial coals is fairly well maintained due to the recovery of industrial activity, and improved financial situation. Winter weather has caused an increased demand for domestic coals. French collieries producing domestic fuels are late with deliveries, British coals are—in some categories—at prohibitive prices, and German coals are arriving in such small quantities that they hardly enter into calculations.

Deliveries of indemnity fuels from the Ruhr in October included 451,400 tons of coal, 231,000 tons of coke and 34,600 tons of lignite briquets. In the first sixteen days of November 104,692 tons of coke was received.

Trade Regains Momentum At Hampton Roads

Business at Hampton Roads last week was more brisk, with stronger demand and an increase in foreign business. The bunker trade held up well, an increase in general shipping promising well for this end of the business.

Though the tropical storm that swept the coast slowed down shipping for several days, it has picked up without serious mishap. Domestic coal is still high, selling around \$12.50 to \$13 at retail, but leaving the retailer little margin from his wholesale costs, the price at the mines for Pocahontas grades having gone well above \$7. The tone of the market is stronger and the outlook brighter.

U. S. Fuel Exports in October

	1924	1925
Anthracite.....	362,118	45,915
Bituminous.....	1,534,459	1,243,460
Exported to:		
France.....	24,004
Italy.....	38,418	33,252
Other Europe.....	3,500	1,978
Canada.....	1,293,963	1,053,210
Panama.....	24,082	12,054
Mexico.....	6,830	6,915
British W. Indies.....	6,364	9,331
Cuba.....	51,358	48,127
French W. Indies.....	18,744	9,850
Other W. Indies.....	27	15,816
Argentina.....	14,973	8,330
Brazil.....	18,228	11,768
Egypt.....	2,216	3,112
French Africa.....	15,551
Other countries.....	31,752	14,166
Coke.....	55,759	70,603

Export Clearances, Week Ended Dec. 5, 1925

FROM HAMPTON ROADS		Tons
For Virgin Islands:		
Br. Str. Maidenhead, for St. Thomas	6,822	
For Cuba:		
Br. Str. Sheaf Spear, for Havana....	4,600	
Br. Str. Pacific, for Havana.....	3,022	
For Newfoundland:		
Dan. Str. Jungshaved, for Cornerbrook.....	5,722	
Dan. Str. Oskild, for Cornerbrook...	3,280	
Br. Str. Torr Head, for Cornerbrook	6,768	
For Argentina:		
Br. Str. Glenmoor, for Buenos Aires	4,735	
For Brazil:		
Br. Str. Saint Patrick, for Para....	3,993	
Br. Str. Ashworth, for Rio de Janeiro	5,967	
For Italy:		
Ital. Str. M. T. Cicerone, for Porto Ferrajo.....	9,251	
Ital. Str. Sile, for Porto Ferrajo....	9,396	
For Dutch West Indies:		
Nor. Str. Blaamyra, for Curacao....	3,700	
For Spain:		
Br. Str. Hypatia, for Barcelona....	5,394	
For French West Indies:		
Br. Str. Trafalgar, for Fort de France	6,904	

FROM BALTIMORE		Tons
For Cuba:		
Am. Str. Santore, for Felton.....	8,196	
For France:		
Ital. Str. Valnoce, for Nice.....	7,000	

Hampton Roads Coal Dumpings*

	Nov. 26	Dec. 3
N. & W. Piers, Lamberts Pt.:		
Tons dumped for week....	169,931	168,326
Virginian Piers, Sewalls Pt.:		
Tons dumped for week....	96,104	101,852
C. & O. Piers, Newport News:		
Tons dumped for week....	165,424	144,302

*Data on cars on hand, tonnage on hand and tonnage waiting withheld due to shippers' protest.

