TR1-31-34

Section 2: Coal

THE DISTRIBUTION OF COAL AT MT. LLOYD

By KERRY BURNS

Summary

The coal-bearing shales at Mt. Lloyd are cut off sharply against dolerite in the north and north-west, and south and south-west. In the west they are underlain by barren sandstone, and in the east dip under the dolerite of Mt. Lloyd.

The coal measures are covered by sandstone, which when present forms flat areas mantled with a thin, relatively stable, veneer of dolerite scree. These are the only areas where mining is a feasible proposition.

In other places, where the overlying sandstone has been removed by erosion (or else where the dolerite was intruded below the sandstone) the face of Mt. Lloyd is mantled with an extensive landsliding scree, which is inherently unstable, and a hazard to mining operations.

The most suitable area to investigate is the large flat in the southern portion of the area, and it is recommended that this be tested by a vertical drill hole, No. 1, sited as indicated on the accompanying map. If economic coal is proved by this bore, then the smaller northern flat should be tested by a vertical drill hole (proposed bore No. 2). Subsequent development will depend on the results of these tests.

Following instruction received from the Senior Geologist, a geological map has been prepared of the Mt. Lloyd district, in order to determine the areal extent of the measures.

The coal measures are underlain to the west by a thick series of quartz sandstone. The coal measures that once covered these have been removed by erosion, so that a large sandstone flat remains with the drainage following a trellis pattern suggesting epeirogenic faulting. Since the intrusive contacts of the dolerite conform approximately to this, the pattern is probably Jurassic in age. These sandstones contain shales which occasionally carry carbonaceous material, but no coal seams, so they constitute the barren " floor " of the coal measures. They occupy most of Paddy's Flat, and are equivalent to the Springs or Knocklofty sandstone of the Hobart district.

The coal measures consist largely of shales with (?)thin interbedded sandstone. Well-preserved plant fossils occur in clays below the coal, and resemble " Thinnfeldia " and others that occur in the Newtown coal measures. The total thickness of coal sampled by Hughes (report of 5.5.55) is 7 ft. 3 in., made up of 2 ft. 11 in., 1 ft. 6 in., 2 ft. 10 in. in the three seams. The top coal seam (No. 1) occurs at the extreme top of the shales with the second seam 15 ft. below, and the third seam 65 ft. lower down.

The shales are overlain, just east of Crosswell's hut, by a felspathic sandstone that presumably underlies all the flat area behind. This flat is covered by a thin veneer of dolerite boulders, which is loose scree from Mt. Lloyd. The coal seams exposed in the southern creek are covered by a thick felspathic (tachylitic?) sandstone about 100 ft. thick, which contains large calcite concretions. Until a more detailed survey can be completed, it seems that the felspathic sandstone in the south, and the sandstone at Crosswell's hut, are equivalent, and form the barren "roof" to the coal measures. The top coal seam (No. 1) immediately underlies this sandstone, both in the extreme south and near the proposed bore No. 1.

The dolerite of Mt. Lloyd is in the general form of a sill, overlying the coal measures. However, the dolerite becomes sharply discordant in the south, where the coal measures are cut off by a Jurassic fault, and in the south-west, where the dolerite is intruded in the form of a dyke along a Jurassic fault zone. Strong metamorphism and dykes of hornfels are a feature of the southern boundary. At the northern end, the Mt. Lloyd sill becomes transgressive, the base of the dolerite dropping several hundred feet between the points marked A and B on the map. The shales appear to wedge out between the transgressive Mt. Lloyd sill on the east and the discordant dolerite intrusion of Barren Hills. It is of interest petrologically to note that the Mt. Lloyd sill is distinctly layered just south of point B.

The shales containing the coal measures thus outcrop over a length of four miles and an average width of half a mile; are cut off in the south, south-west and north-west by discordant dolerite intrusions; are underlain west by thick barren quartz sandstones, and overlain east by felspathic sandstones and dolerite. The distance the shale extends under Mt. Lloyd is unknown, but is not thought to be large.

Within this area the coal seams have been preserved from erosion only where the capping of felspathic sandstone has remained. This is in two places; a large southern area of 700 acres, and a smaller northern one of 240 acres. Elsewhere this sandstone has been removed, and the dolerite scree from Mt. Lloyd is landsliding over the soft shales. As section CD shows, the difficulties of mining in such an area of extensive landsliding are enormous, and exploitation will probably only be economic in the areas where the sandstone cap remains. Section EF is a sketch section through the largest of these. This flat is the only area worth immediate development, and this is the area where Mr. Teakle has done intensive prospecting. Small faults may occur within this, but large faults are unlikely. The overlying dolerite appears to be loose scree except perhaps in the south-west. The coal measures everywhere underly this flat, the total area of which is about 750 acres (measured to include the No. 3 coal seam). Assuming an area a little over 600 acres, about one million tons of coal is available for every foot of proven thickness.

