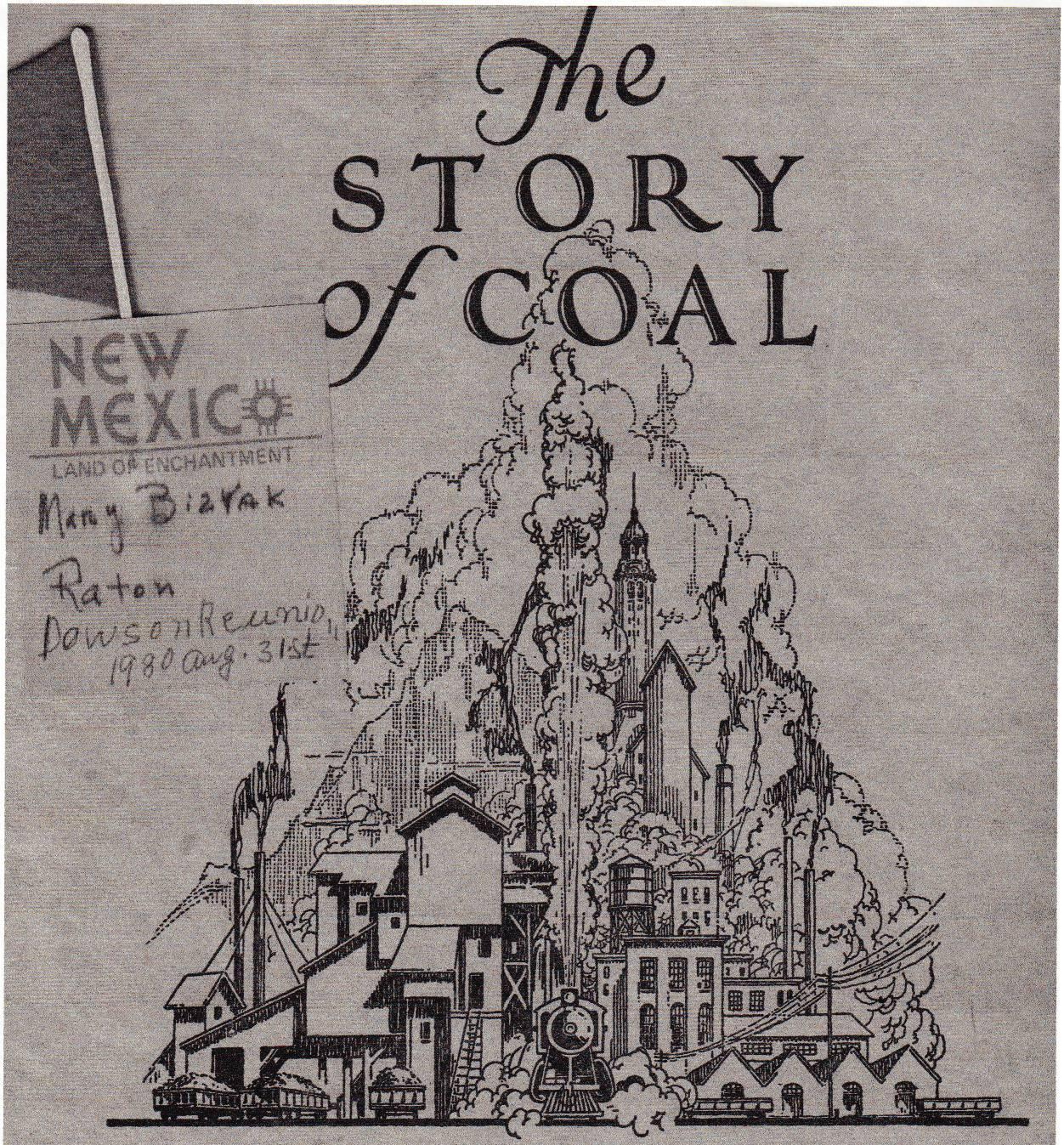
The STORY of COAL



PICTORIAL SUPPLEMENT of the DAWSON NEWS

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The Story of Coal

PICTORIAL SUPPLEMENT

of the

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THE DAWSON NEWS

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STAG CANON BRANCH

DAWSON, NEW MEXICO

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FOREWORD

IN presenting this pictorial supplement of The Dawson News, the publishers have endeavored to cover in a general way, the important features connected with the discovery, mining and preparation of coal; to the end that those who are engaged in the industry may more fully appreciate the importance of their work in service to mankind, and those who are unfamiliar with the titanic task of supplying this product, so essential to our modern civilization, may in a measure comprehend the effort which is daily being made to provide for their comfort and happiness.

WELFARE DEPARTMENT
PHELPS DODGE CORPORATION
STAG CANON BRANCH

Discovery of Coal Dates From the Fourth Century, B. C.

Historians have failed to record the exact date of the discovery of coal, but it is generally believed to have been sometime during the fourth century B. C. The Greeks probably were the first race of people to learn its use. It was not until the thirteenth century, however, that it began to enter actively in the trade of the old world, and nearly five more centuries passed before it was extensively mined. Following the invention of the steam engine in 1765, the industry of coal mining received its first real impetus.

The discovery of bituminous coal in America dates from about 1679, but mining operations of importance were not commenced until 1820 when there was a recorded production of 3,000 tons. From this date its use developed rapidly, the estimated production of bituminous coal in this country during the past year reaching the enormous amount of 579,386,000 tons.

COAL RESOURCES

In workable form, coal is perhaps more generally distributed throughout the world than any other known mineral. Coal deposits are found on every continent, in practically every country, and many of the larger islands of the sea. While the most authentic estimates of the coal resources of the world are only approximations, the data compiled by the Twelfth International Geological Congress, is of interest. Their estimate of the coal resources of the world, (in million metric tons) is as follows: Oceania, 170,410; Asia, 1,279,586; Africa, 57,839; America, 5,105,528; Europe, 784,190.

Within the boundaries of the United States are located the most extensive coal fields of the entire world. Coal is mined in 30 of the 48 states, the largest tonnage coming from the states of Pennsylvania, West Virginia and Illinois. Despite the fact that we have been drawing on our coal supply for more than a century, less than one percent of our estimated resources have as yet been touched. In many localities, however, a large percent of the best grade and most accessible coal has been mined.

COAL FIELDS OF NEW MEXICO

New Mexico is rapidly gaining a leading place among the coal producing states of the west. Within the state are five coal fields with mines being operated in 8 of its 31 counties. The area of coal land is variously estimated from 1,500,000 to 3,000,000 acres. The Raton field, located in Colfax County, and the Gallup field in McKinley County, are the most extensive and the state's largest producers. During the past year, more than 60 percent of the coal produced in New Mexico was mined in Colfax County.

The development of the coal land in Colfax County is being carried on largely by the Stag Canon Branch of the Phelps Dodge Corporation, which has extensive holdings in the vicinity of Dawson, and the St. Louis Rocky Mountain and Pacific Company, of Raton. The latter company is said to have the largest body of coal land under one ownership in the United States. In referring to the holdings of this company, J. E. Sheridan, who was United States Mine Inspector for the Territory of New Mexico for a number of years prior to 1912, made the following comment in his report for the year 1906. "The magnitude of this single coal field may be realized when compared with the great coal fields of Pennsylvania. The area of this single ownership is fully 50 percent greater than the combined area of all the anthracite fields in Pennsylvania, and five times as large as the entire Connelsville basin."

THE DAWSON FIELD

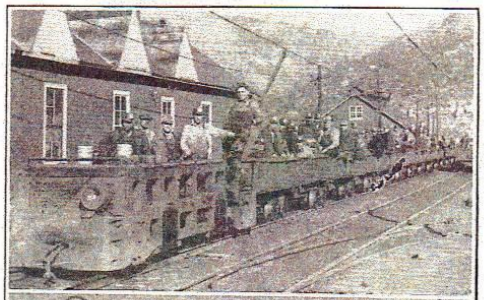
In the Dawson field, which is an extension of the Trinidad, Colorado and Raton fields, are located the mines of the Phelps Dodge Corporation which last year produced one-third of the coal mined in the entire state of New Mexico.

Geologically, the Vermejo formation of the Upper Cretaceous system carrying the coal measure of the Dawson field, has an average thickness of about 100 feet. There are two workable seams in this formation besides two or three smaller seams, ranging from one to two and a half feet in thickness. The Dawson mines are located upon the lower of the two workable seams, known as the Blossburg or Raton seam. The coal body shows an average thickness of eight feet.

The first mine in the Dawson field was opened as a source of home supply by J. B. Dawson, from whom was acquired in 1901, the major portion of the coal land owned by the original operating company. During that year a production of 300 tons was reported by the United States Mine Inspector for the Territory of New Mexico. The development of the field was rapid. On May 22, 1902, the first car load of coal passed over a newly constructed tipple. In 1909, seven years later, over 1,000,000 tons were mined. From that date, the annual production of the mines has averaged in excess of 1,000,000 tons.

Production, at the present time, is being obtained through eight mine openings, four of these being located in the immediate vicinity of the original mine. The mines opened more recently, lie west of the Vermejo valley, where an extensive body of coal is being developed.

