USING SPATIAL TECHNOLOGY TO LOCATE THE VIEW ILLUSTRATED IN EUGENE VON GUÉRARD’S PAINTING OF THE KOSCIUSZKO MASSIF

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ABSTRACT: The colonial artist Eugene von Guérard travelled extensively throughout south-eastern Australia sketching thousands of views during his three-decade-long sojourn in Australia. His field drawings are renowned for their fidelity to nature and observational accuracy, but the validity of the latter claim depends on comparing drawings with the view at the sites where he sketched. The location of the view in some artworks, such as Mount Kosciusko, seen from the Victorian Border, has eluded art historians and aficionados who have ventured into the field. This article discusses the collation of clues from historical narratives, maps and surveying techniques to limit the search area for the vantage point where he sketched the view on which he based his painting of the Kosciusko massif. Novel use of spatial technology utilising satellite imagery, Global Positioning System (GPS) and Shuttle Radar Topography Mission (SRTM) data, particularly digital elevation models, to locate the actual site is explored, and the topographical accuracy of his sketches evaluated when compared with photographs taken from close to the site. Finally, the potential value of using spatial technology in art history field work is discussed.

Keywords: Eugene von Guérard, Kosciuszko, landscapes, locating sites, GPS, SRTM, spatial technology

AN UNLOCATED VIEW

After lengthy negotiations with the Committee of the National Gallery of Victoria, the long cherished wish of the nineteenth-century colonial landscape artist Eugene von Guérard (1811–1901) that his painting Mount Kosciusko, seen from the Victorian Border (Mount Hope Ranges), 1866 (Figure 1) should become ‘national property’ was realised in November 1870. That work, which was purchased for £150, along with Spring in the valley of the Mitta Mitta with the Bogong Ranges, 1866, which was gifted by Archibald Michie, were the only significant examples of the artist’s oeuvre in the gallery for over a century, and ‘thus became the basis of judging his work’ (Bonyhady 1986: 198).

The painting was more favourably received by Melbourne art critics than his more monumental and sublime work North-east view from the northern top of Mount Kosciusko, 1863, now in the National Gallery of Australia in Canberra. One reviewer, most likely the leading Melburnian art critic James Smith, commented in the Argus (Anonymous 1870: 4) that the painting ‘is a minute and faithful likeness of the place its author intended to present’, although the basis on which that judgement was made is unclear, as no reviewer had ever been anywhere near the site. The one person who could have commented authoritatively on the accuracy or otherwise of the picture was the geophysicist Georg von Neumayer (1826–1909), who led the expedition on which the artist sketched the scene, but he had departed Australia in 1864 and it is unlikely that he could have recalled the scene in sufficient detail several years later. The reviewer went on to mention the oft-claimed ‘photographic accuracy of the artist’s pictures…’, but the ‘photographic accuracy’ of this particular artwork is open to challenge.

While the cultural historian Tim Bonyhady carried out extensive field research in the 1980s at the site where von Guérard made the two sketches on which the painting North-east view is based (Bonyhady 1986: 188–194), he did not investigate the site at which the artist made the sketches from which Mount Kosciusko, seen from the Victorian Border is derived, as the work was not in the National Gallery of Australia’s collection. The author of several historical accounts of the expeditions of early Australian explorers, the late Alan Andrews, wrote exhaustively on the exploration and artistic illustration of the Kosciusko massif, including von Neumayer’s expedition (Andrews 1991:145–152). Even though he successfully located the sites of most of the sketches that von Guérard completed on Australia’s highest summits, Andrews failed to find the vantage point from which von Guérard sketched the massif itself. No documented successful investigation into the location of that site had been conducted until the 2018 trip discussed in this article. That excursion to the Mount Hope range was the last of a series of nearly 60 field trips completed between 2015 and 2018, during which 130 of the 165 distinct views illustrated in von Guérard’s Antipodean paintings, lithographic prints and commissioned drawings were located, visited and photographed as part of a research program focusing on the issue of ‘truth to nature’ in his...
Antipodean landscapes. A similar field project, but on a smaller scale, was completed by the late John Tregenza, investigating the locations of all of the sites that von Guérard visited in South Australia (Carroll & Tregenza 1986). Part of my study involves a survey comparing features of the field sketches on which his artworks are based with enduring aspects of the view at the sites, in order to assess the often-praised observational accuracy of the drawings (e.g. Grishin 2014: 101; McCaughey 2014: 46; McDonald 2008: 201; Pullin et al. 2011: 105).