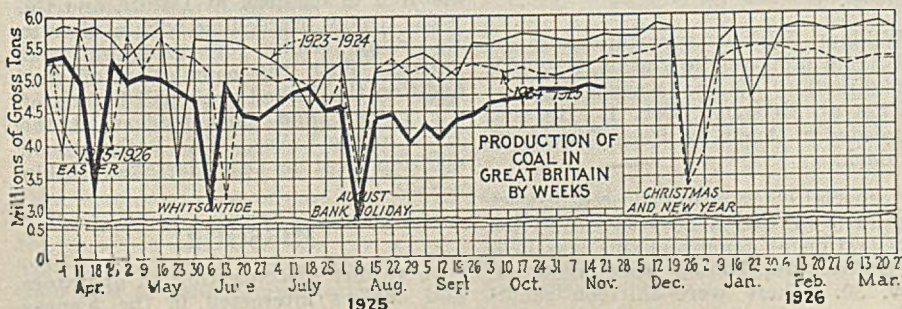
Pier and Bunker Prices, Gross Tons

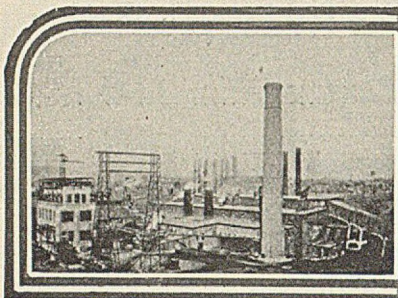
	PIERS	
	Nov. 28	Dec. 5†
Pool 1, New York....	\$5.75@ \$6.00	\$5.75@ \$6.00
Pool 9, New York....	5.00@ 5.25	5.00@ 5.30
Pool 10, New York....	4.75@ 5.10	4.75@ 5.10
Pool 11, New York....	4.55@ 4.70	4.55@ 4.70
Pool 9, Philadelphia..	5.05@ 5.30	5.05@ 5.30
Pool 10, Philadelphia..	4.80@ 5.10	4.80@ 5.10
Pool 11, Philadelphia..	4.50@ 4.75	4.50@ 4.75
Pool 1, Hamp. Roads.	5.00@ 5.25	4.90
Pool 2, Hamp. Roads.	4.85	4.75@ 4.90
Pools 5-6-7, Hamp. Rds.	4.75	4.75
BUNKERS		
Pool 1, New York....	\$6.00@ \$6.25	\$6.00@ \$6.25
Pool 9, New York....	5.25@ 5.50	5.25@ 5.55
Pool 10, New York....	5.00@ 5.35	5.00@ 5.25
Pool 11, New York....	4.80@ 4.95	4.80@ 4.95
Pool 9, Philadelphia..	5.30@ 5.55	5.30@ 5.55
Pool 10, Philadelphia..	5.10@ 5.35	5.10@ 5.35
Pool 11, Philadelphia..	4.75@ 5.00	4.75@ 5.00
Pool 1, Hamp. Roads.	5.00@ 5.25	5.00
Pool 2, Hamp. Roads.	5.00	4.75@ 4.90
Pools 5-6-7, Hamp. Rds.	4.85	4.75

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

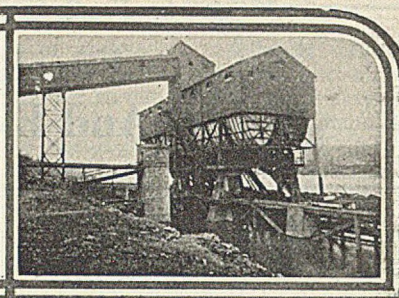
Quotations by Cable to <i>Coal Age</i>		
Cardiff:	Nov. 28	Dec. 5†
Admiralty, large..	22s.6d. @ 23s.6d.	23s. @ 23s.6d.
Steam smalls.....	11s.6d.	11s.6d.
Newcastle:		
Best steams.....	15s.6d. @ 17s.6d.	15s
Best gas.....	16s.6d.	16s.3d. @ 17s.9d.
Best bunkers.....	14s.6d. @ 15s.	15s. @ 16s.

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





News Items From Field and Trade



ALABAMA

Coal holdings totaling 36,000 acres in Tuscaloosa County, near Lock 17, on the Warrior River, formerly belonging to the Friedman interests, have been sold to the Gulf States Steel Co., it is announced. Although no official statement has been made by the new owners it is understood that the property will be developed in the near future. The Gulf States Steel Co. operates coal mines in Jefferson and Blount counties, with a large steel mill, furnaces and byproduct oven plant located at Gadsden. The general offices of the corporation are in Birmingham, Charles H. Moffett being president.

COLORADO

The Colorado-Utah Coal Co. recently installed an Ottumwa car loader at Mt. Harris.

ILLINOIS

At a meeting of the Board of Directors of the Chicago Wholesale Coal Shippers' Association held at the Illinois Athletic Club Dec. 1, the following nominating committee was appointed to present a slate of the officers of the association for the coming year at the annual meeting, which is to be held at the Great Northern Hotel on Jan. 6, 1926: P. H. Holland, James Anderson and T. C. Irwin.

B. Lee Hutchinson, of the West Virginia Coal & Coke Co., went to Chicago Dec. 1 to open a branch office for that corporation in the Windy City.

The stock and property of the defunct Southern Gem Coal Corporation was sold at public auction Nov. 27 in Benton, Franklin County. The purchaser was the Brewerton Coal Co., of Lincoln, and the price paid was stated as \$100,000. In buying the properties the purchaser also takes responsibility of all outstanding obligations, including \$42,000 in bonds, \$91,000 in taxes and payrolls which were unpaid in Sesser, West Frankfort, Pinckneyville and Cutler, aggregating approximately \$90,000. The sale was in accordance with orders of Federal Judge George English and is subject to the approval of the court.

William Brinley, who has been the general superintendent for the Middle Fork Mine of the United States Fuel Co., at Benton, for a number of years, has been transferred by his company to the Pittsburgh (Pa.) district and will leave early in December for his new home.

INDIANA

A terrific boiler explosion Nov. 25 at the Garlett wagon mine, east of Clay City, caused fatal injuries to Robert Garlett, a fireman and son of one of the mine's owners. It is believed that Garlett allowed water in the boiler to get too low, the blast following his turning cold water into the boiler. Top structures of the mine were practically demolished, windows were shattered in nearby residences and parts of the boiler blown more than half a mile from the scene of the explosion.

Willow Creek mine, located near Seelyville, resumed operations Nov. 24, after having been closed down since March 31.

Harold Henderson, Terre Haute, for the past six years general counsel for the United Mine Workers of District 11, has resigned his post in order to devote his attention to his property holdings in Florida, where he also will practice law. His resignation becomes effective Dec. 15. It is understood that John Riddle, at present Henderson's assistant, will be offered the position as head of the union's counsel in the district. The position carries a salary of \$7,500 a year.

IOWA

An agreement whereby the Indian Valley coal mine at Hartford will be operated on a union basis has been reached. Officials of the company told Joe Morris, president of the union, they would make a check-off of half of the initiation fee for admission to the union Dec. 1 and collect the remainder Dec. 15.

KANSAS

Eighty miners in Clemens Coal Co. mine No. 17, in the southeastern Kansas field, who walked out Nov. 25 in protest against alleged discrimination by the company in hiring new men in preference to old, returned to work Nov. 30 by order of district officials pending an investigation of their charges.