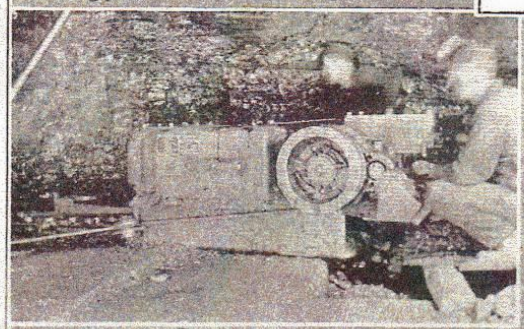
Keeping pace with the development of the mines, the town of Dawson has made a remarkable growth. From a group of tent-houses which provided shelter for employees during the early period of mine development, it has grown to be the largest town in the Southwest supported by a single industry. More than 5,000 people have their homes in this industrial city where practically every modern convenience has been provided.



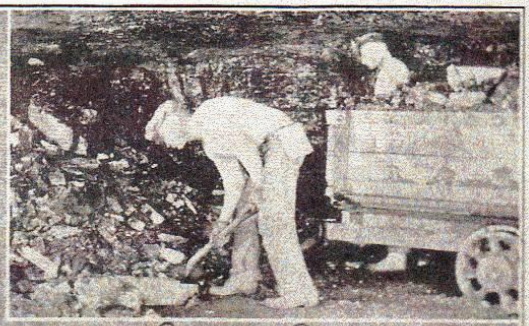
Workmen entering Mine

Typical Mine Entry

Typical Mine Room



Cutting Coal



Loading Coal

Methods of Mining Coal

The method employed in the mining of coal depends almost entirely upon the thickness and location of the coal seam, and the character of the stratum immediately above the seam. The more common methods are known as the Open-pit, Longwall and Room-and-pillar, each having various modifications.

Where the coal seam is near the surface of the ground, the Open-pit method is generally used. In this process, the cover over the coal is stripped off by excavating machinery. The coal thus exposed is usually dug and loaded in cars by steam shovels designed for that purpose.

The Longwall system is extensively used in districts where the coal seam is thin. The coal is mined on a continuous face, which may be either advancing or retreating. In the advancing method, the coal is mined without the driving of entries. As the coal is taken out, roadways from the starting point of development to the working face are maintained through the caved area by means of building pack-walls of waste rock on either side. Where the retreating method is used, entries are driven to the extreme boundary and the coal is mined on retreat.

In the Dawson mines, the Room-and-pillar method is used. Triple entries are driven from the mine openings, one serving as a haulage road, one as a return air course for the proper ventilation of the mine, and the third as an auxiliary man-way and return air course. From the main entries, cross entries are turned off in pairs, on 50-foot centers, at intervals of 630 feet. Starting on the return air course, rooms are turned at right angles on 50-foot centers. Before turning the first room, a barrier pillar of 150 feet is left as a protection to the main haulage road. In starting the rooms, a width of 10 feet is maintained for the first 20 feet of advance. The rooms are then widened to 20 feet and driven to a distance of 300 feet. When this point in the development has been reached, there remains between every two rooms a block of coal 30 feet wide by 300 feet long, known as a pillar. These pillars

are then "pulled" or mined on "retreat," and the roof caves into the area from which the coal has been extracted. Rooms are then turned off the intake entry in similar manner.

The width of the main and cross entries and air courses is 10 feet; the height of the air courses, and haulage roads approximately 6 feet. The main entry of the deepest mine is nearly three miles long. In connection with this brief discussion of mining methods attention is called to the sketch on page 22.

MECHANICAL FEATURES

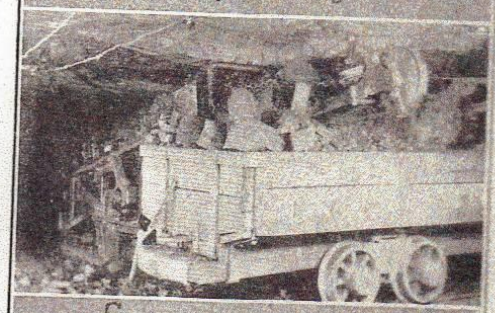
For many years picks and shovels were practically the only tools used in connection with the mining of coal. The constantly increasing demand for the product led to the development of methods for increasing production. Perhaps the most important step in this direction was the invention of a machine for the cutting of the coal. Machines designed for this purpose, eliminated to a large extent, the laborious and hazardous task of digging out the coal with picks, and they are now practically indispensable in coal mining operations.

The principle on which the modern types of coal cutting machine operate, is comparatively simple. An endless chain in which steel bits are fastened at various angles, is electrically driven around a cutter-bar, the general construction depending upon the various conditions under which the machine is to be used. The cutter-bar is driven in or "sumped," at one side of the area to be undercut. As the machine moves across to the opposite side, a "kerf" or channel is cut in the coal to the depth of the cutter bar.

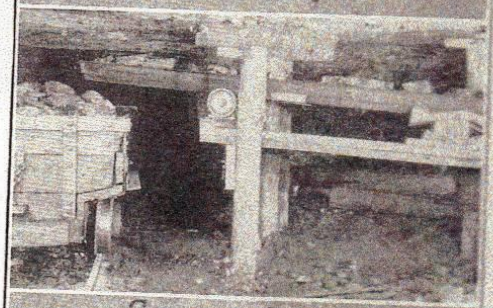
In the Dawson mines, 50 Shortwall and Breast mining machines are in daily use. One of the accompanying illustrations shows a modern type of mining machine in operation.

Rapid strides have also been made in recent years in improving mine haulage equipment, and in the development of mechanical loading. Entry-loaders, Belt Conveyors and Shaker-loaders are being used in several of the Dawson mines with considerable success.

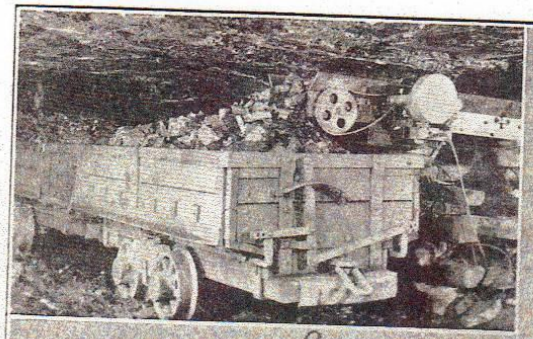
Scraper gathering Coal



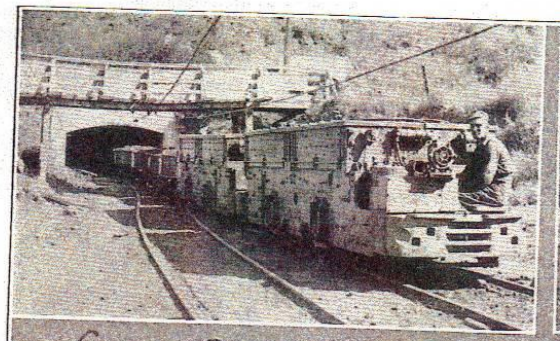
Scraper loading Coal



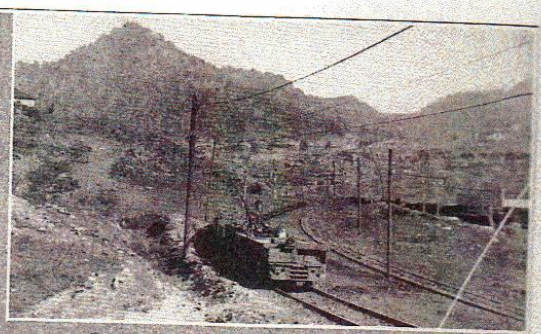
Shaking Conveyor



Loading Coal by Belt Conveyor



Loaded Trip leaving mine



On the way to the tipple

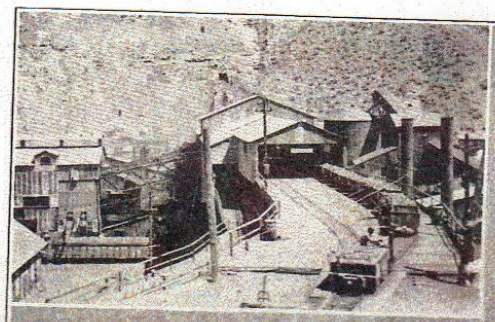
Preparation of Coal is an Important Feature

If the mining of coal were the only operation necessary for the production of a marketable product, our fuel bills would be reduced considerably. The demands of the trade for various grades and sizes of coal necessitate large expenditures of money for the construction, maintenance and operation of preparation plants. A brief description of "Dawson Preparation" is given in the following paragraphs.