Several comprehensive field investigations into determining the location of all sites within a geographical region painted by a landscape artist, Cézanne in particular, have been undertaken by aficionados (e.g. Haber 2011) and art historians. For example, Pavel Machotka’s extensive research in the 1990s uncovered the sites of many of the previously unlocated views in Provence that Cézanne had painted. However, the art historian’s use of topographic tools to locate sites was limited to occasionally making use of a printed topographic map to align features visible in a painting before visiting a site (Machotka 1996: 52). In contrast, the isolation of many of von Guérard’s wilderness and alpine scenes required the novel application of a digital elevation model, used in conjunction with a digital topographic map, to establish the vantage points and sight lines of the views. This article discusses the application of these tools in one of the more challenging investigations into locating the site of an alpine painting by von Guérard.

Interpreting the painting

Given the geographical orientation of the view looking from the Mount Hope range across to the south-western flanks of the distant Kosciuszko massif, the illumination and shadowing imply that the painting illustrates an early morning view of the massif, which extends from Mount Townsend to South Rams Head (Figure 2; Andrews 1991: 23). The middle ground illustrates the foothills of the Mount Hope range, and in the foreground a stream flows through wet sclerophyll montane forest. Such forests occur at elevations between 1100 and 1500 m in moderately fertile, high-rainfall areas, and typically have a tall, open eucalypt tree canopy with an understorey of shrubs and ferns. Sclerophyll vegetation typically has hardened, closely attached leaves that hang vertically (Costermans 2009: 85). The huge eucalypts in the foreground, most likely Mountain Ash *Eucalyptus regnans* (L. Costermans

![Figure 1: Mount Kosciusko, seen from the Victorian Border (Mount Hope Ranges), 1866. Oil on canvas, 108.2 x 153.3 cm. Melbourne: National Gallery of Victoria. Photograph © National Gallery of Victoria. (The name of the mount was originally spelt as Kosciusko but was changed to Kosciuszko by the Geographical Names Board of New South Wales in 1997.) Magnified details of the painting can be viewed at https://www.ngv.vic.gov.au/explore/collection/work/5679.](image-url)
pers. comm. 2017), dwarf the human figures. In the painting a rider approaches two dismounted men. One of them with a dog beside him greets the rider, while the other attends a campfire, and their horses graze in the clearing.

Von Guérard was accompanying a two-man expedition to measure the strength, declination and dip of Earth’s magnetic field at a series of sites in the Victorian Alps, led by the German geophysicist Georg von Neumayer, and lasting from 16 October to 23 December 1862 (Home 2011; Morrison 2011). According to the artist, ‘this romantic district is only accessible by devious and difficult routes on horseback, under the conduct of an experienced guide’ (Tipping 1975: 82). Although von Guérard was not engaged as an ‘official artist’, he accompanied the party as von Neumayer’s ‘private guest’ so that he could sketch the dramatic scenery encountered. From the geophysicist’s detailed narrative of the trip in his official report, it is clear that the mounted figure is intended to represent the scientist on his white horse, Tommy; the waving figure, the artist with the scientist’s dog, Hector; and the man attending the fire, von Neumayer’s assistant, Edward Brinkmann (von Neumayer 1869: 67–69). This portrayal of the activities of members of the expedition, which as we shall see also occurs in his painting North-east view, reflects the historical significance von Guérard attached to the expedition (Bonyhady 1985: 96).

A composite work

Although the picture appears to represent the scenery visible from a single vantage point, it is in fact a composite work (M. Varcoe-Cocks in Pullin et al. 2011: 254; Grishin 2014: 101) with the foreground imagery partially based on a scene sketched at a site identified as Dinner Creek, and the middle and background scenery based nearly entirely on a large 37 x 58 cm drawing (Figure 3), entitled Mount Kosciusco [sic]. N.S.W., seen from Mt Hope on the Victorian side, f. N.W., 16 November 1862. In turn, that drawing appears to be based on a small field sketch (Figure 4) made in a clearing somewhere on the Mount Hope range, dated ‘16. Nov 62.’, i.e. the same day. That small 9 x 32 cm sketch comprises two facing pages and a single-page extension of the view to the right, found on successive sheets in one of von Guérard’s pocket-sized sketchbooks, giving a panoramic field of view. On a later occasion, the pencil sketch was inked in and a wash added to introduce shadows. The much larger pencil-only drawing captures a reduced horizontal field of view but encompasses a wider vertical view of the same scene, with the additional sky and extended foreground giving a much greater depth of field. However, the details of the more distant peaks jutting out above the right flank of the massif in the painting are derived solely from the small sketch.

