

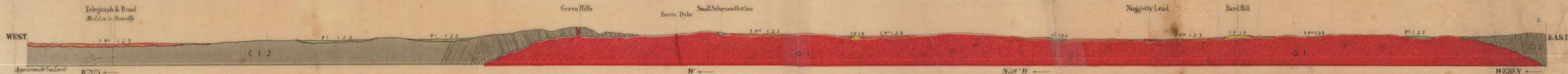
SECTION

FROM THE WEST MARGIN OF QUARTER-SHEET 14 N.W. (BRADFORD) ACROSS THE THREE-CHAIN ROAD AND TELEGRAPH LINE FROM MALDON TO DUNOLLY TO THE EAST MARGIN, ABOUT 1 1/2 MILES NORTH OF PORCUPINE FLAT.

(SEE LINE OF SECTION ON QUARTER-SHEET.)

SCALE—HORIZONTAL AND VERTICAL—40 CHAINS TO AN INCH.

Index to Colors: P. 123 Post Pliocene, U.P. 123 Upper Newer Pliocene, O.P. 123 Older Pliocene, S. 123 Lower Silurian, G. 123 Granite



There are no data whereby the exact thickness of this tertiary deposit can be estimated; in some places it doubtless attains a considerable depth, and may overlie other drifts containing gold.

The dip of these rocks can only be seen in a few places. It varies from a steep inclination of about 75° both easterly and westerly to vertical.

The position of the quartz reefs and dykes, as shown in the section, is correct only at and near the surface. Their extension downwards is assumed.

The exact outline of the junction between the granite and Silurian below the surface is, of course, uncertain.

The thickness of the Upper Newer Pliocene and alluvial deposits is in most cases exaggerated to admit of their being colored. In some places, however, where hollows in the granite occur which are not already filled with older tertiary beds, they probably extend to a considerable depth.

The Silurian rocks here show no defined dip; they are much broken at the surface.

SKETCH SECTION ACROSS BRADFORD LEAD AND CREEK THROUGH THE WESTERN CORNER OF SURVEYED TOWNSHIP. DIRECTION OF LINE—ABOUT N. 26° E.



HORIZONTAL SCALE—40 CHAINS TO AN INCH. VERTICAL SCALE EXAGGERATED.

NOTES REFERRING TO QUARTER-SHEET 14 N.W. (BRADFORD).

1. Hard, yellowish, flaggy, micaceous sandstone. Strike N. 15° W., with a westerly dip of 80° to 85°.

2. Hard, massive, blue, metamorphosed sandstone. Strike N. 15° W., with an easterly dip of 45°. Suitable for road metal.

3. Along the top of the range in this locality a very jointed and broken-up bed of hard, grey quartzite crops out.

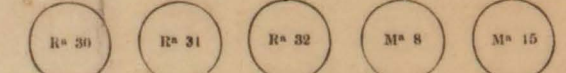
4. Hard, blue, metamorphosed rock, much jointed and cleaved, containing thin veins of granite less than one inch in width. Dip of the sandstone is from 80° towards the west to vertical.

5. Dykes of hard felspar porphyry in the granite, striking N. 14° W.

6. Hard, blue, jointed, metamorphosed sandstone. Strike N. 10° W., dip easterly 85°.

7. Hard, blue schist, dip vertical, strike N. 8° W. a. Hard, blue schist, dip 85° easterly, strike N. 8° W. b. Hard, blue schist, dip 77° westerly. c. Hard, blue schist, dip 70° westerly.

8. At this place the granite has been quarried for building purposes, and is sparingly interspersed with thin scales of molybdenite.



9. The granite of this neighborhood is a mixture of eurtite and porphyritic granite.

10. In the blue slate-bottom here, under the drift, impressions of *Hymenoceras vermiculata* were found during the progress of the survey.

11. This quartz reef contains veins and nests of schori.

12. At this point the tertiary escarpment, which in other places is separated from the river by an alluvial flat, forms its present bank, rising almost perpendicularly to the height of about 50 feet on the north bank. It is composed of red, sandy loam, and whitish sandy clay, containing small nodules and dendritic concretions of impure limestone, which are possibly derived from the fossil bones and shells imbedded in the loam; also, small rounded fragments of light vesicular basalt.

During the progress of the survey several bones of Mammals, and also of Helix, were dug out of the red sandy loam at this place, at a depth of from 2 to 8 feet from the surface, and Professor McCoy describes them as follows:—"The fossil bones examined from the clays on the banks of the Leidon indicate a Pliocene rather than a modern age, for of the only three determinable fragments, one species does not now inhabit the continent, and the other two are extinct. The remains are a skull of the Tasmanian devil (*Sarcophilus ursinus*), a lower jaw of an extinct wombat (*Phascogalea plicata*—McCoy), and a new extinct kangaroo-rat (*Belomys emuloides*—McCoy), differing from the allied living form in the deeper and stronger jaw and simplicity of the milk pnenolus."

