

## THE NEED OF BETTER MANAGEMENT IN MINING OPERATIONS<sup>1</sup>

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I WANT to speak of coal mining, because it is a proposition of large outputs and large numbers of men employed and the value of the mineral is less than in other kinds of mining. As a result the organization of the work underground has more relative importance.

**ISOLATION OF MINING.** The first thing which needs to be realized about mining is its isolation. A mine is not generally found in a settled community where many activities are taking place. Instead a mine is more often in a region where only mining is going on—at least in a region where it is the major activity. Mines are not crowded together with the proximity of factories in a city. A mine needs a large area.

**RESULTS OF ISOLATION.** This isolation makes it necessary for those who operate mines to provide houses and stores and water-works, in fact all that makes life possible. For workmen cannot be expected to build their own homes in a place where they are dependent for their livelihood upon holding a job with one company.

Those engaged in mining are living mostly on branch railroads and the life is not one of growth through contact with other activities. The isolation particularly affects the mine foreman who is responsible for the daily handling of the work of the mine, because his position isolates him in an isolated community.

**WORK ADVANCING.** Another thing to realize about the work in the mines is that the same operation is not repeated in the same place. The working faces of a mine are always advancing and conditions changing. The work of a miner is not repetitive as the work of a tender of a machine in a factory. Instead the mineral becomes mined out and the place abandoned.

**DEFINITE LIFE TO A MINE.** There is a definite life to a mine. In France several companies have been working for over a hundred years, but in that time several mines have been worked out and new ones opened.

**GROWTH.** A mine has a growth. Of a necessity it starts with only two openings—two roadways—and it takes time for roadways to be opened off other roadways before the output can be brought up to quantity. It grows as the roots of a vine grow from the seed. Its growth takes a longer time than the building of a factory, because the number of men who can work at any one time is limited. A large number of men cannot work at the face of a tunnel. To get a large output, one has to have a large number of tunnels, of working faces.

**LARGE AREA.** Headings or gangways—whatever the name used for the openings in the ground—are driven off of other headings and rooms are turned off these. All this requires area. And the area which has to be covered is one thing to be remembered when one comes to speaking about underground management. I have seen a mine with eighteen miles of trolley wires and thirty-six miles of track. Large areas mean long roadways. At another mine the working faces were between three and four miles from the drift-mouth at the surface. I went into a mine of only two hundred tons output the other day and the face of the main heading was 5600 feet from the drift. In that distance I could stand up straight only twice.

**PROBLEM.** Coal Mining is a problem of moving empty mine cars from the surface to the working faces where they are loaded by hand with the coal which has been mined; and then moving the loaded cars to the surface where they are emptied into railroad cars for shipment to the market. Moving cars and mining coal are the two operations which should be continuous.

The map of a mine which is just beginning, drawn on the scale of one hundred feet to the inch, the scale generally required by law, would cover hardly more paper than an ordinary letter-size sheet and would indicate working places for ten or twenty men. The map of a mine which has been putting out five hundred to a thousand tons a day for ten or fifteen years may cover a sheet of blue-print paper six feet by six feet. For five hundred tons output there may be three or four miles of main roadway in "live workings"

and many more miles of "old workings" from which the track has been torn out. One man may be required to oversee work scattered on the edges of an area of four hundred or five hundred acres, a difficult thing to do on the surface of the earth in broad daylight and much harder to do in the tortuous openings of a mine and in absolute darkness.

**SCIENTIFIC MANAGEMENT LACKING.** In speaking about management underground I cannot give you descriptions of any of the elements of scientific management. They do not exist. At least I have never been able to find them and I have searched diligently. The industrial work which has been done in manufacturing along the routes of commerce has passed by isolated mining. In France I was asked, "What are you doing with Taylor management in the coal mines of America?" I answered, "No more than you."

**MINING NEEDS INDUSTRIAL ENGINEER.** That mining is in dire need of the industrial engineer is what I would like you to understand. For although he is not one who forgets the cost of an article yet he considers the welfare of the workman, the pocket-book welfare, not the charity welfare only—that of housing and playgrounds. It is essential for the workman that he have pocket-book welfare at each mine. For in coal mining if the workman changes from one company to another, he generally has to move his home, move to the next town. And so it is more difficult to change one's job. And with the uncertainty of earnings as they exist, it is disadvantageous for him to possess much goods. It is better for him to be free to move.

**INDUSTRIAL WORK STANDS OUT.** The work of the industrial engineer will stand out more prominently because of the isolation and because mining is not mixed in with other lines of work.

**MINE FOREMAN FOCUS OF RESPONSIBILITY.** The lines on any diagram of responsibility of management of a mine will center on the position of the mine foreman. For the mine laws license him to practice. Article IV, Section 1 of the mining laws of Pennsylvania reads: "In order to secure efficient management and proper ventilation of the mines, to promote the health and safety of the persons employed therein. . . the operator . . . shall employ a competent and practical mine foreman." It further states that "The mine foreman shall have full charge of all the inside workings and of the persons employed therein."

**LAW CONCERNED WITH SAFETY.** Now I call your attention to one fact concerning the law. It gives as the first purpose that of securing efficient manage-

ment, but all the provisions concern the safety of the men and good engineering practice. The rules are all excellent—for safety. But none of the provisions give a hint concerning the best way to coordinate divisions of labor. Nor do any of them contain a hint of any of the principles of management as understood by the industrial engineer. The questions on the examination papers for mine foremen's certificates all concern safety and engineering features. That there is a real art of management is not understood and is not a virtue required by law of the mine foreman.

**KEYSTONE OF THE ORGANIZATION.** The mine foreman is the keystone of the organization. The planning department he carries around under his hat; the supervision-of-work-in-progress department is in the same place; the inspection department is also under his hat. He has all the elements of the work to attend to.

**UNDERPAID.** He is not a highly paid man. In 1914 the highest paid foreman in the anthracite region received \$165 a month. \$125 a month was a customary pay. At that rate he might have been in charge of a mine worth a million dollars and the monthly payroll might have been between thirty-five and forty thousand dollars. At the present time one company is paying a base rate of \$145 with \$70 war allowance, a total of \$215 a month. The pay in the bituminous fields is about the same. I was told the other day that in Utah the mine foremen are now getting \$150 a month.

**MINE LAW WRITTEN OUT.** The mine laws are the only written instructions which the foreman generally has. You know what happens. He follows the law. That is very proper, but with the written instructions continually following him, his attention is mainly on what they prescribe, which is safety, and to the exclusion of any proper balance in the work. Safety is a large subject.

**TOO MUCH TO DO.** A mine foreman has more work to do than he can possibly cover. A mine is a growth. When it is small a foreman can cover all the working places. As a mine becomes large, he cannot. It took me sixteen hours to walk the route which one second assistant mine foreman was expected to cover every morning in four hours. At another mine, when it was measured up and the time calculated, it was found that the distance which the foreman was expected to cover was so great that he could spend only forty-five seconds with each workman if he was to make his rounds to every working place as the law requires.

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