

THE MINER AND HIS ENVIRONMENT

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"Environment" has been defined as "the aggregate of physical, regional and circumstantial conditions that surround and influence the life or development of an individual or a community". When this definition is applied to the mining industry, the term denotes something much wider than ground control, mine ventilation, and dust abatement, the aspects of the working environment that have so far received most attention.

The object of this paper is to review, somewhat critically, the total environment of our industry insofar as it concerns those who constitute the productive work-force. It is for this reason that the topic "The Miner and His Environment" has been selected. The paper will, therefore, be in the nature of an analysis of factors and principles relevant to the creation and maintenance of a proper total mining environment, certain aspects of which are seldom examined but which are, in fact, highly relevant.

Mining by surface methods has given rise to little anxiety concerning the physical environment but, as operations have proceeded in depth, more attention to the working environment has become necessary. Most thought has been given to particular functional aspects of the physical mining environment, namely, ventilation and airborne mineralized suspensions. The industry's interest in these aspects of the underground environment is almost as old as underground mining itself. Even in the paleo-metallurgic era of the ancient world, the importance of natural ventilation was acknowledged, and we know from the records of Agricola of the new approaches to induced ventilation (by fire, bellows, and the like) in his day. With our more modern methods, undoubted progress has been made in the physical environment.

In the composite costs of mining, the cost of labor is usually the largest single item and it is through an increase in the efficiency of labor—the output per man shift—that the greatest improvements in this item can be achieved. The initial approach to achieve

greater efficiency was to make the working place safer (from the obvious structural viewpoint). From these beginnings, it is now widely accepted that working places should also be more healthful and comfortable and that our mining activities should be designed in such a way that a reasonable performance of labor can be achieved without discomfort. Much by way of increased productivity has been achieved by increased mechanisation, which is reflected by improvement in the man hours per ton of ore mined: in metal mining, from 1.89 man hours per ton in 1952 to 1.09 man hours per ton in 1962 and, in non-metallic mining, from 0.56 man hours per ton in 1952 to 0.27 man hours per ton in 1962. These are significant improvements in productivity. But, mechanisation has introduced additional, as well as its own special, problems. In more recent years, it has become evident that the physical aspects of our industrial environment must be correlated with psychological, as well as sociological, aspects in the establishment of a comprehensively attractive working environment.

The total environment of mining is therefore, I suggest, a composite one of physical, chemical, biological, psychological and sociological elements; together, they constitute the working conditions within the industry—each giving rise to problems of control. In turning to these environmental components, there are some upon which I shall touch only briefly.

Rock Stability/Instability.

"Falls of ground" are a feature of the physical environment that constitute the highest cause of mine fatalities. These derive generally from inadequate safeguards of loose material on the one hand and/or ignorance of the relative stability of the rock structure en masse on the other. Usually, the first of these relates directly to inadequate inspection of the "back" of a freshly-broken excavation and to inadequate remedial action; the second is part of the established practice of ground control and is often the problem of inadequate support at a localized