

maintains its continuity and thickness as far as development has progressed. The greater portion of the output from Coalbrookdale is obtained from pillar-extraction, and the great thickness of the coal-seam necessitates special precautions being taken to protect the miners from falls. The system of mining in operation is bord and pillar.

On the Grey Coalfield the Blackball Colliery increased its annual output by 33 per cent., which to a considerable measure may be attributed to the extension of the Government railway to the colliery. This has replaced the aerial tramway of limited capacity which was formerly employed. Considerable development has been carried out at the No. 17 Bank section, and it is intended to extend the main endless-rope-haulage system to this section. A dip heading is in progress to win the coal lying to the west and beyond the railway-sidings. It is proposed to penetrate the fault encountered in the main levels, as an estimated area of at least 200 acres, containing a 20 ft. seam of bright hard bituminous coal, is believed to occur behind the fault.

The newly opened Paparoa Colliery, which is equipped with a very high-class plant and endless-rope-haulage system, has not produced as much coal as anticipated, the difficulty being extensive areas of friable coal, for which the demand was not great. The whole of the output was won from Nos. 1, 2, and 3 seams, where considerable development has been carried out.

The North Brunner Mine was added to the list of productive collieries during the year. The output commenced in February. Mining operations were started at what is locally known as the 16 ft. area, but they were discontinued on account of the soft and friable nature of the coal. Operations were then transferred to the upper seams, situated about 1,385 ft. above sea-level, and distant 76 chains from Stillwater, where the storage-bins are located. The top seam, averaging about 5½ ft. in thickness, is in considerable demand for gas-production, also for smithy purposes. It is to be regretted, therefore, that soft and faulted areas are much in evidence.

Point Elizabeth State Colliery No. 1 has almost maintained its output; weather conditions, which interfered considerably with shipping from Greymouth during the year, possibly accounted for the small decline in output. At the No. 1 section the whole of the mine is now standing on pillars, and from No. 2 section the output was all derived from pillar-extraction.

At the No. 2 State Mine, situated towards the head of Seven-mile Creek, and to which a branch Government railway has been formed and only requires ballasting before completion, good progress has been made with the development of a new colliery, which should reach the output stage by August, 1912. The work in hand includes the driving of inclined haulage-tunnels in rock and coal, also trestle-work and storage-bins. At the head of the inclines a level 15 chains in length has been driven in a strong seam of superior bituminous steam-coal.

In the Southern Inspection District the well-known Kaitangata Colliery has increased its annual output. Development has proceeded steadily, in coal of good quality, to the south and east and other sections of the mine. The inclination of the seam in the advanced workings has changed from steep to comparatively flat or undulating, which has caused a problem as regards effective haulage.

At the Nightcaps Colliery a 10 per cent. increase in annual output has occurred. The dip workings of the No. 1 district have developed coal of good quality, with improved roof. In the No. 2 district developments have proved the lower (or No. 3) seam to have increased from 4 ft. to 10 ft. where now worked.

VENTILATION AND SANITATION.

Special attention has been devoted to this very important subject, and it is now believed by those competent to express an opinion that, taken as a whole, the collieries of the Dominion are exceedingly well ventilated. To a certain extent this opinion is substantiated by the fact that for fourteen years no life has been lost as the result of an explosion of firedamp. Owing to the shallow depth of the coal-seams, high temperatures in our mines do not occur, and no inconvenience is experienced from humidity.

The Inspectors of Mines have generally adopted the standard of adequate ventilation as recommended by the British Royal Commission on Mines (1909) when they have been called upon to determine if the statutory minimum of 150 cubic feet of air per minute per person employed below ground shall be increased. The aforesaid standard fixed as a minimum 19 per cent. by volume of oxygen and a maximum of 1¼ per cent. of carbon-dioxide; when this standard is not attained the men to be withdrawn. The above test is not, however, fixed as an exact demarcation between adequate and inadequate ventilation, but as a test applicable to mining conditions. It has the additional advantage of being easy to determine, for when the mine-air reaches that degree of vitiation lights burn dimly. The Inspectors of Mines are provided with Davis anemometers, and hygrometers for gauging the volume and temperature of mine-air, also with portable cases containing glass-stoppered sample-bottles. For testing for the deadly carbon-monoxide, white mice, which are affected in one-fifteenth the time of a man, are employed. These small animals are now recognized as the most practical means of ascertaining whether carbon-monoxide is present. The measurement and sampling of mine-air is regularly carried out by the Inspectors of Mines, the samples being forwarded to the Dominion Analyst for determination.

At all collieries but those of insignificant proportions ventilation is produced by fans of modern type. Thirty fans are at present installed, the type of such mechanical ventilators most favoured being the "Sirocco," Waddle, Sturtevant, and Hayes.

As regards sanitation, attention is being directed towards the provision of satisfactory latrines in the return airways of the mines. In some collieries these have been introduced, but unless carefully attended to the object of their establishment is not attained.

It should be stated that ankylostomiasis (the hook-worm disease) is unknown in New Zealand mines, and, as far as I am aware, pneumoconiosis (miners' phthisis) has not been contracted at our collieries.