On the relatively few occasions when von Guérard completed both a large and a small sketch of the same scene, the large drawing was usually based on the small one and completed soon after visiting the scene. The most likely explanation for this practice was to illustrate the potential of a compositionally promising view that might result in a commission for a landscape painting from one of the affluent squatters, with whom he often stayed on his artistic expeditions.1 When the scientist stated that the artist ‘made a sketch of Mt Kosciusko’ from their ‘first glimpse of that highest point of the Australian continent’ at 3pm (von Neumayer 1869: 76), undoubtedly he was referring to the small sketch. With the vertical field of view being limited by the narrow format of the sketchbook, there was no room for the artist to include foreground detail. Von Guérard realised, therefore, that he would need to capture the foreground of the vista in the more typical ‘landscape format’ of one of his large sheets of drawing paper.

1 In this case, however, the artist invested time in making a large drawing of an important scene, which he later painted without the benefit of a commission.
The question arises as to whether von Guérard completed the much larger drawing in the same place as the smaller one. Given the party would not have wanted to linger long at the site, as they needed to complete the long trek to Tom Groggin station before nightfall, it seems highly unlikely that the artist would have been allowed sufficient time to complete the very detailed large version. At best he may have had time to pencil in an outline of the major features. On a later occasion he would have transferred the features of the left three-quarters of the small sketch onto the large sheet, and then fleshed out the foreground based on his visual memory of the clearing, and developed the cloud layers further. The topography of the Kosciuszko massif and the foremost tree-top line in the large drawing align closely with those features in the small sketch. That the shape and location of the lower cloud strata in the large drawing match those in the panoramic sketch tends to confirm that the former was not sketched in situ as surely the clouds would have moved on.

As to where exactly the party was when von Guérard sketched the view, an annotation (in brackets) on the right panel of the small drawing stating ‘View from Mt. Hope Ranges’ confirms that the vantage point was somewhere on the Mount Hope range rather than on Mount Hope itself, as was mistakenly stated in the title of the large drawing (along with the incorrect bearing). Further locational information is revealed in von Neumayer’s account of that day, which is reproduced below in part as it provides some clues that contributed to eventually locating the site.
Though dense fog covered the hills on the morning of the 16th we started early. At 10 a.m. we reached the top of Mt. Hope (4505)... Arrived at the Dinner Creek (4057) by 12 a.m. and made a short stay; temp. of air 67°.1, temp. of creek 49°.1, at 1 p.m. On starting at 2 we had again to mount a steep hill. At 3 p.m. we were on View Point (4490) from which M. de Guérard made a sketch of Mt. Kosciusko. Here we got the first glimpse of that highest point of the Australian continent and the sight was truly grand. The huge forms of this magnificent range, beheld on a delightful day under a deep blue sky, reminded one of the mountain scenery in Italy. From “View Point”, the descent into the valley of the Indi is very steep and requires a great deal of care and precaution in effecting it. We were, however, so fortunate as to arrive safe and sound at Groggan’s [sic] station (1615) on the Indi river at 7 p.m. (von Neumayer 1869: 75–76)

A small annotation in nineteenth-century German in the far left of the small panoramic sketch, transcribed as Schau Punkt, can be translated as ‘View Point’ (S. Haring pers. comm. 2018), which confirms that the small drawing was made at the spot von Neumayer referred to as View Point. While there is no geographical feature known as View Point on the modern topographic map covering the Mount Hope range (Tom Groggin 8524-N 2013), the geophysicist did have a map of the route they were following, which at the time was used to move cattle and supplies between Omeo and Tom Groggin stations. The stock route is thought to have been based on a traditional Indigenous pathway used to reach the Kosciuszko massif from Omeo during summer months to feast on the migrating Bogong moths (Gardner 1980; Spooner et al. 2010: 334). Given von Neumayer’s italicisation and insertion of quotation marks, most likely View Point was marked on the sketch map given to him by the District Surveyor at Albury, Edward Twynam (von Neumayer 1869: 70), but that map appears not to have survived.

