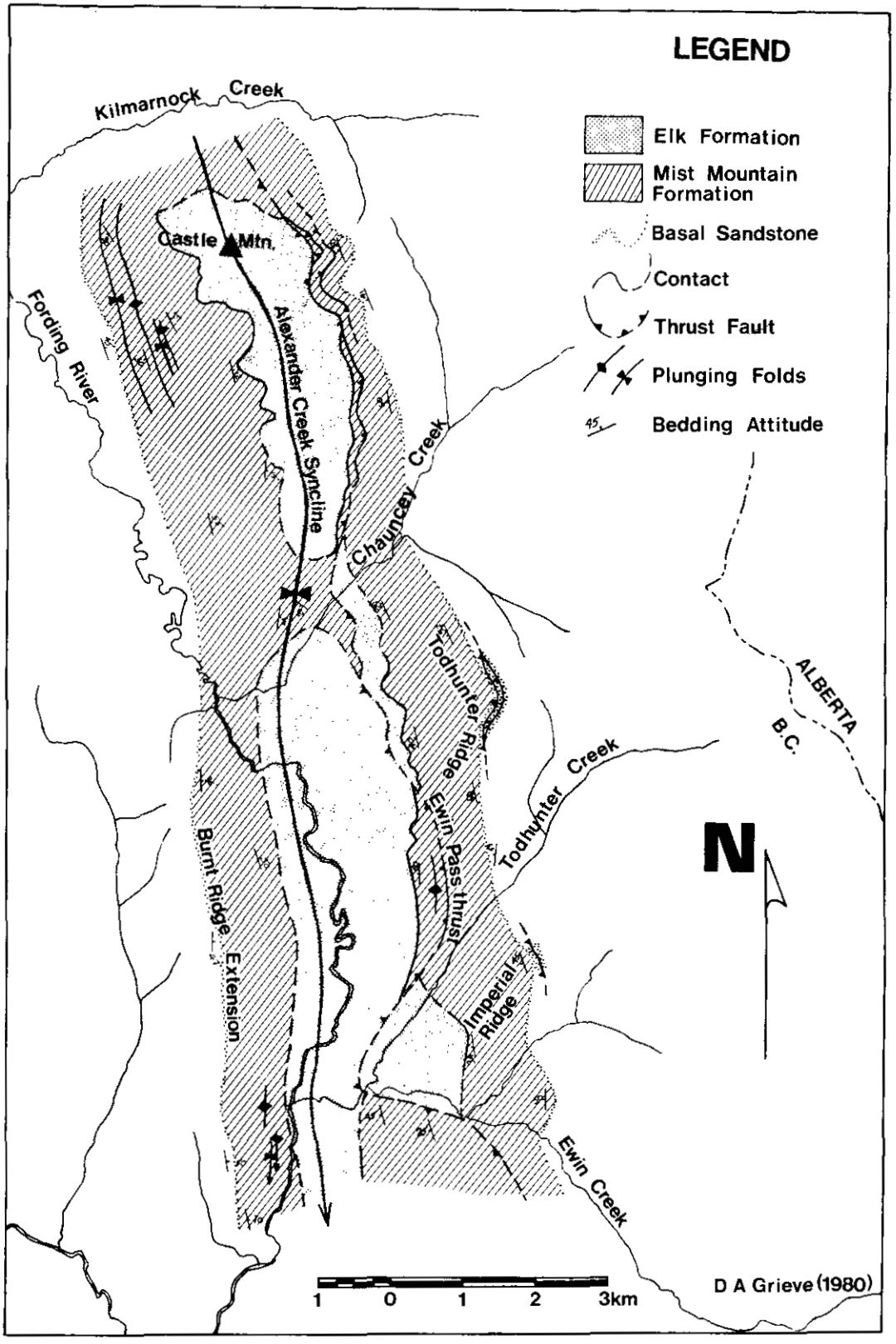

Figure 22. Geology of the Fording River area in the Elk Valley Coalfield.

ELK VALLEY COALFIELD
(82J/2)

By D. A. Grieve

INTRODUCTION

The central part of the Elk Valley Coalfield has been investigated as a continuation of studies of the structure and coal resources of the coalfield (Pearson and Grieve, 1980a, 1980b). The study area is 10 kilometres east and northeast of Elkford, and straddles Fording Coal Limited's mine road in the Fording Valley (Fig. 22). The area studied is bounded on the north by Kilmarnock Creek, on the south by Ewin Creek; elevations range from 1 530 metres to 2 500 metres.