The above determination, by Professor McCoy, confirms the correctness of the previous mapping of these deposits by the Geological Survey as Upper Newer Pliocene.

13. The bank of the creek at this point forms an escarpment, about 30 feet in height, composed of granite detritus ("regenerated granite").

14. The bank of the river here is composed of a loose conglomerate of white and ferruginous quartz pebbles, resting on a coarse grit of cemented sand, which must be of very recent origin.

15. Jointed beds of very hard, blue, metamorphosed sandstone, together with massive beds of the same, dipping on the north side of the gully 70° to the east, and on the south side 75° westerly. This rock is suitable for road metal.

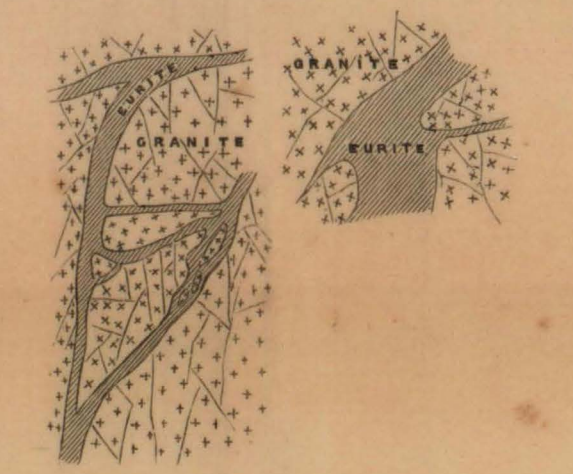
16. Intensely hard, metamorphosed rock, having a metallic ring when struck. Strike N. 15° W., dip vertical. Good road metal.

17. On the surface of these low rises highly ferruginous sandstone and grit are exposed.

18. An unsuccessful attempt has been made to manufacture bricks out of the black clay forming the bank of the river.

19. Well about 20 feet deep, sunk in alluvium, with white quartz pebbles, and containing good water.

20. Dykes of felspathic eurtite in coarse granite.



21. Spring of good water.

22. Spring of good water.

23. Strong spring of good water in the gully at the junction of the granite and Silurian.

24. Alternations of layers of yellow mottled, gritty cement, and semi-rounded, rounded, and irregularly shaped quartz and Silurian pebbles, looking very like the Newer Pliocene gold drift near the Beehive Reef, Maldon. There is a possibility that the bottom of this drift is auriferous, also that it may overlie the Older Pliocene. It is exposed at several places along the river, cropping out from under the basalt escarpment on the west bank.

25. These steep and rocky ranges have been but little prospected for gold, and, as yet, none of the quartz reefs have been proved auriferous; most of them are small, of no great thickness, and contain, apparently, but slight traces of metallic minerals. On the highest parts of the ranges there are a few dykes, chiefly of a coarsely granitic character, having in some cases the same strike as the quartz veins, in others striking at right angles to them. The Silurian rocks forming the range are principally blue and grey, very hard, and highly metamorphosed.

26. These low ranges are, in some places, but a few feet above the gullies which intersect them, and are a good example of the result of the denudation to which the country has been exposed. The quartz reefs occurring in them are small, and few in number, and none of them have been proved auriferous.

27. The true western junction line of the granite and Silurian can only be determined with certainty where it is not covered with detritus. In this locality there are Silurian ranges on the west, granite ranges on the east, and a creek with wide alluvial flats between them, which effectually hides the junction.

28. In the granite of this range are two inliers of metamorphosed rock, which must have escaped denudation at the time when the superincumbent Silurian strata were removed.

29. Most of the quartz reefs crossing the range between the Moonlight and Nuggetty Reefs are more or less associated with dykes, chiefly a fine eurtite and eurtite granite, sometimes, however, occurring coarse, with large plates of mica, and sometimes with schori. These dykes, when large and distinct, are indicated on the map; those, however, which are mixed up with the reefs, being generally small, are omitted. The reefs here have a general dip towards the east of 70°, coinciding with that of the schist.

30. VICTORIA REEF.—The western wall of this reef is formed by a dyke of a grey and whitish eurtite, in some places soft, in others hard and siliceous.

31. Spring of good water.

32. Spring of slightly brackish water.

33. Spring of brackish water.

34. This lead is composed of semi-rounded pebbles of quartz and ironstone, cemented together, and resting on a bluish-white clay, angular quartz, and loose drift of soft Silurian sandstone. At the lower end, near where the lead enters the gully, the wash dirt is reported to have yielded several ounces nuggets.

