

LIMITS OF DEEP MINING.

The question of deep mining is thus treated in the last issue of the London Mining Journal:

"It is universally recognized that the obstacles to deep mining are of a two-fold nature, physical and economic. The first consideration limits the depths below which it will be impossible to mine; the second that below which it will not be profitable. That there really is a limit to which the word impossibility can fairly be applied is evident, when we consider that the earth's temperature is a constantly increasing amount as we descend below the surface, so much so, that if the more central portions are not in an actually liquid condition, they are probably in what may be called a potentially liquid condition at a temperature much higher than their melting points. It is fairly well known nowadays that the rise of temperature does not vary with the depth in simple arithmetical progression, but that the law is rather more complicated, so much so that the probable temperature attained at great depths is not easy to calculate. Moreover, there are a number of subordinate circumstances that must serve to profoundly modify the results in individual cases. First of all, both the absolute depth and the relative depth must be considered, meaning by the former the depth that the working reaches below sea level, and by the second the depth below the mouth of the working, or, to put it differently, the height above sea level at which operations are commenced must be taken into account. The theory of the effect of the inclination of the strata upon local temperature seems to be entitled to considerable weight, more especially when the depths are, comparatively speaking, not very great. More important still, perhaps, is the greater or less conductivity of the rock strata, and more especially would it be important to ascertain whether there is a stratum of non-conducting rock below any given spot thus preventing the central heat from ascending, or above the given spot, thus preventing the central heat from escaping. For example, the low temperatures obtained by Agassiz at the Calumet and the Hecla mines are due not only to the proximity of the cold waters of Lake Superior, but to the conducting powers of rock impregnated with metallic copper, which enables the cooling influence of the body of water to make itself felt at great depths. Another most important factor is the direction when the water currents at any particular point are moving, whether they are coming upwards, and are thus conveying heat to the spot, or whether they are capable, on the contrary, of cooling it by taking heat away. It seems accordingly certain that local conditions, such as cannot well be predicted, will play a most important part in determining the temperature in depth at any particular point. Mining is no longer the severe manual labor it used to be, and machine drills and mechanical haulage require rather intelligent supervision than physical exertion. We hold that the greater difficulty will be found less in keeping the temperature of the air low enough for working in than in handling the very hot rock as broken out from the mine, especially if it be wet, and the miners have hot water or hot mud to contend with. If this water is highly mineralized, as in the bottom of the Calumet and Hecla shafts, a further difficulty will be encountered.

"Pressure must, like temperature, be considered under two heads namely, that of the atmosphere and that of the rocks. The former does not need serious consideration. In the Triger method of shaft sinking, men have worked under three atmospheres of pressure, though with a certain amount of difficulty. This pressure may be taken as just about the limit at which men can work, and not all men by any means can stand this, though, no doubt, sufficient labor (at a price) could be obtained for all ordinary mining purposes. As this pressure corresponds to a depth of over 25,000 feet below sea level, any difficulty on this score may be disregarded. The effect of rock pressure is more open to discussion: some engineers hold that the pressure on the roof and sides of an excavation must necessarily increase with increasing depth, and attempts have been made to reduce this view to a matter of calculation. It is, however, by no means so self-evident as it appears at first sight, and has often been proved to be absolutely inaccurate. Thus all mining engineers have come across instances

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	Arrives at Rossland	11:30 a.m.
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