Figure 5: Northern part of the route from Mt. Hope to Tom Groggin Station. Tom Groggin topographical map, 8524-N, 1:50,000 (detail). Department of Sustainability and Environment, Victoria. The blue line shows the shape of the route surveyed by Alfred Howitt in 1865 (see Figure 8).
FINDING VIEW POINT

A section of the Tom Groggin topographical map (Figure 5) shows the current route from Mount Hope in the southwest to Tom Groggin station in the north-east. This four-wheel drive track follows the ridge line of the northern part of the Mount Hope range but does not descend into the valley on the eastern side of the ridge line to cross Dinner Creek, as the route taken by von Neumayer’s party did. After the party departed from their lunch stop at Dinner Creek at 2 pm, they ascended a steep hill until they regained the main ridge line, most likely somewhere close to the location identified as The Grassy Knob on the modern topographical map, and then continued on until they reached View Point at three o’clock.

An altitudinal clue

Initially, I thought it possible to locate likely sites of View Point by considering von Neumayer’s calculated altitude of 4490 ft (1369 m). He estimated altitudes by using the barometric or thermometric method (Cajori 1929: 449–521 & 512–14; Negretti & Zambra 1864: 39–46 & 95–99). The thermometric method uses the boiling point temperature of water, which decreases at higher altitudes due to the lower air pressure. A direct reading of air pressure from a barometer, or an indirect reading of air pressure derived from a Steam Table, is inserted into the formula $Z = 62,900 \times \log_{10}(P_o/P)$, where $Z$ is the altitude in feet, $P$ the air pressure at the location in any unit and $P_o$ the air pressure at sea level at the same time measured in the same unit (Graham 1996). Von Neumayer, identifiable by his legionnaire’s cap, can even be seen diligently measuring (Bonyhady 1985: 94) the boiling point of water using an instrument called a hypsometer in a detail of the painting North-east view (Figure 6). At that location, the geophysicist recorded the boiling point of water on Mount Townsend as being 198.62°F, and based on that reading later calculated the altitude to be 7140 ft (von Neumayer 1869: 77) after he had returned to Melbourne and accessed the hourly weather data recorded at the Flagstaff Observatory (von Neumayer 1858: 101; Home 1991).

In order to gain a measure of the margin of error involved, von Neumayer’s estimates of the altitude of five supposedly known sites were compared with modern measurements (Tom Groggin 8524-N 2013; Geehi 8525-S 2013; Highest Mountains 2010). The large discrepancy between the two Mount Hope figures (Table 1) was puzzling until it was realised that Mount Hope was not on the original track but about 1 km to the east through thick bush, which the party would not have traversed. Excluding Mount Hope, the errors are all about 2% or less under the actual heights. Adding the maximum error to von Neumayer’s estimate of the 1369 m height of View Point gives a revised height of nearly 1400 m. The only summit close to that height north of where von Neumayer’s party regained the ridge after leaving Dinner Creek is located approximately 400 m north of the location of The Grassy Knob. At 1390 m, that peak initially seemed a likely candidate for View Point.

Two sight line clues

The second strategy used to restrict the range of possible locations of the artist’s vantage point involved looking for sight lines that transect two identifiable features in his panoramic sketch. If two such sight lines existed and could be transposed onto a topographical map, then where they intersected in the Mount Hope range would help limit the search area to a manageable size (Figure 7). The peaks in the sketch were identified by comparing them with the view from The Grassy Knob using a virtual horizon software program called PeakFinder, an application that

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2 The detour to Dinner Creek would have been required to water cattle being moved along the track.

3 As the closest summit to Mount Hope along the ridge track has a height that matches the scientist’s estimate to within a few metres, the most probable explanation for the discrepancy is a case of mistaken identity.
Table 1: Comparing von Neumayer’s estimates of altitudes with topographic data. The measurements for Mount Kosciuszko and Mount Townsend are from the Geoscience Australia website, and the Mount Hope and Tom Groggin figures from the Tom Groggin topographic map.

<table>
<thead>
<tr>
<th>Location</th>
<th>Date</th>
<th>Neumayer’s estimate (feet)</th>
<th>Neumayer’s estimate (metres)</th>
<th>Topographic data (metres)</th>
<th>Percentage error</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mount Hope</td>
<td>16/11/1862</td>
<td>4505</td>
<td>1373</td>
<td>1558</td>
<td>–11.9%</td>
</tr>
<tr>
<td>South Rams Head camp</td>
<td>18/11/1862</td>
<td>6254</td>
<td>1906</td>
<td>1929</td>
<td>–1.2%</td>
</tr>
<tr>
<td>Pinnacle Hill (Rams Head)</td>
<td>19/11/1862</td>
<td>7038</td>
<td>2145</td>
<td>2190</td>
<td>–2.1%</td>
</tr>
<tr>
<td>Mt Kosciuszko</td>
<td>19/11/1862</td>
<td>7176</td>
<td>2187</td>
<td>2228</td>
<td>–1.8%</td>
</tr>
<tr>
<td>Mt Townsend</td>
<td>19/11/1862</td>
<td>7140</td>
<td>2176</td>
<td>2209</td>
<td>–1.5%</td>
</tr>
</tbody>
</table>