35. Hard, blue, metamorphosed rock. Dip vertical to easterly.

36. Hard, blue, metamorphosed rock, splitting into good flags, in the line of bedding, about 4 inches thick. Dip 60° to 70° easterly.

37. Thick beds of hard, blue schist, splitting parallel to bedding into flags from 1 to 2 inches thick. Dip 65° to 65° easterly, strike N. 18° W.

38. Hole, showing white rounded quartz and granite detritus.

39. Outcrop of red and yellow mottled grit, under a drift composed of very large semi-rounded fragments of schist and granite.

40. Shaft about 40 feet deep, showing soft sandstone or grit, composed of quartz like that from the granite.

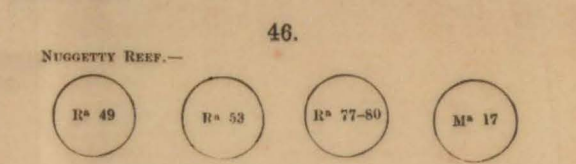
41. Shaft about 50 feet deep, sunk through the same material as the last, but containing also rounded red quartz, smoky quartz, with schori and mica.

42. Conical hill about 30 feet high, composed of a layer, about 10 feet thick, of soft brown and whitish sandstone, containing rounded pieces of a soft ferruginous material, resting on a similar sandstone, but without the rounded masses. This deposit probably extends over much of the neighboring area, where no granite is exposed, but cannot be traced, being covered over with granite and Silurian detritus.

43. Holes, showing rounded quartz and granite detritus at the bottom, with Silurian shingle above, similar to Nuggetty Lead.

44. Semi-rounded Silurian detritus on granite detritus.

45. NUGGETTY LEAD commences below the northern extremity of Nuggetty Reef, near the granite boundary, in a narrow ravine, with granite rising on each side. At first it takes a general north-west course, spreading over Nuggetty Flat, and then contracting to a few chains in width, till, at about a mile from the reef, it reaches the largest branch of the Bradford Creek. It has not been traced farther, although it is probable that it extends in that direction. The holes which have been sunk on this lead are not deep, and show two bottoms; the lower one consists of red and grey cemented granite detritus, often with a great deal of yellow mica and fragments of granite; the upper one, of Silurian shingle and quartz pebbles, and fragments of granite, apparently derived from the dykes on the range near Nuggetty Reef. This lead is probably a channel of Older Pliocene date, filled up with Newer Pliocene and alluvial material.



See printed "Notes and Observations on the Nuggetty Reef," by G. H. F. Ulrich, F.G.S., Senior Field Geologist.

46. HARD HILL.—This hill is composed of soft, mottled sandstone and grit, resting on cemented granite detritus, containing rounded quartz, formed in some places into a coarse conglomerate. The lead of gold, commencing here, has been traced in a direction nearly parallel to the Nuggetty Lead, but keeping on the rise above the gully along which the latter runs. In some parts it is only "surfacing" of angular quartz, resting on cemented granite detritus. It is, in all probability, the same lead as the Bradford.

47. The BRADFORD LEAD appears to be an extension of the one mentioned in note 47, as it begins on the rise on the opposite side of the gully, and at about the same height as where the other ceases, and commences as surfacing of angular quartz on cemented granite detritus, and stretches across the south-west corner of the Bradford town reserve, where the depths of the shafts are about 80 feet. After crossing two small creeks, and reaching a third, the workings cease, though probably the lead continues. Between the point of commencement and the first creek, which it crosses, it is composed of grey and mottled grit and sandstone, resting on cemented granite detritus, exactly like slightly decomposed granite, and has white rounded quartz at the bottom. Between the last creek crossed by it and the point of termination kaolin is mixed with the cement.

The minerals found on this lead comprise— 1. TOPAZ.—The Geological Survey party has found in the waste heap from one of the deepest shafts two fine valuable specimens, of a pale sky-blue color, one a rounded pebble, the other a worn crystal of 513.3 and 132.8 grains in weight. Another specimen, a small crystal of the clearness of rock-crystal, enclosed in a worn crystal of calcareous, is in the possession of Mr. Hornsby, of Maldon.

2. GARNET.—First discovered by Mr. Hornsby in crystals, varying in size from a pin's head to that of a pea; some fine blood-red transparent, others light orange yellow, but the generally dark brown opaque. All are enclosed in crystals of smoky quartz. Their form is generally the rhombic-dodecahedron modified by planes of the trapezohedron, and several have been found of very curiously distorted shapes; for instance, resembling modified hexagonal tables, &c.