William Hislop, superintendent of the Arma mine-rescue station, assumed the direction of the Kansas central station at Pittsburg, Dec. 1. He was succeeded at Arma by Jesse Rogers, of Dunkirk.

A special election to choose a district auditor to fill the vacancy caused by the registration of Jonah Jenkins was held in District 14, United Mine Workers, Nov. 30. There were thirteen candi-

dates. Returns must be made to the district board before Dec. 10, at which time the results of the election will be announced.

A referendum vote on the question of removal of the headquarters of District 14, United Mine Workers, from Pittsburg to either Frontenac or Arma will be held Dec. 29. The decision was made at a board meeting in Pittsburgh Nov. 24, at which Arma, by written bid, promised \$18,000 toward the construction of headquarters, and Frontenac, by the same means, promised free use of a building.

KENTUCKY

It is reported from eastern Kentucky that the Hatfield Reliance Coal Co. has taken over the mines at Dakota, near Viper, and that car loading started at this plant on Dec. 1, after it had been idle for some time.

Federal Judge Charles I. Dawson issued a permanent injunction at Louisville, on Dec. 1, against the United Mine Workers, restraining members of District 23 (western Kentucky) from interfering with operation of the Lee Land & Mining Co., at Island, McLean County. A temporary injunction was granted several months ago, during strike troubles at the plant.

MARYLAND

The Stanley Coal Co., which is operating two coal mines adjoining the town of Cullin, has purchased from the Kendall Lumber Co. the town, which is located four miles west of Oakland, for the sum of \$60,000. The sale includes 65 dwellings, a large storehouse, warehouse and about 25 acres of ground, but does not include dwellings and lots which are now owned by individuals. The town has a population of about 400 and was founded by R. P. Cullin, in 1892.

MINNESOTA

The Inland Coal & Dock Co. has let contracts for the building of a 375-ft. addition to its dock at Duluth and the work is now proceeding with a view to its being ready for operation next spring. With the completion of that addition the Inland dock will be one of the largest and most modern at the Head of the Lakes. This is the second addition to it to be undertaken within a year.

MISSOURI

A verdict disconcerting to operators and dealers interested in the Kansas

City (Mo.) market was returned by a jury in circuit court in Kansas City, Dec. 2, on an appeal by James C. Wilson, a coal dealer, from a police court fine of \$100 for delivering coal from the Hume field on an order for Cherokee. Wilson maintained the Hume coal was from the same vein as the Cherokee in an argument which brought a reversal of the police court decision. Cherokee lump is quoted at \$5 at the mines on the Kansas City market, Hume coal at \$3 to \$3.50.

NEW YORK

The demolition of the New York, Ontario & Western coal trestle at Oswego is planned. It is found that the use for it to handle coal is small and that the traffic needs the space for an extension of the package-freight docks. The Pennsylvania R.R. also is expected to tear down its soft-coal trestle at Sodus, on account of poor business. Anthracite shipments from Lake Ontario ports, mostly from Oswego and some from Fair Haven, for the season of 1925 were 152,474 gross tons, as against 220,510 in 1924. For a long time shipments ran above 600,000 tons annually.

OHIO

The offices of the Lorain Coal & Dock Co., which have been located in the Huntington National Bank Bldg., Columbus, for about ten years, are to be moved about Dec. 15 to the eighth floor of the New First National Bank Bldg. The company will occupy about two-thirds of the space of the entire eighth floor.

Dumpings at the docks of the Hocking Valley Ry. during the week ended Dec. 2 were 197,213 tons as compared with 188,903 tons in the corresponding week last year. So far this season the docks have handled 8,301,670 tons as compared with 6,777,357 tons during the same period last year. The docks will be kept open for at least another week and possibly longer. One of the loading machines was stopped Dec. 5 but the other loader will be kept going, as the Ford Motor Co. will continue to ship coal from lower lake ports to Detroit as long as Lake Erie is free from ice.

Production is increasing in eastern Ohio. The Barton Coal Co. mine at Taggart has been placed on full time, after being operated three days per week for a few weeks. The Bixler Coal Co. has opened its Cochran mine, which had been idle for several months. This will be operated full time. The Jefferson Coal Co. has started operations at Mines No. 1, 2 and 3, on Piney Fork, which had been idle for months, and the announcement is that they will be operated with a full force. The United States Coal Co. has opened its mine at Plum Run on the New York Central lines and also has put its mines No. 1 and 2 in full operation. The last two named mines are at Bradley and have been operating on part time. The Maher Collieries Co. has opened Mine No. 2, which had been idle for weeks. This is the largest mine in the eastern Ohio field to resume operations.

OKLAHOMA

Ten miners exploring the Lucky Jew mine near Picher, were injured Nov. 27 by an explosion following the ignition of gas by the open cap lamp of one of the men.

PENNSYLVANIA

John C. Brydon, formerly president of the Quemahoning Creek Coal Co. and of the National Coal Association, has been appointed vice-president of the Hagey H. Campbell Co., general insurance agents, of Pittsburgh, and resident vice-president of the Commercial Casualty Insurance Co., of Newark, N. J. The appointments became effective Dec. 1.

A new steel tippie for the Adrian mine, now operated by the Jefferson & Indiana Coal Corp. under lease from the Rochester & Pittsburgh Coal & Iron Co. was put into operation Nov. 30. It cost \$80,000 and was built in 23 days, which is called a record for speed. The mine now employs 270 men and puts out 1,500 tons of coal a day, the heaviest since 1914.