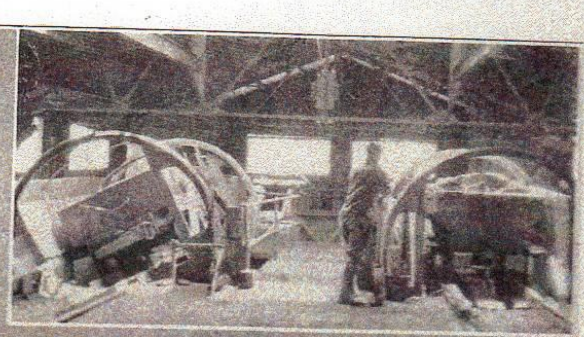
Four plants for the preparation of coal are operated at the Dawson mines. The largest, known as No. 1 and No. 2 tipple, is an all steel structure, equipped in two separate units to handle a combined daily capacity of 6,000 tons in nine hours' operation. Two separate tracks on the top floor of the tipple lead to two independent automatic weighing scales and rotary dumps. Each trip of cars is divided before arrival at the tipple, permitting the two separate units each to handle one-half the trip at the same time.

As each car is automatically clamped into place, the rotary dump turns it completely over, allowing the coal to fall into the 12-ton hopper below with a minimum of breakage. Each one of the mine cars contains approximately two tons of coal. The miner's check, securely attached by a snap to the inside of the car, is then released, placed on a conveyor belt and deposited in trip order, on the weighman's table in the cabin above. The check number is entered opposite the car's loaded weight and credited to the miner holding that check number. Automatically released from the rotary dump by the arrival of the next loaded car, the empty car runs off by gravity onto a switch-back and is coupled to the string of empties ready for the return trip to the mine. Under normal operating conditions three cars a minute are handled by each rotary dump.

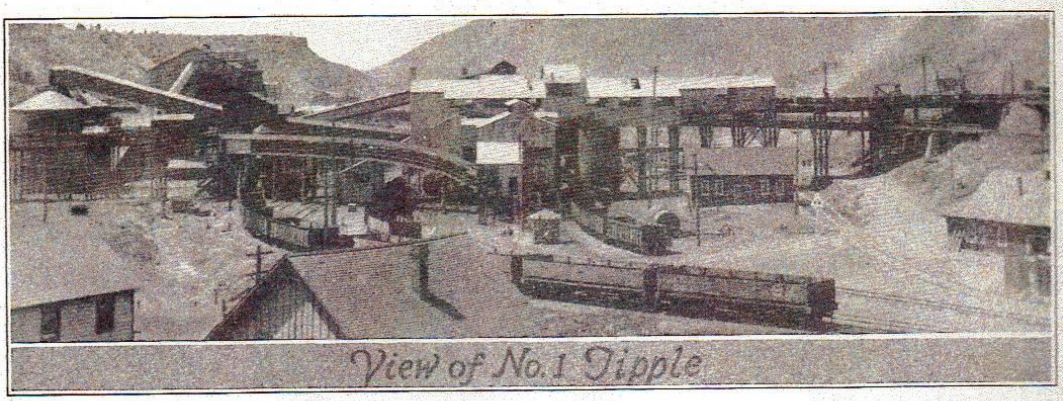
Beneath each hopper is a separate unit of shaker screens for the sizing of coal. An automatic feeder from the bottom of the hopper to the top shaker screen maintains an even flow, insuring an equal distribution over the screens and also prevents choking. Each set of shaker screens is set on a 14-degree slant and maintains a ten-inch back-and-forth motion to keep the coal moving. The top screen is comprised of a series



Trip Entering Tipple



Rotary Dump



View of No. 1 Tipple

of six steel plates, 72 x 42 inches in size perforated with 6-inch round holes. The over-size coal, known as "Dawson Fancy Lump," slides off the lower end of the screen onto 12-foot picking tables, passing under the scrutiny of men who remove the bone or rock. From these tables, the lump is loaded directly into railroad cars by means of an adjustable boom.

Beneath the top shaker screen, and paralleling it, is a screen of six steel plates, perforated with $2\frac{1}{2}$-inch square holes. The slack and undersize coal passing through this screen falls into a large hopper below and from thence is carried by conveyors to be loaded into railroad cars as stoker coal for locomotive boiler use.

The over size coal coming off the lower end of this screen, ranging from $2\frac{1}{2}$ inches to 6 inches in size, is carried by conveyor belts to the re-screening plant. Here the process of separation as to size and the removal of impurities is continued.

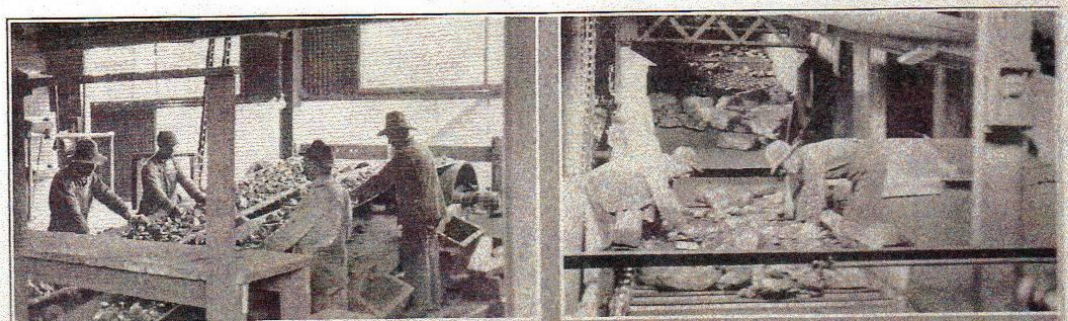
The coal now passes over a second series of shaker screens, quite identical in process with that carried on at the main tipple. The top shaker screen, 7 x 21 feet and perforated with holes 3 inches square, retains the oversize product, 3 to 6 inches in size, known as "Dawson Fancy Egg" coal. The undersize coal falls through the upper on to the lower screen of the same dimensions, perforated with holes $1\frac{1}{2}$ inches square, thus removing all coal from $1\frac{1}{2}$ to 3 inches in size, and commercially known as "Dawson Fancy Nut" coal. The undersize then passes over another screen, perforated with holes $\frac{3}{4}$-inch square, to remove the slack, and produces what is known as "Dawson Fancy Pea" coal.

Both for the "Fancy Nut" and "Fancy Egg" coal, a special system of preparation is separately maintained. Upon discharge from the shaker screen, both are evenly fed upon a double picking conveyor belt, 15 feet long, and 34 inches wide. Men are stationed at each side of the conveyor to remove any impurity appearing in the coal.

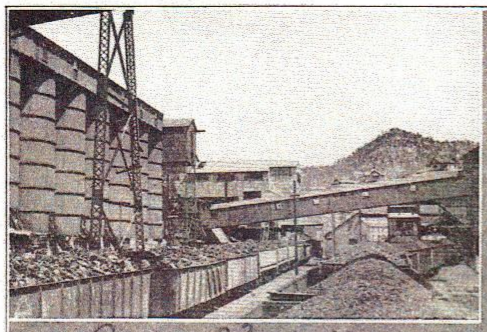
TIPPLE MACHINERY

All the machinery throughout the tipple is electrically driven. For the tipple operations 18 motors are used, requiring a total of 350 H. P. The combined length of the conveyor system is approximately 2500 feet.

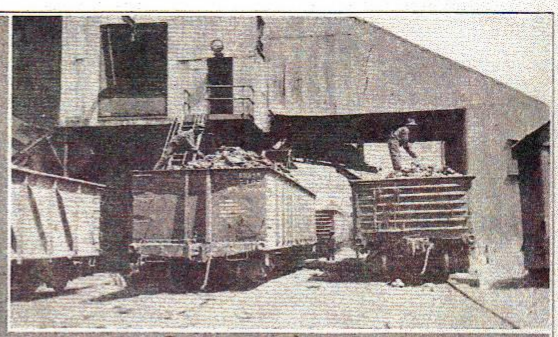
In connection with the loading devices, there has recently been installed an adjustable boom which reduces to a minimum the breakage of coal as it is loaded into railroad cars for shipment.



Picking Tables



Loading Yards No. 1



Loading Yards No. 2

Organization and Details of Coal Mining Operations

The personnel of the organization engaged in the operation of the Dawson mines and the necessary surface plants, normally includes about 1,100 employees.

In addition to the supervisory force, there are four general classifications of underground workmen, i.e., miners, loaders, machine mining contractors and company men. The company men include shot firers, fire bosses, and those engaged in the operation of mine haulage, timbering, tracklaying, sprinkling and the extension and maintenance of pipe and power lines.

SHOT FIRING SYSTEM

As most of the coal is broken down by explosives, much thought has been given to the development of a system to provide a maximum degree of safety to life and limb in the handling of powder and the firing of shots.