This flat may be developed in either of two ways. If the seams are too thin to permit underground mining, it may be feasible to open-cut and recover all seams. As suggested by Mr. Hughes, the logical step is now to put down a vertical drill hole where indicated on the map (No. 1) in order to ascertain the true thickness of the

seams and overburden and to pick up any other seams not detected. This point was chosen as being the part of the flat most readily accessible to drilling rigs. If economic coal is proved by this bore, the rig should be shifted to the second site (No. 2) on top of the smaller flat. This flat has an area of about one-third of the southern one, but is more conveniently situated with regard to access. As shown on the map, and section GH, this flat is very similar to the other consisting of about 500 feet of shales overlain by about 50 feet of felspathic sandstone, with a thin covering of dolerite boulders. Barometer levelling indicates that the two flats are at the same level. The western face of the northern flat is eroding by slippage, the largest landslide containing about one million tons of rock. The landslides on the face of the southern flat are smaller, because the slope is not as steep. Both bores should pass through between 50 to 100 feet of felspathic sandstone, then into the No. 1 seam (pyritic), then through shales into No. 2 seam 15 feet below, then through 65 feet of shales to the No. 3 seam (the most promising), and should bottom at about 600 feet on thick, massive quartz sandstones. The drills should be sited at least 100 yards back from the edge of the flats to avoid repetitions of beds due to incipient landslides.

Acknowledgments

This work was supervised by the Senior Geologist (T. D. Hughes) and assistance was given by Mr. Baker and Mr. Guilline, of the Mines Department, Mr. Teakle of New Norfolk, and several residents of Mt. Lloyd.

SUPPLEMENTARY NOTE ON MT. LLOYD

Since completion of the report of May, 1956, new facts of interest have been noted. A brief petrological examination by Mr. Spry of specimens from the southern area, interpreted in the field as dykes of hornfels (p. 32), has shown that they are in fact dykes of chilled dolerite, intruding and stoping an earlier dolerite. The two types are easily recognised in the field, the later intrusion being brown in colour, more fine-grained, and seemingly porphyritic.

The Mt. Lloyd Post Office is built on top of a bare, convex hill of dolerite (called Barren Hills). The edges of this hill are flanked with metamorphosed shale in the north, and quartzite at Leeson's mill, dipping away from the hill. Underneath the clothes-line at the Post Office, and behind the side door, are small dykes of white, fine-grained quartzite intruding the dolerite. The dykes vary between a quarter of an inch and one inch in diameter, branch frequently, and are up to 20 feet long. They are interpreted as fused sediment intruded into cooling joints in the roof of the dolerite intrusion.

The composition of these dykes is seemingly identical with the large numbers of very thin platy veins that intrude the dolerite in the southernmost creek on the map. The veins are less than