The power plant and fan house of the Good Clay & Coal Co., located at Johnston's Ridge, about one mile from the village of Bells Landing, was totally destroyed by an explosion of dynamite about 2 a.m., Nov. 28. The mine had been working for some time under the 1917 scale but several weeks ago some trouble arose between the miners and their employers and the mine was shut down. The loss will exceed \$25,000. The work was done by one man, the tracks being plainly visible in the soft earth about the place. State police and county detectives are making an investigation.

The Rosedale Coal Co. announced sale of its No. 2 mine, at Poland, in Greene County, to Ben Evans, of Fairmont, W. Va., on Nov. 18. It will be operated under the name of the Evans Coal Co., with main offices in Fairmont. The property is a complete mining and tippie plant with 763 acres of coal land valued at about \$750,000, according to John L. Hatfield, president of the Rosedale Coal Co., but has been operated at only part capacity for several years, the Rosedale company concentrating most of its activity on the No. 1 mine, near Morgantown, W. Va. The new owners are considering enlargement of tippie facilities to increase production, which is 10 railroad cars daily at the present time.

Decision has been reached at Harrisburg by the state sanitary waters board that no objection will be made to the removal of culm from banks of streams in the anthracite field by means of steam shovels but that the removal of culm by washery or wet process will be considered stream pollution and will not be tolerated. It is understood that the decision was made in regard to plans for the removal of culm from a Delaware & Hudson right of way near Carbondale, where it is said that there are several hundred thousand tons of culm that may be reclaimed and prepared for market.

UTAH

The Peerless Coal Co., Newhouse Building, Salt Lake City, following the dispute with its local retail agent, the Marsh Coal Co., has purchased the old yard of the Central Coal & Coke Co. and will go into the retail business in Salt Lake City. The Peerless Coal Co. is owned by the Murdock interests and is one of the more important coal-mining companies with headquarters in Salt Lake City.

L. E. Adams, of the sales department of the Spring Canyon Coal Co., Salt Lake City, has been appointed head of the department, succeeding the late J. A. Stallings, whose death occurred recently.

WASHINGTON

Extensive experiments with Washington coal to determine its most efficient application to industry is planned by the U. S. Bureau of Mines in co-operation with the College of Mines of the University of Washington. Owing to the nature of the coal beds, a great deal of waste in the form of fine coal is experienced. The mining experts hope to find new uses for this fine coal, but also will study the specialized uses of other grades and qualities of coals. At present the fine coal is used extensively for briquetting.

WEST VIRGINIA

Deeds placed on record in Fairmont and Morgantown Dec. 4, show that Edward H. Thomas, treasurer of the Hines Lumber Co., of Chicago, sold 4,000 acres of Sewickley coal land and between 500 and 600 acres of surface land along Indian Creek, in Monongalia and Marion Counties, to the Continental Coal Co. of Fairmount for \$467,000. Most of the coal land lies in Marion County.

Union leaders in the Scott's Run field of Monongalia County were surprised, according to their own version, when the Golden mine of the By-Products Coal Co., which was leased by Scatchell Brothers from the Watson interests, was placed on a non-union basis early this month. The mine had been idle for some time but when the miners were offered 45c. a ton for their labor in preparing to resume, some of them ceased work. The lessees then decided to operate the mine independent of any agreement with the union. The property at Osage upon which the union miners' barracks were built more than a year ago is owned by the Scatchells.

Mines on the Monongah and Charleston divisions of the Baltimore & Ohio R.R. loaded 1,796,800 net tons of coal to the lake docks this season. Most of this coal originated at mines on the Monongah Division.

George Gaskill has been made superintendent of the Parker Run mine of the Fairmont & Cleveland Coal Co., at Rivesville, one of the largest mines in the region. He succeeds J. W. Bischoff, formerly of Elkins, who went to Mont-

gomery to be superintendent of the mine of the Kanawha & Hocking Coal & Coke Co.

Junior mine of the West Virginia Coal & Coke Co. resumed recently in the Elkins section with M. Benton Mitchell, formerly connected with the Bethlehem Mines Corporation, as superintendent.

Presterly B. Robinson, who was superintendent of the Elk Horn Coal Corporation's mine at Interstate, has accepted a position as superintendent of Hughes mine of the Robinson Coal Co.

The Long Coal Mining Co. resumed operation at its Gladius mine in the Clarksburg section recently on a non-union basis. L. R. Collins, a mine engineer, is now superintendent.

C. D. M. Kramer, of Clarksburg, has been appointed a district state mine inspector, but thus far has not been assigned to any particular district.

It is reported that within a short time Robert M. Lambie, of Charleston, chief of the West Virginia Department of Mines, will announce the appointment of five division safety inspectors. All of the men are the product of the school of engineering of West Virginia University in Morgantown. L. S. Magee, of Morgantown, will be inspector assigned to Monongalia, Marion and Harrison counties. It will be the duty of these men to instruct the men around the mines in safe practices, first-aid and mine-rescue work, according to reports.

Prof. Charles E. Lawall, of the mining engineering department of West Virginia University, has called the annual conference of mining extension instructors in the field for Dec. 21 and 22 in the McClure Hotel, in Wheeling. The instructors will visit the mine of the Windsor Power Co., said to be the largest mine in the state, producing more than 4,000 tons in eight hours.