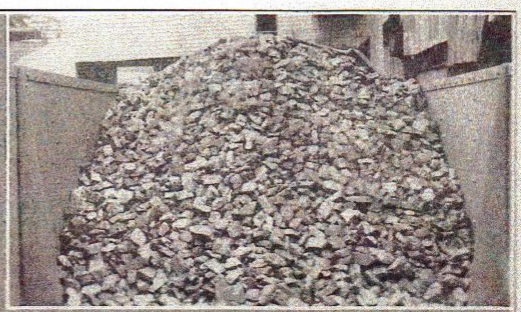
Preparatory to shooting down the coal after it has been undercut by the mining machines, (an operation of the machine mining contractors) three holes are drilled near the top of the seam; one in the center and one at each side of the exposed area. These holes are loaded by the shot firer after all the miners and other workmen have been checked out of the mine. The shot firer is the only man permitted to handle explosives. Only permissible powder is used. (Powder approved by the Bureau of Mines). The charge is then connected with a power line. After completing his rounds to all the places where coal is to be broken down for the following day's loading, and ascertaining that every man has been checked out of the mine, the shot firer reports to the lamp-man. When all the other shot firers working in the adjacent mines have also reported, the lamp-man goes to a sub-station and throws a switch which makes connection with the power line, firing all shots in each mine at one time. Fifteen minutes after the shots have been fired, the shot firer re-enters the mine to ascertain if any of the shots failed to discharge and inspects each working place for possible fires which might have resulted from a "blownout-shot."

THE FIRE BOSS

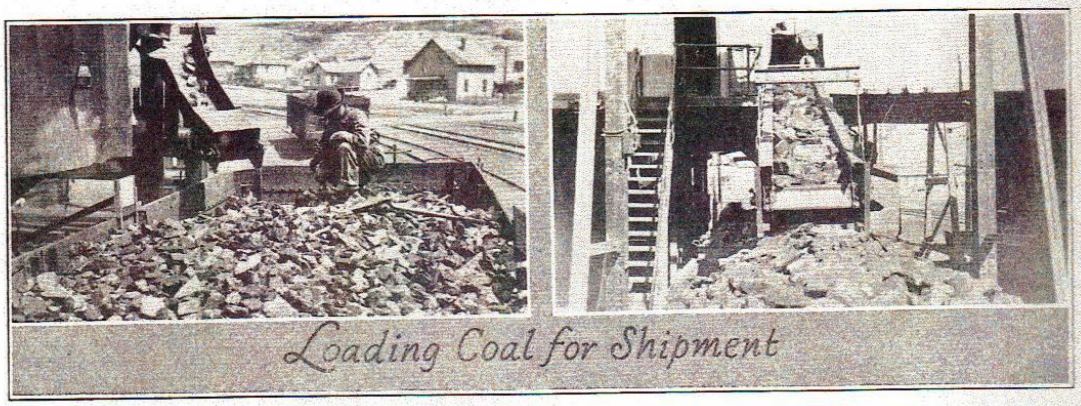
The fire boss occupies one of the most responsible positions in a coal mining organization. To him is entrusted, in a large measure, the safety of the men in the mine.

These men enter the mines in the morning and make a careful inspection of every place where men are to work during that day. It is their especial duty to locate any hazardous condition, giving particular attention to the ventilation of the mine. By the aid of a

Fancy Lump



Fancy Egg



Loading Coal for Shipment

flame safety lamp designed for that purpose, they test every room and working place for the presence of gas. Roof conditions are also noted. At each working face they record the date of their inspection and their initials.

These inspections are made at such an hour in the morning, that the fire bosses are enabled to return to the outside in time to check in each miner and inform him as to the condition of his working place; his attention is also called to any special precaution that should be exercised.

LOADING THE COAL

Upon arrival at the mines in the morning each man working under-ground is furnished an approved Edison electric safety lamp. Open lights are absolutely prohibited. After being checked in by the fire bosses, the miners and other workmen are taken into the mines on the man-trips, which are safeguarded by a speed limit of not more than five miles per hour.

The first duty of the miner upon reaching his working place, is to carry out any instructions which he may have received from the fire boss; examine the roof, set any props that may be necessary and otherwise provide for his own safety. This preliminary work having been completed, he sprinkles down his working place and sets to work loading the coal into the cars which are brought to him by the drivers or motormen. As the cars are loaded, he attaches his check number to a snap on the inside of the car, which provides the means of receiving proper credit for his labor.

HAULAGE ROADS AND EQUIPMENT

A safe and efficient haulage system is of paramount importance. In most mines, haulage constitutes one of the largest items of mining expense. Delays are costly to both the miner and the operator.

The loaded cars in the various rooms are hauled by storage battery locomotives or mules to the partings or sidings within the mines from whence they are brought to the outside yards by electric haulage motors, of which there are 39 in use. As a safety measure, the trips are limited to 35 cars and a speed limit of 800 feet per minute.

There are 30 miles of haulage tracks in the main and cross entries, all of which are laid with spruce ties and heavy rails. The production from mines Nos. 1, 2, 3 and 6 is conveyed to the tipple over a tramway 6,000 feet long, in trips of 40 cars, by electric locomotives.

VENTILATION

Of the numerous details comprising the general operations of coal mining, ventilation is considered one of the most important. Specific requirements as to ventilation are prescribed by law.

The Dawson mines are regarded as being especially well ventilated. Eight electrically driven exhaust fans are in operation. These exhaust fans furnish a volume of air from three to five times in excess of the minimum amount required by the state law.

Fancy Nut Coal

Fancy Pea Coal

Methods of Reducing Coal Mining Hazards

Due to the frequency of coal mine explosions and the attendant destruction of property and loss of life, much thought and attention has been given in recent years to the development of ways and means of minimizing the possibility of such disasters.

Gas and coal dust are generally recognized as the most dangerous explosive agents encountered in coal mining operations. Methane, known to the miners as "fire damp" or "gas," is colorless, odorless and tasteless. It is constantly given off in most coal mines and forms explosive mixtures with air. For many years it was generally believed to be almost wholly responsible for mine explosions. The invention of the flame safety lamp for its detection, was an important step in the reduction of the number of gas explosions. "Fire damp" is usually of local occurrence, and except in notable instances, is controllable by careful manipulation of ventilating currents. If, by mischance, a body of "fire damp" is ignited in a mine, the force of the explosion may be terrific, but the effect is local unless coal dust is present or the explosive mixture of methane and air extends through a large area of the mine.

Not an Oil Well, but an Explosion of Coal Dust

Only within comparatively recent years has the dry dust of bituminous coal been generally recognized as an explosive agent more insidious, threatening and deadly to the miner than "fire damp." In a dry mine, dust accumulates everywhere. It is produced for the most part at the working face in connection with the operations of undercutting, blasting, digging and loading into pit cars. A large quantity is also produced by the spillage from cars being ground into dust by the traffic along the entries. Much of this dust, with the fine "float" dust from the tops of cars, is picked up by the ventilating currents and deposited on the ribs, roof and timbers.

In the event of an explosion due to the ignition of gas, or any other cause, the dust is thrown into suspension and thus serves to propagate the blast through miles of entries and rooms, wrecking everything to the entrance of the mine.

SPRINKLING AND ROCK DUSTING

While it is impossible to make a coal mine dustless, the coal dust may be rendered incombustible by wetting it down at the source and neutralizing it with rock dust at other points where it accumulates.

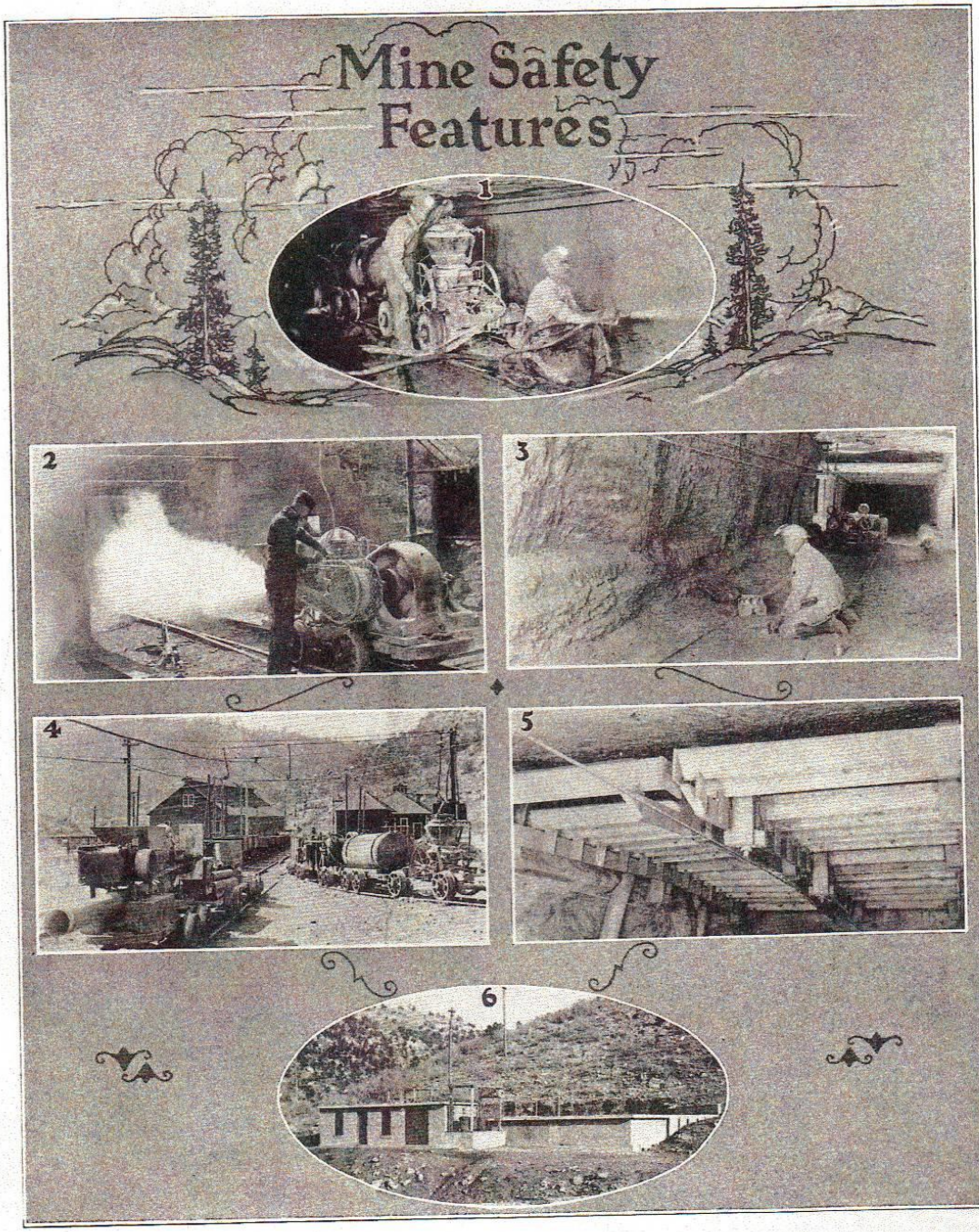
In the Dawson mines, this is accomplished by wetting down the machine cuttings as they are produced, sprinkling all coal before it is loaded into the cars, and drenching all of the loaded cars before they leave the inside of the mine. As a further precaution, all of the rooms are kept sprinkled and the intake air saturated by atomizers.