Coal properties in the study area belong to Kaiser Resources Ltd., Crows Nest Resources Limited, and Fording Coal Limited, and Fording's open-pit operations lie north of Kilmarnock Creek.

FIELD AND LABORATORY WORK

Fording's mine road and secondary forestry and exploration roads were used to gain access to most of the study area. A helicopter was used to reach the highest parts of ridges.

Mapping was done on British Columbia government air photographs BC78153-110 to 118, enlarged to approximately 1:15 000 scale. A stratigraphic section of coal-bearing strata was measured on Imperial Ridge, using chain and compass. Outcrops and trenches were sampled for coal rank and maceral studies.

Vitrinite reflectance in oil of selected samples was determined in Victoria by D. E. Pearson, project geologist with this Ministry.

STRATIGRAPHY

Sedimentary rocks of the Jurassic-Cretaceous Kootenay Group comprise the Elk Valley Coalfield. Basal sandstone of the Morrissey Formation overlies passage beds of the Fernie Group and outlines the study area (Fig. 22). The coal-bearing Mist Mountain Formation of the Kootenay Group is 640 metres in thickness on Imperial Ridge, and includes nine major coal seams, ranging in thickness from 3.1 metres to 10.5 metres. Other strata in the coal-bearing section include shale, siltstone, and sandstone.

The Elk Formation, at the top of the Kootenay Group succession, is well exposed and includes an estimated 250 metres to 300 metres of shale, siltstone, sandstone, minor conglomerate, thin coal seams (up to 1 metre), and lenses of 'Elk coal.' The last is a brittle coal rich in alginite, and is commonly referred to as 'needle coal.' The contact between the underlying Mist Mountain and the Elk Formations does not represent a consistent stratigraphic horizon. It was generally mapped at the lowest stratigraphic occurrence of Elk coal and at correlated horizons. On the west-facing slope of Todhunter Ridge, a prominent conglomeratic unit occurs immediately above the lowest Elk coal and forms a mappable 'contact' over a distance of 3 kilometres.

Conglomerate of the overlying Blairmore Group crops out 3 kilometres south of the study area, in the core of the Alexander Creek syncline.

STRUCTURE

The north-south-trending Alexander Creek syncline, known locally as the Fording River syncline, is the dominant structure in the study area (Fig. 22). It generally plunges south in the map-area and reaches a culmination immediately to the north and a depression to the south (Pearson and Grieve, 1980a). Dips on both limbs are steep, especially in lower parts of the section. Both limbs are complicated by minor folding which, in at least one case (north of Todhunter Creek), is directly related to movement on thrust faults.

The east limb is considerably faulted. The major fault zone, the Ewin Pass or Fording thrust, transects the study area and has been mapped throughout the southern half of the coalfield. South of Ewin Creek, it places coal-bearing Mist Mountain strata adjacent to Elk Formation on the west end of Imperial Ridge (Fig. 22). The fault cuts rapidly up-section at this point, and throughout the rest of the study area it lies either within the upper coal-bearing section or in the Elk Formation.

COAL RANK

Rank distribution of coal in the Elk Valley Coalfield has already been described (Pearson and Grieve, 1980a, 1980b). For this study rank determinations made so far include values from samples taken on the south side of Ewin Creek. It appears that coal in the lower part of the section at Ewin Creek is lower in rank than that from the base of the Imperial Ridge section ($\overline{R}_O$ = 1.11 compared with $\overline{R}_O$ = 1.34, or high volatile compared with medium volatile). This is consistent with a similar rank difference across the Ewin Pass thrust at Ewin Pass, and substantiates the hypothesis that some portions of the Ewin Pass thrust experienced late-stage, post-coalification normal movement.

Several other new rank determinations confirmed data presented in previous reports.

ACKNOWLEDGMENTS

D. E. Pearson carried out vitrinite reflectance determinations and generated useful discussions.

Blair Krueger is thanked for his assistance in the field.

REFERENCES

Pearson, D. E. and Grieve, D. A. (1980a): Elk Valley Coalfield, *B.C. Ministry of Energy, Mines & Pet. Res.*, Geological Fieldwork, 1979, Paper 1980-1, pp. 91-96.

..... (1980b): Geology and Rank Distribution of the Elk Valley Coalfield, Southeastern British Columbia, *Geol. Assoc. Can.*, Annual Meeting, Halifax, May 1980.