The Lick Fork Coal Co., operating on the main line of the Virginian near Mullens, in Fayette County, has been reorganized and will be known in the future as the Hysteam Coal Co. The mines of the old company were out of commission for a number of months. Since the reorganization production has been resumed.

The recent purchase of the Low Moor Iron Co.'s mining operations at Kay-Moor and the coal lands of the Coal Land Co. by the Berwind-White interests for \$1,001,000 is reported to be a part of the policy of the Berwind-White concern to acquire the larger part of the coal holdings fronting the New River. It is stated that overtures are being made to acquire the holdings of the Stover Coal Co. located not far from the Low Moor property. The Coal Run Land Co., through Josiah Low, president, received \$150,000 for two tracts of 1,684 acres of fee land and 407 acres of mineral in the transaction. Frank Lyman, president of the Low Moor company conveyed all interests in approximately 3,000 acres, of which

about one-half was in fee, in this transaction, for \$851,000.

The Marcus tippie of the Upland Coal & Coke Co., at Elkhorn, contract for which was awarded to the Roberts & Schaefer Co., Chicago, is rapidly nearing completion. This tippie will be completed with retarding conveyor, Marcus screen, and "RandS" shaker loading booms.

WYOMING

For the first time in more than four years a fatality occurred in the Blairtown properties of the Lion Coal Co. on Nov. 27, when Theodore Poupakies, a miner, was killed by a fall of roof rock. This was the first death in four months in the Rock Springs district, in which several thousand men are employed.

John A. Smith, safety engineer of the Union Pacific Coal Co. at Rock Springs is spending ten days in Pennsylvania at the Bureau of Mines station at Pittsburgh and the Bureau's experimental mine at Brucetown. His time will be taken up with the study of rock-dusting methods.

The U. P. First Aid Association celebrated its 16th anniversary Nov. 21 with a banquet and dance. This association is the most active in southern Wyoming and is at present holding weekly classes in first-aid and mine-rescue work.

At the November meeting of the Rock Springs chapter of the Rocky Mountain Coal Mining Institute, embracing membership in Rock Springs and the surrounding camps, E. H. Denny, of Denver, district supervising engineer for the Bureau of Mines, addressed the meeting upon general mining conditions, with particular reference to the use of rock dust throughout the United States as a preventive of coal-mine disasters.

CANADA

Twenty-six miners were arraigned before Judge Boyle in the Criminal Court at Calgary, Alta., on Nov. 30 on charges arising out of the strike at the Drumheller coal mines last summer. Eight are charged with unlawful assembly to compel certain persons to abstain from working and to compel the Alberta Block Coal Mining Co. to abstain from employing any persons not belonging to the United Mine Workers. Seven are charged with watching and besetting the Alberta Block mine.

Coal output in British Columbia during the first ten months of this year was 393,040 tons greater than for the corresponding period of 1924, according to a statement by the provincial Department of Mines. Output by districts during the first ten months of 1925 was: Crows Nest Pass, 727,350 tons; Nicola-Princeton, 136,925 tons; Vancouver Island, 1,140,169 tons a total of 2,004,599 tons. For the first time within the last two years nearly all of the Vancouver Island collieries are operating at capacity. A large amount of

exploration is being done in the Princeton district and several promising coal prospects recently have changed hands.

The Ontario Government will bend every possible effort to obtain as soon as possible the remaining 6,000 tons of Alberta coal still due that province under the contract entered into by the Alberta, Ontario and federal governments through the Canadian National Rys., Charles McCrea, Ontario Minister of Mines, stated last week. About 19,000 tons of coal was received out of the 25,000 tons trial order prior to the railway withdrawing its cars for the grain movement. "The grain movement should be pretty well completed by the middle of December," stated Mr. McCrea. "We are taking the matter up with Sir Henry Thornton, first as to the balance of the 6,000 or 7,000 tons shipment, and, secondly, to see if, under the conditions now existing, this tonnage could not be increased."

Traffic

Sanctions New Coke Rates In New York

The New York Public Service Commission has approved new rates of the New York Central (East) on coke and coke breeze from Harriet to New York Central (West) stations: Fredonia, \$1.39; Falconer, \$1.76 per net ton; no joint rates heretofore in effect; effective Dec. 22, 1925.

Also of the New York, Chicago & St. Louis R.R. on coke, and coke breeze from Buffalo and Buffalo Junction to Falconer (on Erie and New York Central), \$1.76, and to Fredonia (on New York Central), \$1.39 per net ton; no joint rates hitherto in effect; effective Dec. 19.

The Commission has approved a new rule of the New York, Ontario & Western R.R. governing diversion or re-shipment of coal and coke so as to make the same applicable on coke breeze, dust and screenings. The new regulation provides mileage charges to apply for excess haul when shipments are out of direct route; effective Dec. 22, 1925; P. S. C. No. 4804.

Obituary

Isaac G. Hall, 40 years old, well known coal man of Indianapolis, died at his home Nov. 29. He had been in ill health for several months, but remained actively in business as an officer of the Knox Consolidated Coal Co. until two weeks before his death. Mr. Hall was born in Brazil, Ind., and was educated at Purdue University. In addition to his connection with the coal company he was a director of the First National Bank at Brazil.

John Quincy Dickinson, pioneer in the industrial development of the Kanawha Valley and Southern West Virginia, died at his home in Charleston, W. Va., Nov. 26, after an illness of several years. He was the father of John L. Dickinson, Charleston banker, and of Charles C. Dickinson, who has extensive coal interests. He early recognized the value of coal lands in the Kanawha Valley and acquired extensive holdings of coal, gas and oil properties in Boone, Kanawha, Fayette and Raleigh counties. He also was extensively interested in a number of coal mining companies but in his later years turned the management of these interests over to his sons.

