

A Three Catchment Problem. [1]

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It is quite a three pipe problem, Watson, and I beg that you won't speak to me for fifty minutes.

Arthur Conan Doyle, *The Red Headed League*

A picnic party in the bush to the west of Taradale is disrupted by a rain squall. With a rug over her hair and around her shoulders one of the picnickers braves the rain while the rest of the party huddle in the car and ask each other whose idea was it to go on a picnic. The outsider observes the rain trickling into pools and the overflow of the pools accumulating to form a rivulet in a gully. She muses on the fate of the water, certain that it will eventually join the Murray River, but undecided whether its passage will be the Campaspe or the Loddon River.

We are speaking of catchments. A workable definition of a catchment is an area with a single identifiable drainage outflow. The practical effect of this definition depends on where you stand. The manager of the barrage across the mouth of the Murray River would speak of the Murray catchment. The captain of the paddle steamer at Echuca might refer to the Campaspe catchment. The weir keeper at Eppalock would draw the distinction between the Campaspe and Coliban catchments. If we continued this process of successive refinement further upstream, ultimately we would, if we had selected a certain path and time, have found water overflowing from a temporarily abandoned picnic plate. It might well be said:

Great catchments have little catchments on their back to feed 'em,
And little catchments have lesser catchments, and so on *ad infinitum*. [2]

Two neighbouring catchments meet along a watershed. A watershed generally runs along the top of a ridge, over peaks and along saddles. Rain falling on a watershed will run into one catchment or the other dependent upon whether the fall is marginally to one side or other of the watershed. The watershed between the Loddon and Campaspe catchments starts near Bullarto South and runs north towards Bendigo [fig 1] [3]. (I have not investigated its location beyond Bendigo.) Had the inquisitive picnicker of the opening paragraph had a map of the Campaspe-Loddon watershed to hand she would have been able to resolve her conundrum.

The headwaters of the rivers contributing to the Loddon and Campaspe catchments rise on the north side of the Great Dividing Range. On the corresponding south side of the range are the headwaters of the rivers that contribute to the Werribee catchment. Thus two more watersheds, the Werribee-Loddon and the Werribee-Campaspe are identifiable [fig 1].

The three watersheds will meet at a point, termed here "tri-shed". Rain falling in the vicinity of this point will flow down into the Loddon, Campaspe or Werribee catchment depending on how the rain is marginally placed with respect to the tri-shed. (The situation is somewhat analogous to a traveller standing on Poeppel Corner. A step due south would place her in South Australia, a step north-east would place her in Queensland and a step to the north-west would place her in the Northern Territory.) A tri-shed is a point (rather than an area) in the same sense that a summit is a point rather than an area. The precise determination of the point is scale and practicality dependent, analogous to the precise determination of a summit. Tri-sheds proliferate: there would be many (the number determined by the scale you select for the catchments) along the Great Dividing Range. Of course tri-sheds are not limited to the Australian continent. From my domestic atlas I can identify a South American tri-shed in the region of latitude 16 degree south, longitude 48 degree west, formed by the upper catchments of the Paranaiba, São Francisco and Tocantins rivers.

Fig 2 [4] shows the area near the Campaspe-Loddon-Werribee tri-shed on a larger scale. (Note: the convention on this map is that the contour values read the right way up when the reader is facing uphill.) The southern part of the map contains a number of creeks that contribute to the Werribee catchment. The two creeks contributing to the Campaspe catchment exit the study area near the north east corner of the map and those several creeks that are headwaters of the Loddon exit along the northern map boundary. The tri-shed is near the peak of Coghlands Hill. The contour spacing of 10 metres serves well for the country to the south of the peak – the gullies containing the creeks are

well defined. However some interpretation is required to shape the flatter country to the north. In particular, the section of the Campaspe-Loddon watershed between the knoll with a spot elevation of 798 metres and the peak marked 792 metres warrants some discussion. I have, because of the two adjacent 780 metre contours, interpreted this section as a saddle with the lowest point a little under 780 metres. Thus the ground at the saddle falls to the north towards the 770 metre contour and to the south also falls towards (though not so directly) the 770 contour in the Campaspe catchment.

Fig 2 enables us to determine the location [5] of the tri-point with an uncertainty of perhaps 100 metres. A field inspection would establish the worth of this expectation.

Although tri-sheds are unique points, they do not appear to have any advantages as demarcation entities. They are no more precise than mountain peaks; in general considerably less so. Their significance is purely academic.

George Mallory's often quoted justification for attempting the climb of Mount Everest, "because it's there" [6] could be generalised to, "because it's identifiable". This generalisation would encompass past searches for the poles, the other side of deserts, inland seas, mouths of rivers, junctions of rivers and the source of rivers. The concept of tri-sheds adds another item to the list of identifiable geographical features. Because the majority of tri-sheds are yet to be identified and yet are implicitly defined (to some degree of precision) by map features (watercourses and contours) there is scope for armchair researchers to participate in the search for new tri-sheds. In addition, field researchers (or philosophical picnickers) can locate the actual points on the ground and make appropriate speeches.

References.

- [1] Concept first published as: *Three Catchments Define a Point*, The Australian Geologist, Mar 2001, No.118, pp 18-19
- [2] Various sources, earliest Jonathan Swift 1733. The original rhyme, bite 'em – *infinitem*, is superior to my corrupted version.
- [3] Derived from "Interactive Map" via <http://www.land.vic.gov.au/>
- [4] Derived from "Vicmap Topo Maps 1:30000" via <http://www.land.vic.gov.au/>
- [5] Datum GDA, UTM 55S 256093 5854569, MGRS 55H 56093 54569, 37° 25.42' S 144° 14.62' E.
- [6] *The Oxford Dictionary of Modern Quotations*, Oxford Uni. Press, 1991 p. 145