3. SCHEELITE TUNGSTATE OF LIME.—Of this mineral but one solitary crystal, of about the size of a pea, has been found. It is enclosed in a crystal of smoky quartz, is of a half-rose color, and appears to be a rather imperfectly developed tetragonal octahedron.

4. DAMOURITE(?).—Two small rounded pieces have been observed enclosed in calcareous, one of a yellowish-white, the other of a rose-red mica (muscovite) like mineral, that seemed, by its giving off water on heating, and by the non-elastic character of the thin transparent scales into which it can easily be split, to agree with the species damourite.

5. ORTHOCLASE FELSPAR.—Crystalline, white and light flesh-colored; pieces of this mineral are frequently found enclosed in calcareous pebbles and crystals.

6. TOBERMORANNE (Schori), in aggregations of black acicular crystals, also enclosed in crystals of calcareous.

7. MOLYBDENITE has several times been found enclosed in calcareous, in fine scales and small hexagonal plates, generally accompanied by—

8. IRON PYRITES in small cubical crystals.

9. QUARTZ occurs in the following varieties:— a. Common opaque grey and white quartz, in pebbles, and sometimes in water-worn crystals of 8-10 inches in length by 6-8 inches in diameter. b. Rock-crystal, in pebbles and water-worn crystals. c. Amethyst, of different shades of color, the dark ones rare, sometimes in water-worn crystals, but generally in pebbles. d. Smoky quartz, Calcareous.—In great abundance as pebbles and more or less water-worn crystals, varying in color from light honey-yellow to dark brown and black. The crystals sometimes reach the size of 8 inches in length by 4-6 inches in diameter, affording thus fine specimens for the lapidary; and the most are modified by some of the rare hexagonal planes. Many exhibit parallel lines of color, white, transparent and dark brown, and sometimes amethystine; these lines are also parallel to the crystal planes, and evidently represent successive positions or lines of growth of the crystals. The most interesting crystals, however, are those—a number of which have already been found—enclosing the mineral species previously described.

49. Angular quartz, resting on red ferruginous grit and sandstone.

50. Tunnel driven into the side of the gully, showing jointed flaggy beds of hard, blue, metamorphosed rock. Dip 45° easterly.

51. Small quarry, showing beds of hard, blue flags, cut by joints in the line of the dip into long narrow strips, having a clear metallic ring when struck. Dip 65° to 70° easterly.

52. EAGLEHAWK REEF.—The outcrop of this celebrated reef is worked nearly its entire length by several different companies, and has yielded handsome returns. Five hundred ounces are said to have been procured from one ton of quartz. The yield from the Union Company's claim at one time averaged 6 ozs. to the ton; the width of the reef was then from 4 to 14 feet, and the depth of shaft 225 feet. On the south side of the Eaglehawk Creek the reef is at one place about 30 feet thick, and dips westerly at 78°, and only the west half of the reef was auriferous. The walls consist of soft, white and yellow sandstone, intersected with small leaders of quartz. The strike of the reef is N. 13° W. At the lower level iron and arsenical pyrites become very abundant. Galena occurs occasionally.

53. Hole 40 feet deep, showing clay, Silurian shingle, and granite detritus and gravel. Granite.

54. Very hard, massive, bluish-grey granite.

55. Very massive, hard, grey granite, with mica in nests and bunches.

56. This lead probably at one time crossed the flat, as indicated by the dotted line, but has since been denuded.

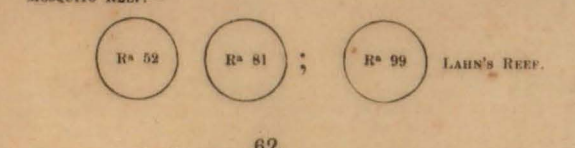
57. The exact spot where the Older Pliocene "forty foot" lead ends is difficult to be indicated, as it is covered by the Newer Pliocene of the Porcupine Flat.

58. Cemented granite detritus capping out along the creek.

59. At numerous places, particularly in the neighborhood of Bradford, outcrops of soft mottled sandstone and grit, like that of the Bradford Lead, are met with (indicated by the yellow color). They probably occupy hollows in the granite, and can only be traced with certainty where they crop out, although they may extend over a large area covered by newer detritus.

60. Well in alluvium, 30 feet deep. The water intensely saline.

61. MOSQUITO REEF.—



62.

63.

64.

General Note. In the country comprised within the dotted area the granite is only visible in isolated rocks and patches, indicated by the undotted portions; the remainder is covered by a deposit of granitic and Silurian detritus (T^{ns} 1, 2, 3.) of variable thickness.