Coming Meetings

New River Coal Operators' Association. Annual meeting, Dec. 17, at Mount Hope, W. Va. Secretary, S. C. Higgins, Mount Hope, W. Va.

Chicago Wholesale Coal Shippers' Association. Annual meeting, Great Northern Hotel, Chicago, Ill., Jan. 6, 1926. Secretary, G. H. Merryweather, Temple Bldg., Chicago, Ill.

American Wood Preservers' Association. Annual meeting, Jan. 26-28, 1926, at Cleveland, Ohio. Secretary, E. J. Stocking, Chicago, Ill.

Coal Club of Philadelphia. Annual meeting, Jan. 23, 1926, at the Bellevue-Stratford Hotel, Philadelphia, Pa. Secretary, C. K. Scull, Philadelphia, Pa.

American Institute of Electrical Engineers. Annual convention, Feb. 8-12, 1926, at Engineering Societies Bldg., New York City. Secretary, F. L. Hutchinson, 29 West 39th St., New York City.

New Companies

The Fairplay Coal & Development Co., with a capital of \$75,000 has been incorporated at Excelsior Springs, Mo. The company will operate coal mines and buy and sell coal. The incorporators are J. D. McDermott, George W. Maldment and Preston Denton.

The David Thomas Coal Co., Columbus, Ohio, has been chartered with an authorized capital of 100 shares, no par value designated, to operate a mine in West Virginia. Operations will start as soon as work is completed on the placing of new equipment in the mine, which will have a capacity of 200 tons daily. Temporary offices will be located at 1113 Bryden Road, Columbus. David R. Thomas is president of the concern. Other incorporators are: David S. Thomas, Walter L. Thomas, Warren H. B. Thomas and Mary A. Thomas.

The Red Star Coal Co., of Whitesburg, Ky., on Nov. 24 filed articles at the State Secretary's office, Frankfort, Ky., capital being \$10,000. Alex Taylor, Frank Grimes and W. T. Taylor are the incorporators.

Industrial Notes

W. J. Nugent, vice-president and general manager of the *Nugent Steel Castings Co.*, Chicago, has been elected president to succeed Charles Piez. Prentiss Coonley was elected vice-president and C. A. MacDonald, secretary, was elected to fill a vacancy on the board of directors. Mr. Nugent has been associated with the company since 1918, when the present plant was erected. From 1918 to 1921 he served as vice-president and in 1921 became general manager as well. It is announced that there will be no change in policy as a result of the recent changes in officials. The interests of Mr. Piez have been taken over by Mr. Nugent and others. The company was organized in 1916 and has made electric steel castings since its inception. A large electric annealing furnace of reciprocating type was recently installed and the entire output is now annealed in this furnace.

Robert Wolfers has joined the McGraw-Hill Co. and will be in charge of directories, lists and a direct-mail department which is being developed to serve McGraw-Hill advertisers. The E M F Electrical Year Book recently was purchased. Other McGraw-Hill reference publications are McGraw Central Station Directory, McGraw Electric Railway Directory and the Radio Trade Directory. It is planned to extend the directory and list services into other industries now served by McGraw-Hill publications. Mr. Wolfers was formerly connected with the Automobile Trade Directory and Chilton Automobile Directory. J. S. Cortelyou, who for the last year has been devoting his time to the Radio Trade Directory, will in future direct the compilation of all McGraw-Hill directories and lists. Mr. Cortelyou was associated for many years with Mr. Wolfers in the automotive directory business.

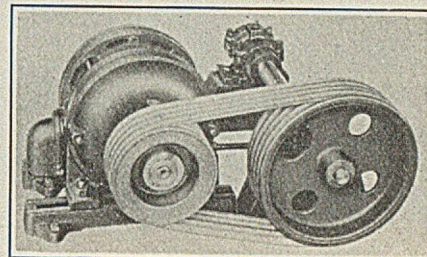
New Equipment

Short Coupled Texrope Drive Smooths Transmission

A new development in the field of power transmission recently has been announced by the Allis-Chalmers Manufacturing Co., of Milwaukee, Wis. This firm has perfected a short-center, flexible drive, known as the Texrope. This consists of two grooved sheaves and a number of specially constructed endless "V"-belts. The sheaves are set at such a distance apart that the belts fit the grooves with neither tension nor slack. In outward appearance this drive strongly resembles the well known English rope drive, except that the place of Manila rope is taken by the "V"-shaped fabric and rubber belts.

Inasmuch as the new type of belts just fit the sheaves, there is no slack or lost motion in the drive. Because of the "V" construction, also, slip of the belts upon their pulleys is minimized, since the harder the belts pull the more firmly do they grip in the grooves. Being somewhat elastic, they cannot jerk, either in starting, accelerating or running, neither can they transmit vibrations, but act as cushions between the driving and driven pulleys. This results in a smoothness of transmission, seldom, if ever, previously attained.

Inasmuch as there is no tension on the belt, the bearing pressures are low and the drive occupies extremely small space. It is silent, clean, unaffected



Model of New Drive

This means of power transmission is practically a cross between an English rope drive and that employed on many an automobile to operate the fan. The utility of both of these types of drive has been thoroughly proven by long hard usage, the one for transmitting large amounts of power and the other in operating over extended periods under the most trying conditions, subjected to grease, dirt and neglect. Coming of such parentage this drive should prove of high utility.

by either moisture or dirt, safe, simple and trouble proof. As the slip is small, the speed ratios are approximately fixed. The drive is durable and each belt carries its proportional share of the load.

