

## (6) ECONOMIC PROBLEMS.

The supply of coal which can be worked by "rise" methods on the Reefton Coalfield will be exhausted within the next few years. Consequently, in the near future the whole of the output from the field will be derived from the higher levels of the seams which dip beneath the alluvial plain of the Inangahua and Waitahu rivers.

The measure of success which is attained in winning coal from dip section depends on three main issues :—

- (a) The extension of the seams beneath the valley :
- (b) The nature and extent of the faulting that may be encountered :
- (c) The flattening of the measures in depth.

The present report is not concerned with artificial difficulties with which investors are confronted, and which are impeding the progress of mining to a greater extent than geological uncertainties.

For the guidance of those interested in the industry, these three issues are discussed in the sequel. The amount of available data is admittedly insufficient to warrant dogmatic conclusions ; my opinions are deduced by analogy with neighbouring fields, and by assumptions based on established geological facts. Proof can be obtained only by drilling, which is an essential complement to geological work of this nature.

(a) *Extension of Seams under Inangahua Valley.*

The quantity of available coal is an important factor which governs the size, type, and permanency of proposed haulage and pumping plants. The following discussion is based on the Burke's Creek section, but is equally applicable at Waitahu and Caplestone, except in the line of the washout mentioned elsewhere.

There are two ways in which the seams may be lost (apart from structural possibilities).

(i) *Blind outcrops*—i.e., the line of intersection of the coal-seam with the suballuvial surface : The exact underground configuration is indeterminable without drilling, but the approximate position of a blind outcrop can be judged by continuing the contour of the adjacent hills beneath the alluvial flat. It is important that the slope which is carried underground should be that of the surface of the coal-measure strata only, as the greywacke hills behind the narrow strip of coal-measures have a higher relief on account of their superior resistance to denudation.

A glance at the map accompanying this report shows that the circular outcrops that appear when the dip of the strata is less than the slope of the hillside seldom occur. Hence it may be confidently assumed that similar conditions prevail along the suballuvial surface, and that proposed dip headings will not break through into the alluvium.

The upper levels in the dip sections will, of course, be stopped laterally by blind outcrops, which will be encountered farther and farther from the main dip heading, with increasing depth. The approach to a blind outcrop is indicated by a softening of the coal, abundant iron-stains, and inflow of water. The alluvium of the valleys is composed of greywacke and granite pebbles and sand, and consequently holds vast quantities of water, which will drain into the mine should the levels be driven close to the alluvium. The additional pumping-expenses outweigh the revenue obtained from the few tons of coal extracted at the blind outcrop. The inflow of water into several of the dip sections now working might easily have been reduced by foresight in this connection.

(ii) The second possibility which must be considered is the approach to the edge of the coal-seam. It has been shown that the continuity of the strata is more regular longitudinally than transversely, with respect to the depression in which the measures were formed. In a north-easterly direction the three main seams continue for a distance of over six miles with little variation in character or thickness. In a transverse direction, however, marked changes occur in a short distance. The coal-measures fail to reappear at the base of the Paparoa Range, on the western side of the depression : this may be due to their being faulted against the granite, but more probably to pinching out. In the opposite direction also evidence is incomplete. The coal-measures at Murray Creek, about two miles south-east of the Reefton Coalfield, rest immediately on the basement rocks. The stratigraphic succession, however, changes completely in two miles. The correlation is not obvious, as the intervening coal-measures have been removed by erosion. The relative age of the two coalfields cannot be determined with certainty, but, on account of overlap of beds, the oldest beds on the Murray Creek field are probably newer than those of Reefton. The evidence is sufficient to demonstrate a rapid change in facies transversely across the depression.

A study of the coal-seams in the neighbouring coalfields shows that on nearing the edge of a seam the ash content increases rapidly, and thin stone bands appear within the seam. The deepest mine on the Reefton Coalfield extends beneath the valley for a horizontal distance of 10 chains, and in this distance no deterioration in the quality of the seam is perceptible.

There are, then, three seams which extend in a north-easterly direction for six miles, and in a perpendicular direction for half a mile without noticeable change in character or in thickness ; but in a distance of two miles in the latter direction the strata change so completely that correlation is impossible. It may be reasonably inferred that a similar change occurs in the opposite direction, but it is unlikely that the alteration in facies will be so rapid, as deposition near the centre of the depression would be more regular than that along the margins.