

the coast-line, between the Seven-mile and Ten-mile Creeks. The sequence of strata, of which the coal-measures and the underlying beds form the lower part, and which is closed by the Cobden limestone, is of Upper Cretaceous or Cretaceous-tertiary age.

The larger and more characteristic divisions of the whole sequence are given below :—

- VII. Lower conglomerates.
- VI. Lower grits, sandstones, and shales.
- V. Coal-measures.
- IV. Fine-grained sandstones.
- III. Dobson's Bluff beds=Island sandstone.
- II. Mudstones and marly clays.
- I. Cobden limestone.

VII. *Lower Conglomerates*.—The Lower conglomerates are not seen in the section through the Brunner Gorge, but they show on the southern side of the Grey Valley near Stillwater Creek, the exposure there being on the north-east side of the anticlinal axis, commencing on the northern bank of the river, and continued south and south-west through Mount Buckley, and along the slate ridge in the direction of the western sources of Stillwater Creek and the New River watershed.

Passing to the northern side of the anticline in the Brunner Gorge, these conglomerates are seen to form and constitute some part of the spur, which, from the northern part of Mine Cliff, reaches down to the low grounds of the Grey Valley, a little above the St. Kilda portion of the Brunner workings. In the low grounds on the south side of the river the conglomerates are but a few feet thick; but on being followed to the north-west, on to Bald Hill Range, and towards Mount Sewell, they rapidly increase in thickness, and on the north-east face of Mount Sewell there is a fine exposure displaying not less than 300ft. of these conglomerates in vertical section. At no other place have these beds been observed during the progress of our investigations. Shaly bands appear amongst these rocks on the east face of Bald Hill Peak, but nowhere definite indications of the presence of even thin seams of coal are to be met with in them. From Bald Hill these conglomerates for some distance run along the base of the northern continuation of Mine Cliff, along which, to the peak of Bald Hill, the dip is to the south-south-west, at angles varying from 13° to 23°; the north-east dip met with in the St. Kilda workings being local.

VI. *Lower Grits, Sandstones, and Shales*.—These beds consist of hard, gritty sandstones, having an irregular stratification. With these are associated bands of indurated micaceous shale, appearing at different horizons, but more abundantly in the upper part, and immediately under the main seam of coal. The beds are from 80ft. to 100ft. thick. Sometimes the upper beds form the floor of the overlying coal, but as frequently there are interposed beds of fire-clay, which have to be regarded as belonging to the coal-measures proper.

These lower grits, &c., show well along the banks of the Grey River in the Brunner Gorge, between the outcrops of the coal on each side of the anticline, a section of which can be seen on either bank of the river. On Mount Sewell they appear to be somewhat of a different character, being less irregular in stratification, and having two or three strong bands of shaly rock with which there may be thin seams of coal. The cliff face on the north-east side of Mount Sewell being inaccessible, this point could not be determined; and there is the further possibility that the rocks of this locality may belong to the coal-measures—the next formation overlying these lower grits—in which case the small seams seen to underlie the 3ft. 6in. seam of coal in the cliff face, are apparently the same as that found on the south slope of the mountain. At no other place have these beds been studied, except it may be near Stillwater Creek, where they have a very feeble development.

V. *Coal-Measures*.—These beds consist of grits and sandstones, having the main or Brunner coal at their base, underlain or not, as the case may be, by fire-clay and micaceous shales. The beds, not including the main seam of coal, have a thickness of from 60ft. to 90ft. About 20ft. above the Brunner seam there is a 2ft. or 3ft. band of a very close-grained and exceedingly hard sandstone, resembling chert or water-quartz, which serves as an indication of the near presence of the Brunner seam, not only near the Brunner Mine, but for some considerable distance along the face of Mine Cliff, and in other parts of the field also. Above this, on the banks of the Grey River, there are two small seams of coal associated with, and overlying which are bands of shale and gritty sandstone. These beds—i.e., the coal-measures proper—are closed by one or two bands of gritty micaceous sandstone, which, on exposure to the atmosphere, acquires a rusty-brown colour. Samples of the less decomposed rock are remarkable on account of the presence in them of a leek-green or paler-green ferri-ferrous mineral, which accounts for the colour of the rock under exposure to the air. This particular band is seen on both banks of the Grey River; first, on the right bank, between the natural exposure of the Brunner seam and the Coal-pit Heath shaft; and second, a little to the north of Dobson's Bluff, forming a reef of rock washed by the river during floods, but fully exposed when its volume is moderate. The same rock appears to have been passed through in the air-shaft on the Wallsend freehold. The coal-measures show on both sides of the river in the lower and upper parts of the Brunner Gorge, and on Mount Buckley, east of Wallsend and Taylorsville; along Mine Cliff to Bald Hill, and thence along the Bald Hill Range as far as examinations were made, and for some distance from the top of the range along the beds of the various creeks draining to the south-west. Towards the north-west, on Bald Hill Range, it is possible there are two distinct seams of coal. That which is supposed to be the higher in the sequence has a thickness of 3ft. 6in. while the supposed lower seam seen further down the slope of the range has a thickness of nearly 5ft.

IV. *Fine-grained Sandstone*.—These rocks are well seen in Mine Cliff, on the right bank of the Grey, also on the left bank through the Gorge, and at the northern foot of Dobson's Bluff. They appear at the surface over the greater part of the Brunner lease, and outside the northern boundary of this lease they rise along the spurs on to the higher part of Bald Hill Range, and also form the