These drives range in size from $\frac{1}{2}$ to 250-hp. each, with ratios up to 7 to 1. Belt speeds range from 800 to 6,000 ft. per minute. Drives of this kind have been applied to almost every industry. They are particularly applicable to textile machinery, fans and blowers, machine tools, refrigeration, mining, crushing, wood and metal-working machines, elevators and conveyors, and similar contrivances.

The Climax Engineering Co., Clinton, Iowa, announces the appointment of T. L. Keeling, as Sales Representative for Ohio, western New York, and western Pennsylvania, with offices at 657 Leader Building, Cleveland.

Publications Received

Power-Plant Lubrication, by Wm. F. Osborne. McGraw-Hill Book Co., Inc., New York City. Pp. 275; 5 $\frac{1}{2}$ x8 in.; illustrated. Price, \$3. A practical book for the power-plant engineer explaining the physical and chemical properties of lubricants, their action under changing influences of heat, pressure, etc., and the methods of determining their relative value.

Alternating-Current Circuits, by John M. Bryant and James A. Correll. McGraw-Hill Book Co., Inc., New York City. Pp. 405; 6x9 in.; illustrated. Price, \$4. This book is intended as an introduction to the study of alternating-current circuits and transmission lines.

Analyses of Alberta Coal, by Edgar Stansfield, Robert T. Hollies and William P. Campbell. Scientific and Industrial Research Council of Alberta, Edmonton, Alta., Can. Pp. 63; 6x9 in.; illustrated.

The Case of Bituminous Coal, by Walton H. Hamilton and Helen R. Wright, with the aid of the council and staff of the Institute of Economics. The Macmillan Co., New York City. Price, \$2.50. Pp. 307; 5x7 $\frac{1}{2}$ in.; illustrated.

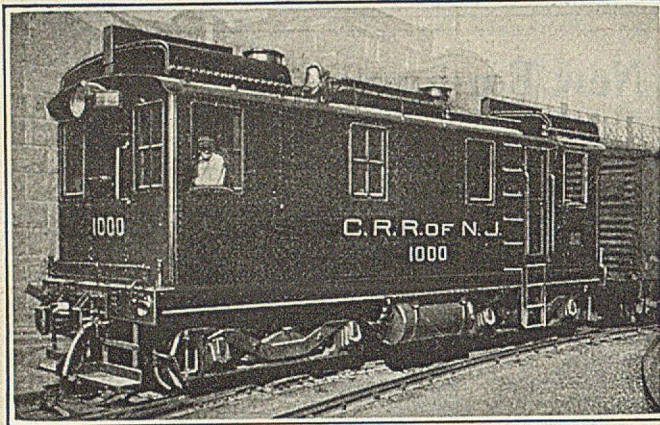
Annual Report of the Director of the Census to the Secretary of Commerce for the Fiscal Year Ended June 30, 1925. Pp. 34; 6x9 in.; tables.

Annual Report of the Secretary of Commerce. Pp. 43; 6x9 in.

Thermo-Electric Locomotive Obviates Smoke

Recent years have witnessed a gradual decrease of steam in all industry. A recent advance in railway engineering is represented by the development of a locomotive driven by an oil engine through the medium of an electric generator and motor. The Central Railroad of New Jersey recently purchased a 60-ton machine of this kind and was followed closely by the Long Island R.R. with a 100-ton machine. Other railroads are also trying out oil-electrics. If service performances of these locomotives bear out their demonstration performances, it may possibly foreshadow a wide substitution of the oil-electric locomotive for the steam engine in railroading throughout the United States, in the operation of coal company short lines and yards and in haulage about strip pits.

In the construction of one type of these locomotives the oil engine, which is the product of the Ingersoll-Rand Co., has six vertical cylinders operating on the four-stroke cycle. Fuel oil is injected directly into the cylinders under pressure and is ignited by the heat resulting from the compression. The action of the engine is similar to



In the Switching Yard

This 60-ton locomotive is built to attain a speed of only 30 m.p.h., with a draw bar pull of 36,000 lb. Machines of this kind can, of course, be designed with equal facility for higher speeds. The thermo-dynamic efficiency attained with this machine is from three to five times that of steam locomotives.

that of an ordinary automobile engine with the heat of compression doing the work of the spark plug. Forced lubrication is employed and circulating water is distributed to all parts of the engine by a centrifugal pump.

Directly connected to this oil engine is a General Electric generator, the voltage of which ranges from 200 to 750. The output of this machine is regulated by the throttle control of the engine. The framework or chassis is built by the American Locomotive Works.

Control of a locomotive of this kind is extremely simple, being centered in the manipulation of two levers. One of these serves as a throttle for the engine, while the other is a master controller or electric switch which places the tractive motors either in series or in parallel as circumstances may require. Tractive efforts may be varied to suit any operating condition.

Performance records of these locomotives show that they are far more economical in cost of operation than steam-driven machines of like capacities. The thermal efficiency, as referred to the effort delivered to the driving wheels, ranges from 25 to 27 per cent, as compared with from 5 to 8 per cent in steam locomotives. The engines used by the Central Railroad of New Jersey and the Long Island R.R. have been designed and constructed for slow speed switching service. The 60-ton machine develops 300 hp. and is capable of traveling at 30 m.p.h., exerting a tractive effort of 36,000 lb. The larger machine is of 600 hp., travels the same rate per hour, but has a draw-bar pull of 60,000 lb. Machines of this type may, however, be designed for high speed road service with equal facility.