Rock dusting is perhaps the most effective means of minimizing the possibility of explosions in a dusty mine. Tests on Dawson coal made by the U. S. Bureau of Mines, show that an explosion will not propagate through a mixture of 30 percent coal dust and 70 percent shale dust with one percent of gas in the air current.

Adobe, which is obtainable in large quantities adjacent to the mines, is used for dusting the floors of haulage roads and aircourses in the Dawson mines. When scattered along the haulage roads, the adobe soon loses its moisture and is effectively distributed on the ribs and roof by the disturbance resulting from passing trips, men and animals. The dusted areas are frequently sampled in order that the proper mixture may be maintained at all times.

As a further means of neutralizing the coal dust, screened adobe, other incombustible dusts, are mixed with water and plastered on the ribs and roof of the entries by means of a "Cement Gun." This process is known as "muditing." Since the coating excludes all air, it prevents the coal from sloughing and assists in keeping the entries clean. Dry pulverized limestone, discharged through portable blowers, is also extensively used as a neutralizing agent.

At all cross entries and at various intervals on the main entries, "dust barriers" are installed. These barriers consist of a series of dust filled V-shaped troughs, usually 16 in number, suspended near the roof. They are so balanced that they can be easily overturned by the force of any explosion that might occur. The dust thrown into suspension is designed to neutralize the coal dust in that immediate area and thus prevent further extension of the blast.



1. *"Mudding" an Entry*
2. *Portable Rock Dust Blower in Operation*
3. *Sampling a Dusted Entry*
4. *Various Types of Portable Dusting Machines*
5. *Rock Dust Barrier*
6. *Typical Mine Ventilating Fan*

First Aid and Mine Rescue Work

1. *Champion First Aid Team, 1925*
2. *One of the Mine Rescue Teams*
3. *Champion First Aid Team, 1926*
4. *No. 8 and 9 First Aid Teams*
5. *Oldest First Aid Team in America*
6. *First Aid Contest*

First Aid and Mine Rescue Training

To those engaged in the occupation of coal mining, as in other industrial pursuits, a knowledge of first aid to the injured is of vital importance. Many minor accidents which occur may become serious and many serious accidents may prove fatal, unless proper and immediate attention is rendered the injured persons.

Recognizing this fact, much stress is placed on first aid instruction at the Dawson mines and every possible effort is made to impress on the minds of the workmen its importance as a means of protecting their own well-being and that of their fellows. A trained first aid instructor is employed who devotes his entire time to this work. Part-time instructors are also employed through the cooperation of the supervisors of trade and industrial education which is carried on under the direction of the state and federal government.

First-Aid Trophy

Through the operation of a carefully developed plan of instruction, every employee in the operating departments is given an opportunity to acquire a practical knowledge of first aid to the injured. Many of these having but little or no knowledge of English, classes are conducted for the various foreign groups with practical first aid men who speak the respective languages, as instructors. As soon as an employee has acquired the necessary knowledge to pass a prescribed examination, he is awarded a certificate of proficiency. These certificates are renewed each succeeding year upon successfully passing another examination.

Supplementing the first aid instruction given in connection with the regular mining operations, representatives of the U. S. Bureau of Mines visit the district each year for the purpose of giving instruction in first aid and examining those previously instructed. Those successful in passing this examination are awarded government certificates. A special award is also being arranged for those who show especial aptitude in first aid work.

As a means of furthering interest and attaining greater proficiency in this work, first aid contests are held each year. Teams representing the several mines enter into competition for a cash prize and the honor of having the first aid trophy displayed at their mine during the year following the contest.

The Dawson mines claim the distinction of having the oldest first aid team in America. The combined ages of the six men total 360 years, the youngest member of the team being 49 years of age, and the oldest 71.

MINE RESCUE TRAINING

Mine rescue training is also of paramount importance. In the event of workmen being overcome by mine gas, or exit from the mine is cut-off by a possible fire or explosion, trained rescue crews are an immediate necessity. It is these men who become the men of the hour when rescue work is required.

Training for mine rescue work comprises a thorough knowledge of mine gases and their detection, ventilating currents, methods of erecting barricades and the use of gas masks and oxygen breathing apparatus. Knowledge is also required regarding surface organization and methods of procedure for recovery operations.

In furtherance of this educational work, a splendidly equipped training station has been built for the use of this department. In connection with its construction, a training gallery was driven into the mountain immediately back of the building. This gallery duplicates the double entry of a mine and contains all the features found in the ordinary mine workings. For training purposes, the gallery is filled with formaldehyde fumes in which men wearing oxygen breathing apparatus remain for a two-hour period crawling under and over the imposed obstructions, arranged as they would exist in a wrecked mine, doing work and undergoing the experiences they would be called upon to meet under actual conditions.

For emergency use in case of mine accident or mine fire, the station is equipped for immediate service with ten full sets of oxygen breathing apparatus of the "Paul" type. Supplementary equipment for emergency service consists of 12 oxygen storage cylinders of 100-ft. capacity; ten extra large size oxygen cylinders for the "Paul" machines; and 150 regenerators filled with cardoxide for attaching to the breathing apparatus to purify the air that has once been breathed. There are also five sets of "All-Service" gas masks.

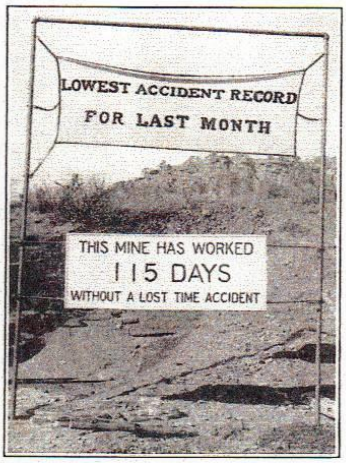
Accident Prevention a Common Objective

Coal mining, as an occupation, is hazardous under the most ideal conditions. Confronted with this inalterable fact, both employers and employees are cognizant that an active and incessant campaign for the prevention of accidents is an essential part of coal mining operations.

It has been repeatedly shown by statistics covering industrial accidents, that a large percent of all accidents that occur could have been prevented and were the direct result of carelessness. The cooperative effort that is put forth in reducing the number of these avoidable accidents not only results in a great saving of life and limb, but is also a distinct economic gain to all parties at interest.

SAFETY ORGANIZATION

An efficient and comprehensive organization is one of the most important factors in any accident prevention campaign. The safety organization at the Dawson mines is designed not only for the rigid enforcement of all rules of safety and the maintenance of all safety equipment in efficient working condition, but also for the development and sustention of a general interest in accident prevention. A safety engineer is employed who gives his entire attention to this work. Functioning in an active manner with the safety engineer, are a number of safety committees. These committees are known as Departmental and General.



Monthly Honor Banner

The Departmental Committees are composed of practical workmen. For each mine and the surface plant, there is selected a committee, usually three members, to serve for a period of three months. The foreman or assistant foreman acts as chairman. The selection of the committeemen is so rotated that only one change in personnel occurs each month. In this manner, the new member is enabled to profit by contact with those of previous experience.