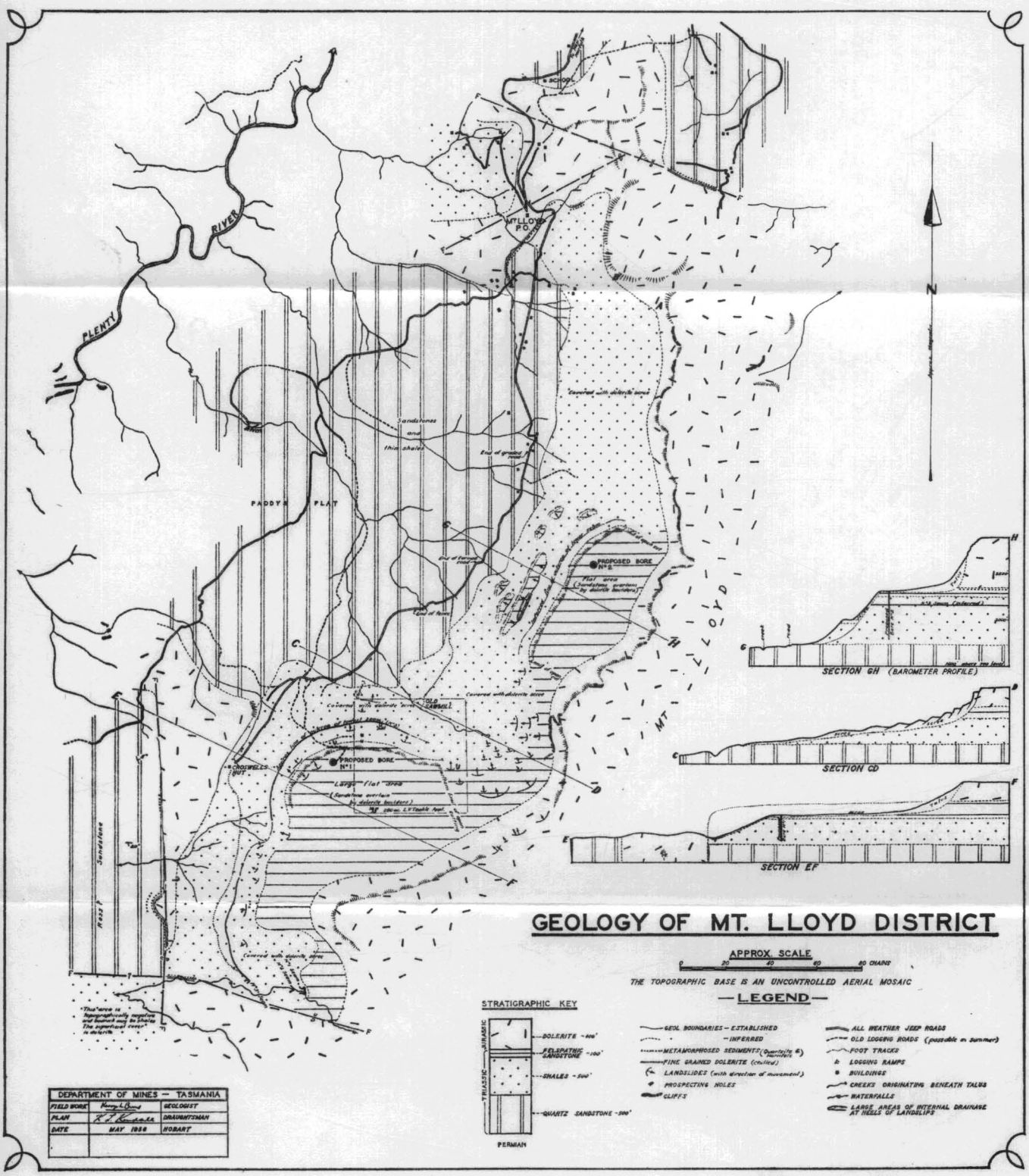
one-tenth of an inch thick, traverse the width of outcrops, and are arranged on a grid pattern in sections normal to the plane of the veins.

The small dyke on Paddy's Flat shows strong metamorphism of the sandstones on the south, but relations on the northern side are obscure. There is a marked jointing or flow structure parallel to the sides of the intrusion. The rock contains olivine phenocrysts, so is probably of Tertiary age. There are very small remnants of an old basalt flow near the farmhouses in the extreme north-east corner of the map.

A further point of interest is a very strong magnetic anomaly on the cliff just north of the gully that lies half a mile E.N.E. of bore site No. 2.

A piece of rock 16 in. x 8 in. x 12 in. was sufficiently magnetic to cause an 180° compass deviation. Even on top of the range the compass showed a 30° variation. A check of the compass later showed a maximum instrument error of one degree of arc. The observations were confirmed by Mr. B. Garrett, a surveyor of New Norfolk.

Arrangements have been made for the writer to inspect drill core during the summer, and it is hoped to find occasion to more thoroughly investigate the phenomenon



GEOLOGY OF MT. LLOYD DISTRICT

APPROX. SCALE
0 20 40 60 80 CHAINS

THE TOPOGRAPHIC BASE IS AN UNCONTROLLED AERIAL MOSAIC

—LEGEND—

STRATIGRAPHIC KEY

- GEOL. BOUNDARIES — ESTABLISHED
- — INFERRED
- METAMORPHOSED SEDIMENTS (Quartzite & Hornfels)
- FINE GRAINED DOLERITE (Outlier)
- LANDSLIDES (with direction of movement)
- PROSPECTING HOLES
- CLIFFS
- ALL WEATHER JEEP ROADS
- OLD LOGGING ROADS (passable in summer)
- FOOT TRACKS
- LOGGING RAMPS
- BUILDINGS
- CREEKS ORIGINATING BENEATH TALUS
- WATERFALLS
- LARGE AREAS OF INTERNAL DRAINAGE AT HEELS OF LANDSLIPS

DEPARTMENT OF MINES — TASMANIA		
FIELD WORK	Percy L Quaid	GEOLOGIST
PLAN	R F Rosser	DRAUGHTSMAN
DATE	MAY 1958	HOBART

PLATE 8

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5 cm