Big Fuse Puller Will Not Twist or Slip

The Trico Fuse Manufacturing Co., of Milwaukee, Wis., makers of cart-ridge fuses, announces the addition of a "Giant" fuse puller and replacer to its present model, the pocket-size tool. The giant-size fuse puller is the big brother to the pocket size puller and it



Makes Fuse Pulling Safe

Seven laminations of fibre securely held together prevent this device from twisting.

has been aptly termed a "brute for strength." It is 12 in. long and made with seven laminations of the finest genuine gray horn fibre, securely riveted at all points subject to strain. Inserts placed between the laminations provide a firm, even grip on the fuse and prevent any tendency to twist or slip in the hands of the user. The puller and replacer is designed for use on fuses from 100 to 600 amp. at 250 volts and 60 to 400 amp. at 400 volts, making it an ideal tool for safely and conveniently handling fuses of large capacity.

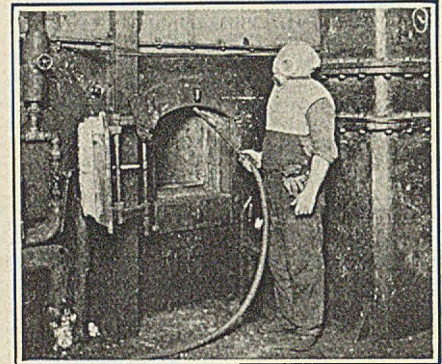
Hood with Respirator Protects Worker

In many occupations dust or fine particles of other matter pervades the air in large quantities. These particles, if inhaled, cause serious discomfort to the worker if not even endangering or impairing his health. Before a workman may safely breathe such an atmosphere it is necessary that the dust or other particles be screened out of it. To accomplish this result the Engineering Products Corporation of New York has placed on the market the dust mask shown in the accompanying illustration.

This mask consists essentially of two parts or elements namely, a dust proof hood and a respirator. The hood is made of a closely woven washable twill that fits down over the shoulders, but allows free movement to the arms. At the neck it is provided with a gathering string or strap which may be drawn up effectively excluding all dust that might find its way under the hood skirts. This hood may readily be washed or otherwise cleaned without injuring its fabric or impairing its efficiency.

The respirator is made up of spun and cast aluminum, the cushion touching the face being made of rubber. The tape or strap drawing the hood about the neck also draws the respirator firmly against the mouth and nose. The flutter or exhalation valve is attached to the bottom of the respirator preventing the exhaled air from fogging the sight lenses. The strainer element is made up of a series of felt disks the exact number of which is governed by the size of dust particles encountered and their density in the air. The vision lenses are of non-shatterable, clear, two-ply, laminated glass. They are held in their machined, cast aluminum receptacles by means of spring clips.

Because of the materials of which this equipment is made as well as the care in detail with which it is manufactured this dust mask is extremely efficient in use. It forms an effective protection for the wearer when working in an atmosphere laden with sharp abrasive dust that would irritate the lungs or one filled with fine particles or globules of paint, varnish or enamel as that encountered when using a paint spray or gun, and which may have an equally detrimental effect upon the organs of respiration.



No Fine Ashes Penetrate This Man's Lungs

Blowing down the tubes of a boiler is often an extremely dusty job, and the ash dust encountered is sharp and abrasive and highly irritating to the lung tissues. Use of this dust mask precludes all possibility of such particles entering the workman's respiratory organs, no matter how thick may be the cloud of it in the air breathed.

Recent Patents

Mining Machine; 1,552,909. Harry L. Brown, Glen Ridge, N. J. Sept. 8, 1925. Filed May 22, 1922; serial No. 562,829.

Coking-Retort Oven; 1,553,662. Joseph Becker, Pittsburgh, Pa., assignor to the Koppers Co., Pittsburgh, Pa. Sept. 15, 1925. Filed June 11, 1921; serial No. 476,677.

Coal-Loading Bucket; 1,554,164. Norman H. McClevey, Petersburg, Ind. Sept. 15, 1925. Filed July 14, 1924; serial No. 725,352.

Loading Machine; 1,554,725. Isidor S. Hochreiter, Luzerne, Pa. Sept. 22, 1925. Filed Feb. 19, 1923; serial No. 619,943.

Portable Coal Tipple; 1,554,885. Grover C. Singer, Oakland City, Ind. Sept. 22, 1925. Filed Jan. 6, 1925; serial No. 839.

Trade Literature

Automatic Voltage Regulators. General Electric Co., Schenectady, N. Y. Bulletin No. GEA-1234. Pp. 60; 8 x 10 1/4 in.; illustrated. In two sections, the first covering voltage regulators for alternating-current generators, protective relays, voltage regulators for direct-current generators and speed regulators for direct-current motors, and the second devoted to induction voltage regulators for station operation and induction voltage regulators for outdoor installation.

Specifications for Goheen Paints, Damp-Proofing, Water-Proofing, Goheen Corporation of New Jersey, Newark, N. J. Bulletin 102. Pp. 23; 8 1/2 x 11 in. This booklet should prove useful to mining men in the selection, specifying and use of paints for both underground and surface equipment. Numerous color charts are included.

Overland Line Contactors for Electric Locomotives. The Automatic Reclosing Circuit Breaker Co., Columbus, Ohio. Bulletin No. 504. Describes and illustrates the advantages of the Overland line contactors, why they reduce demand charges, their operation, etc.