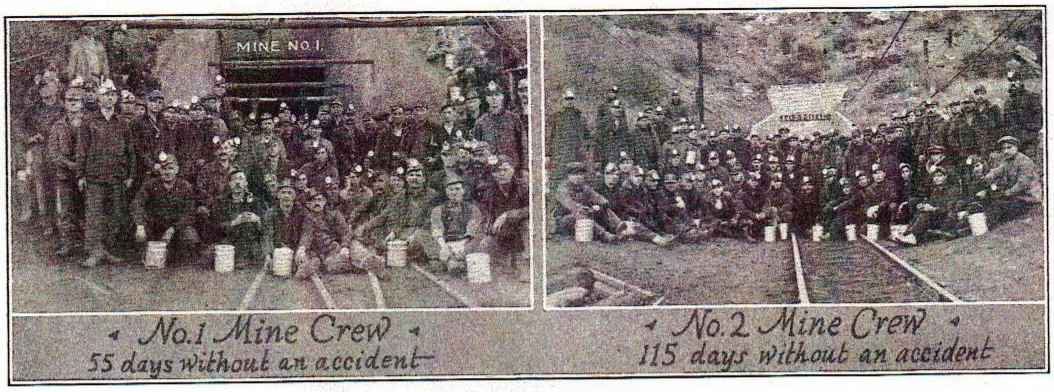
The chief duty of the Departmental Committee is to establish safer and better working conditions for the employees in their department. They make a study of the general conditions, departmental and occupational hazards and practices, and endeavor to encourage the cooperation of their fellow workmen in promptly reporting for correction any existing unsafe conditions or practices through which personal injury may result. Meetings are held at least once each month for the purpose of making formal departmental inspections, reviewing the accidents of the previous month and making such recommendations to the General Committee as they may deem advisable. An appropriate badge is presented to all employees who serve in this capacity.

The General Committee is composed of the local executive staff of the corporation, the manager acting as chairman. To the members of this committee, all safety matters of importance are submitted for consideration. Meetings are held monthly for the purpose of passing upon important recommendations made by the Safety Engineer, Departmental Committees or others. Accidents are reviewed and consideration given to any new phases of the safety movement.

In addition to the work of these committees, daily inspections are made and safety instruction given to the workmen by the foremen, assistant foremen, fire bosses, shot firers and others who share the responsibilities of supervision. Once each year the mines are given a rigid inspection by an outside coal mining engineer of recognized ability.

THE SAFETY ENGINEER

The position of the Safety Engineer in the Dawson organization is somewhat unusual. Not only has he general supervision of all safety work, but he is also vested with operating authority. By this arrangement immediate action may be obtained in cases where the delay occasioned by the usual method of reporting hazardous conditions, might prove disastrous. It is his duty to make regular inspections of all departments for the purpose of eliminating accident hazards and dangerous practices. These inspections involve a careful investigation of ventilation, dust accumulations, sprinkling, haulage roads and equipment, power lines and checking the work of the shot firers and fire bosses. It is his especial duty to investigate and study all accidents for the purpose of making recommendations to remove the causes and prevent recurrence of similar accidents. Acting in an advisory capacity, and also as secretary, he is in attendance at all meetings of the Departmental Committees, prepares the necessary reports and sees that all recommendations are given prompt consideration. The various phases of safety education are also under his supervision.



No. 1 Mine Crew
55 days without an accident

No. 2 Mine Crew
115 days without an accident

PRACTICAL MINING SCHOOL

A survey of mine accidents reveals that the frequency rate is usually the highest among new employees who have had but little or no experience working underground. In this connection, the practical mining school instituted at Dawson for the training of inexperienced men, is of interest.

An entry in one of the larger mines has been set apart for the use of the school and a practical miner with teaching experience, placed in charge as instructor. When inexperienced men are employed, they are placed in this school. Here they are taught the essentials of safe mining practice, the proper use of mine tools and methods of providing for their own safety. Under the close supervision of the instructor, the new men acquire the safety habit.

A detailed record of each student is kept by the instructor, showing name, age, nationality, previous mining experience, date enrolled and progress in the school. As soon as a student acquires the knowledge regarded as necessary for safe and efficient work outside the school, he is transferred to some other mine and takes his place in the regular operating department. The period of instruction is usually about 70 days, depending upon the amount of previous experience and the aptitude of the student.

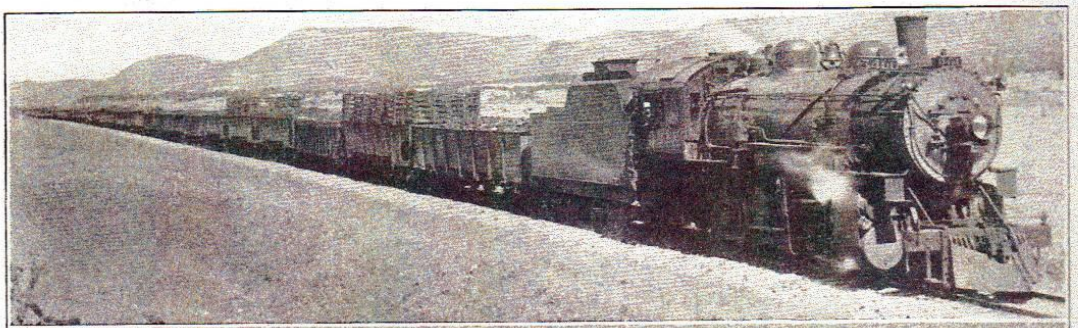
The results accomplished in the school thus far have been very encouraging, both from the standpoint of developing capable miners and reducing the number of accidents which occur among the new men. Nearly 70 percent of the men enrolled have developed into good miners. From the standpoint of accident prevention, the results have been even more encouraging. During the past nine months 30,000 tons of coal have been mined in the school with only one lost-time accident. This accident resulted in but three days loss of time. Among the men transferred out of the school, there has not been an accident.

ACCIDENT PREVENTION CONTESTS

Monthly contests for the best accident prevention record are entered into by the employees of the several mines. At the portal of the mine having the best record, based on the tonnage of coal produced and the number of days lost on account of accidents, there is displayed the Monthly Honor Banner. The number of days worked without a lost-time accident is conspicuously shown at each mine on large signs which are corrected daily. To date, the best record has been attained by No. 2 mine, the employees of this division having worked 115 days without a lost-time accident.

Through the cooperation of the management and the workmen at the Dawson mines, the results accomplished in this important field have been noteworthy. In 1925 the accident frequency rate was reduced 14 percent. During the past year there was a reduction of 46 percent.

"Silent Foremen"



Coal Train leaving the Dawson Mines

Coal An Important Commercial Factor

Coal, and its by-products, rank among our most important commercial factors. While for many years it was used only for domestic purposes, its production at the present time, is directly or indirectly, necessary to most of our industrial enterprises. Despite the hydro-electric and oil development of recent years, coal continues to furnish the principal source of power.

In an address recently delivered before the American Institute of Mining and Metallurgical Engineers, Walter Barnum, president of the National Coal Association, stated that more than 60 percent of the total energy developed by the use of mineral fuels and water power in 1925 was obtained from coal. If all the theoretically available water power east of the Mississippi were utilized, he said, it would replace less than five percent of the bituminous production.

It is estimated that the bituminous coal produced in the United States during the past year was used as follows:

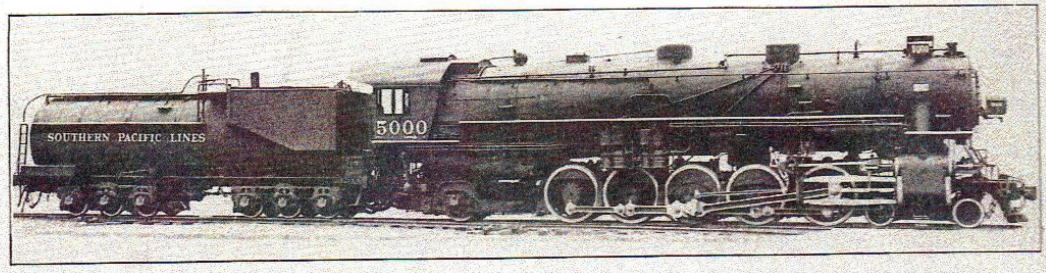
Industrial Purposes	32%
Railroads	29%
Domestic Purposes	10%
Manufacture of By-Product Coke	10%
Electric Utilities	6%
Manufacture of Beehive Coke	4%
Steamship Bunkers	2%
Used at the Mines	2%
Manufacture of Coal Gas	1%
Exported	4%

One of the most important developments in recent years, affecting the coal industry, has been the rapid increase in the use of pulverized coal. Not only has it resulted in the more general use of coal, but it has made possible the use of low grade fuel for which there was previously but little demand.

Pulverized coal is now extensively used under stationary and locomotive boilers, in reverberatory and metallurgical furnaces, and in connection with the manufacture of gas, lime, and cement.

BI-PRODUCTS OF COAL

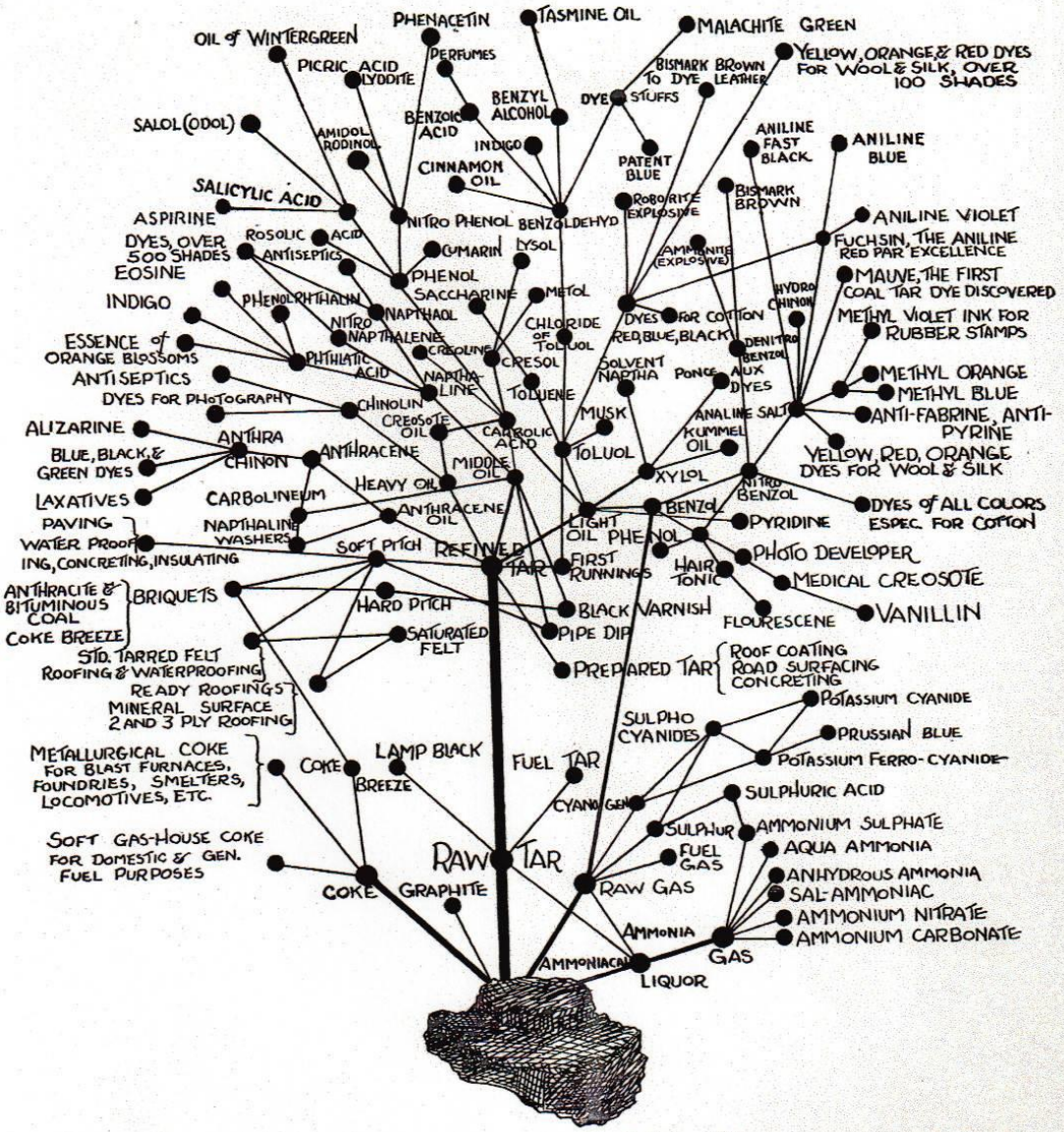
Through a process of heating coal in ovens designed for that particular purpose, a great variety of by-products may be obtained. The most common of these are coke, tar, gas and ammonia liquor. Some of the other bi-products are shown in the chart on the following page.



By courtesy of the Southern Pacific Co.

Above is the most modern development in railroad locomotive construction. It is the new Southern Pacific type locomotive with three cylinders and ten driving wheels. It is 105 feet and one-eighth inch in length and weighs 685,200 pounds.

The Southern Pacific Company is one of the largest users of Dawson Coal.

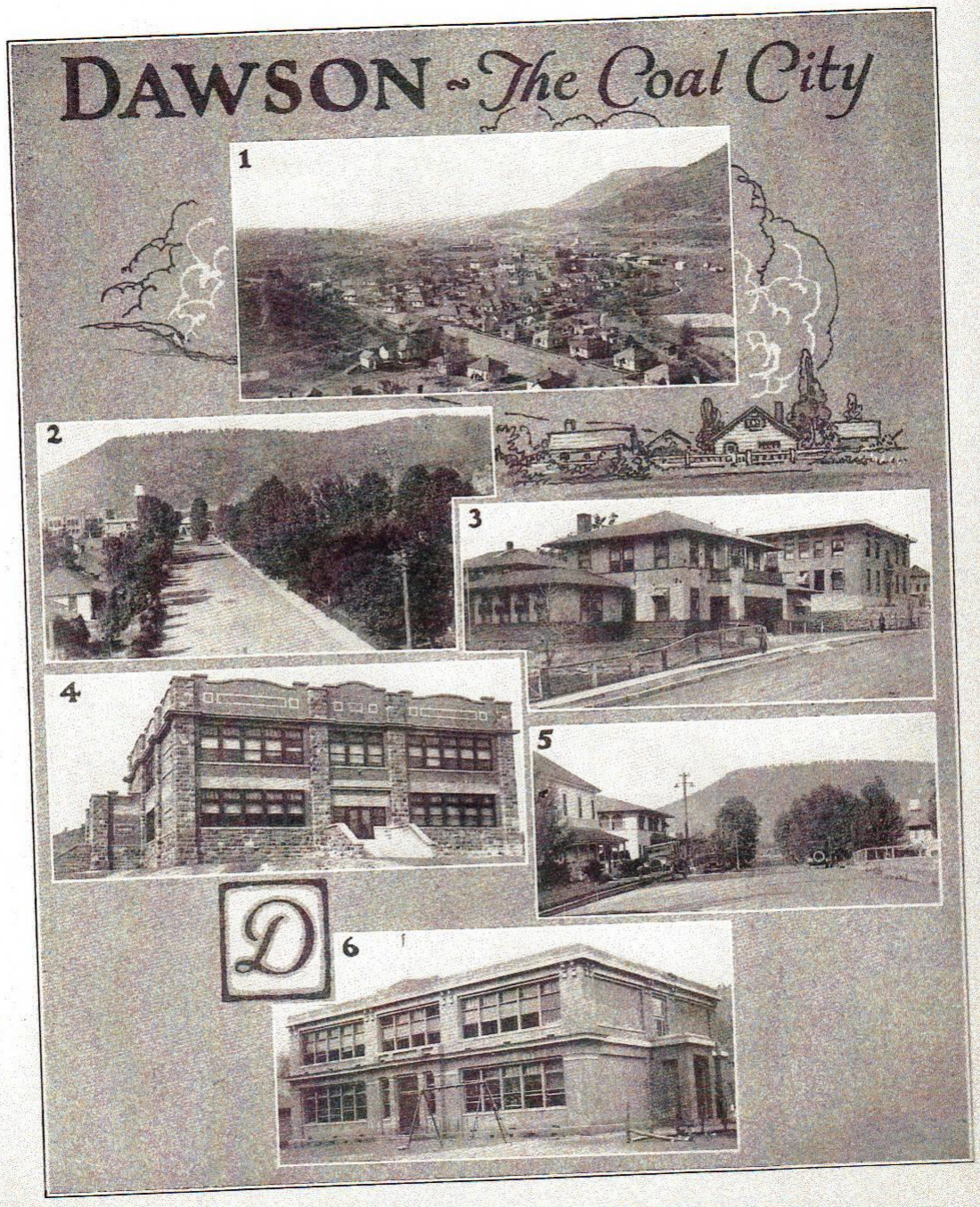


By Courtesy of Jeffrey Service, Jeffrey Mfg. Co., Columbus, Ohio

What Is In a Lump of Coal?

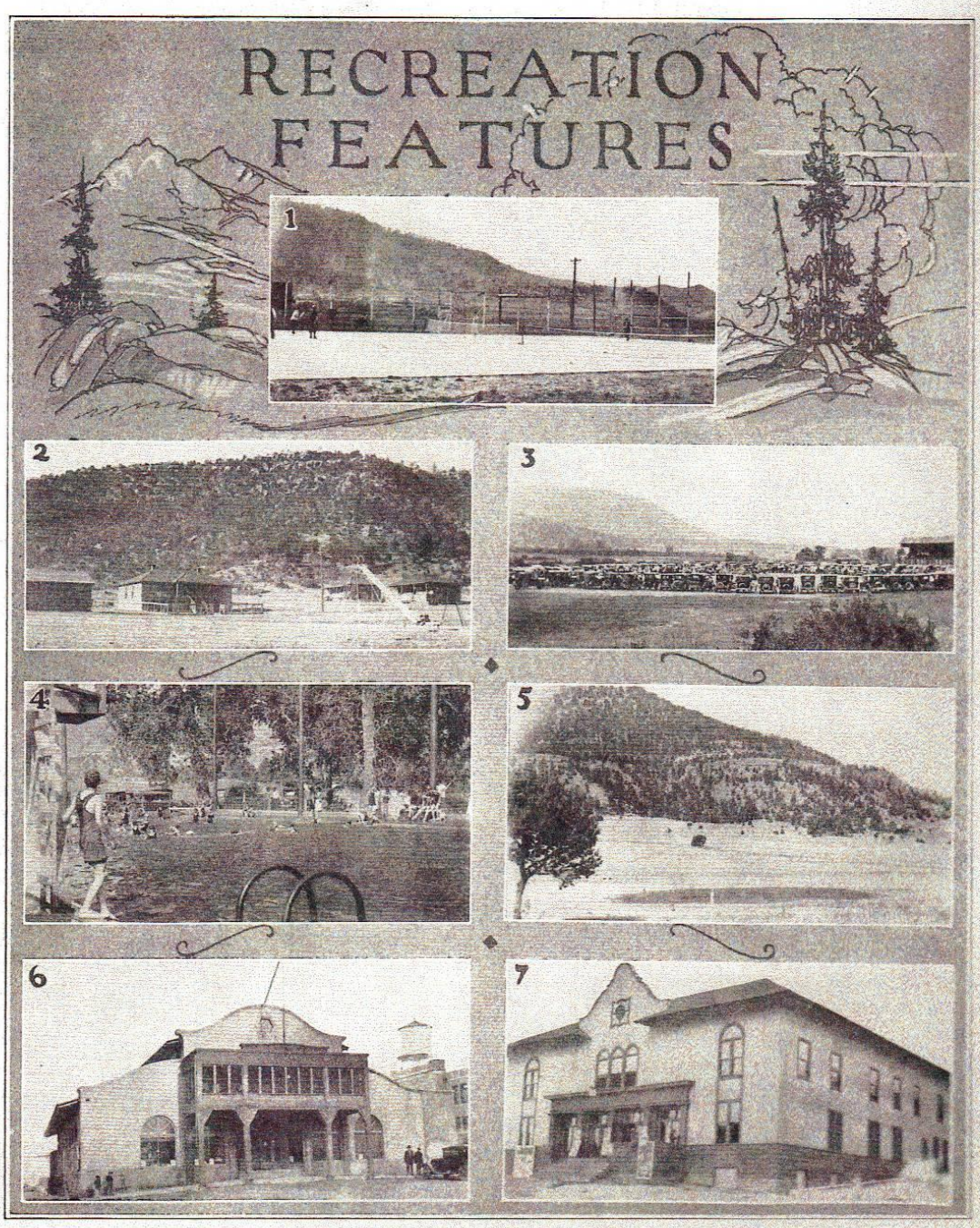
Hair tonic, perfumes, crude carbolic acid, laxatives, antiseptics, dyes, oils, explosives, roofing, paving, ink, and numerous other items of common usage, are all by-products of coal. The coal that we shoveled into the stove or furnace could, if put under the proper environment, have been converted into any of the many products shown in the accompanying chart. The amount to be derived from one lump of coal would, of course, be practically infinitesimal.

DAWSON ~ *The Coal City*

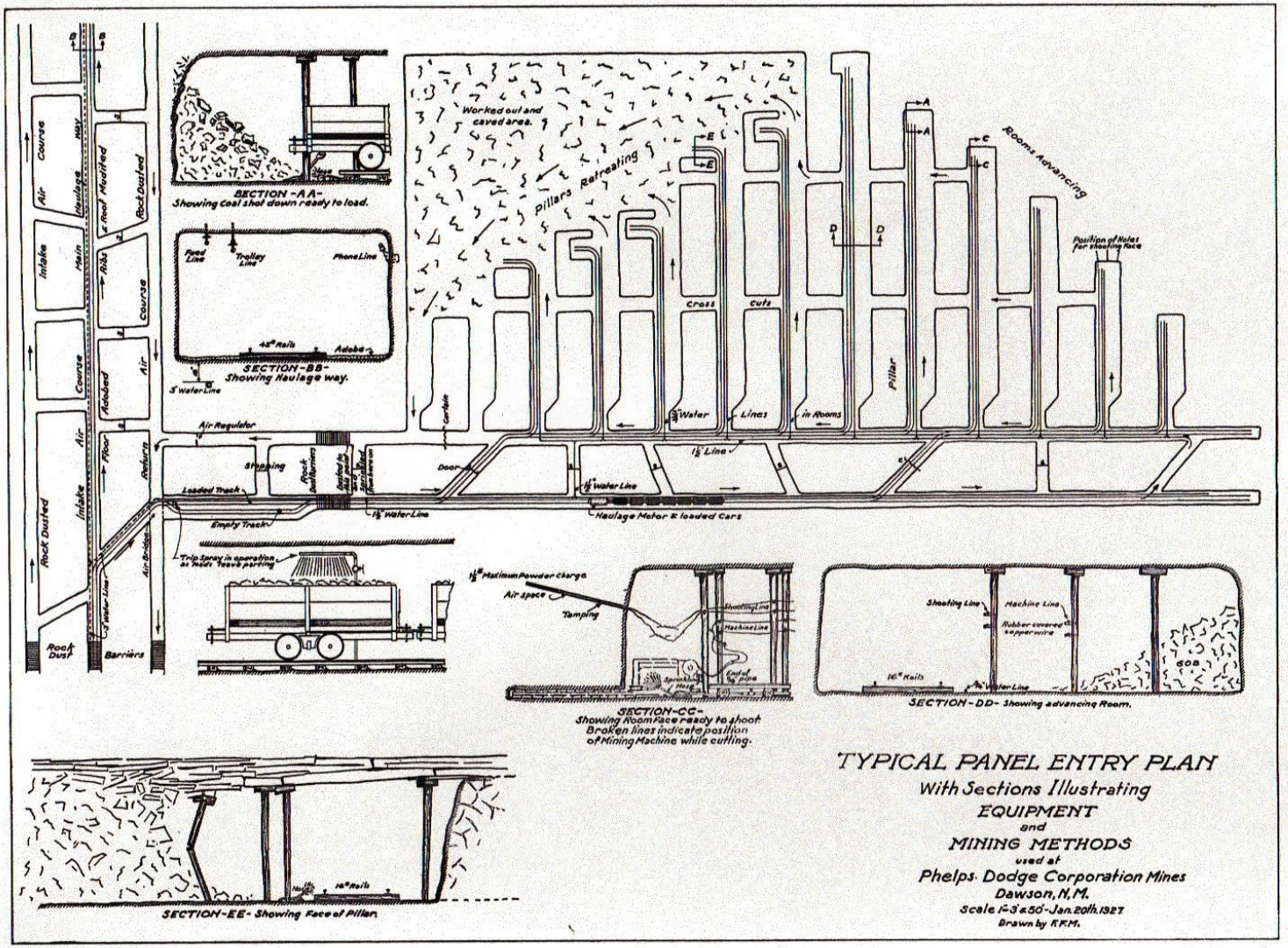


1. *View of Main Business District*
2. *One of the Residence Streets*
3. *Hospital and Dispensary Buildings*
4. *Dawson High School*
5. *Another Dawson Street Scene*
6. *One of the Grade School Buildings*

RECREATION FEATURES



1. *Tennis Courts*
2. *Children's Playground*
3. *Baseball Park and Athletic Field*
4. *Community Swimming Pool*
5. *View of Golf Course Fairway showing No. 2 Green in the foreground.*
6. *Gymnasium and Home of the Dearborn Club*
7. *Benson Ford House*


Air Course
Haulage Way
Intake
Main Road
Return
Rock Dusted
Barriers
Worked out and caved area.
Pillars Retreating
Rooms Advancing
Cross Cuts
Pillar
Position of Motor for shooting face
Air Regulator
Stopping
Door
Loaded Track
Empty Track
Haulage Motor & loaded Cars
Trolley Line
Phone Line
Adobe
Water Line
Lines in Rooms
SECTION -AA-
Showing Coal shot down ready to load.
SECTION -BB-
Showing Haulage way.
Trip Spray in operation at head "face parting"
SECTION-CC-
Showing Room Face ready to shoot
Broken lines indicate position of Mining Machine while cutting.
Air space
Tamping
Shooting Line
Machine Line
SECTION-DD- Showing advancing Room.
SECTION-EE- Showing Face of Pillar.
TYPICAL PANEL ENTRY PLAN
With Sections Illustrating
EQUIPMENT
and
MINING METHODS
used at
Phelps-Dodge Corporation Mines
Dawson, N.M.
Scale 1-3 & 50'-Jan. 20th. 1927
Drawn by R.R.M.

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Hardware, Furniture, Ice

THE HOUSE OF COURTESY AND SERVICE

ACKNOWLEDGMENT

The Dawson News wishes to take this opportunity of expressing its sincere appreciation of the cooperation and assistance so freely given by the various departments of the Phelps Dodge Corporation, Stag Canon Branch, in connection with the preparation of this Pictorial Supplement. Thanks are especially due to Mr. W. D. Brennan, Manager; Mr. Scott Dupont, General Underground Superintendent; Mr. William Moorhead, Assistant General Underground Superintendent, and Mr. W. C. Holman, Chief Engineer.

PAUL K. CARSON, *Editor*