Figure 7: Vantage point, field-of-view and sight lines relating to von Guérard’s sketching of the Kosciuszko massif from View Point. Diagram © Tony Mander.
later proved critical in identifying the actual vantage point. Unfortunately, there was only one such transecting sight line — a view through Dead Horse Gap of the tops of Knob Hill (1950 m) and Paddy Rush Bogong (1800 m). By itself, this sight line proved of little use as, although the 12° arc virtual view back through Dead Horse Gap from the top of Knob Hill took in the northern part of the Mount Hope range, over a distance of 30 km it included a 5 km wide swathe of the landscape. The other possibly useful feature in the sketch is a view of Dicky Cooper Bogong (2003 m) just over the left flank of Mount Townsends. In terms of finding the general location of View Point, any virtual view from the Mount Hope range would need to include the top of Dicky Cooper Bogong on the left, as well as the tops of both Knob Hill and Paddy Rush Bogong on the right. By testing unobstructed virtual views of the Kosciuszko massif from different altitudinal locations on the northern part of the Mount Hope range, it was determined that View Point would need to be at an altitude of at least 1200 m.

The route clue

While the correction to von Neumayer’s estimate, to give a maximal altitude of up to 1400 m for View Point, and the minimal altitudinal requirement of 1200 m for specific peaks to be visible over the flanks of the Kosciuszko massif were significant clues, unless the actual route the trio followed could be determined the probability of locating his vantage point, either virtually or physically, was miniscule, given the large area involved (up to 5 km²). Fortuitously, a chance discovery of a sketch map (Figure 8) by the explorer and anthropologist Alfred Howitt (1830–1908) led to a crucial breakthrough. Von Guérard had previously accompanied Howitt on a trip deep into the Gippsland Alps in 1860–61, exploring areas previously unknown to Victorian colonists, which was the artist’s first experience of such challenging terrain (Pullin 2018: 207–211).

According to the biography of the explorer written by his granddaughter, Howitt travelled from Omeo to...
the highest summit in Australia late in 1865 (Walker 1971: 163–164), just three years after von Neumayer’s expedition in 1862. Most likely he surveyed the route on that trip and used his field book to construct the 1868 sketch map. Given the small time difference involved, the route on that map is most likely to have been the same route that von Neumayer’s party followed. When rotated clockwise, the general shape of the track north from the approximate location of The Grassy Knob to Tom Groggin on Howitt’s map is a more than reasonable match with the shape of the current track in the same section of the modern topographical map (Figure 5, blue line), confirming that today’s track essentially follows the pathway of the original stock route. Therefore, View Point is inferred to lie on or close to the current track. Further south, however, the route from Mount Hope to the approximate location of The Grassy Knob on Howitt’s map does not follow the ridge line as the modern track does, but rather descends into the valley on the east side before crossing Dinner Creek and then ascending back onto the main ridge, just as von Neumayer described in that section of his narrative.

A magnetic clue

At a point well north of The Grassy Knob, Howitt recorded his first bearing (N45°E) on The Tomb, as Mount Kosciuszko was then sometimes called, as its flattened shape resembled the mound in Krakow erected to commemorate the Polish hero Tadeusz Kościuszko, after whom the explorer Paweł Strzelecki (1797–1873) had named the highest summit in Australia in 1840. Could the spot where Howitt took his first bearing on Australia’s highest summit be the same location as where von Neumayer’s party first saw the Kosciuszko massif on ‘a delightful day under a deep blue sky’? Given that Howitt experienced clear skies on the day he traversed the Mount Hope range (Howitt 1866), that seemed a likely possibility.

If Howitt’s bearing on The Tomb was made from View Point, then reversing that bearing from the top of Mount Kosciuszko should yield an intersection with the Mount Hope range close to where von Guérard sketched, but that depends on the accuracy of the bearing. Howitt had already completed several expeditions into the Gippsland Alps for the Victorian government, particularly in the search for mineral resources, and these ‘mountain journeys also entailed taking accurate bearings and drawing maps…” (Walker 1971: 115). He would have been competent in the use of a circumferentor or surveyor’s compass (Figure 8 inset) and a theodolite (Smith 2013), although he does not seem to have used the latter instrument on this trip, given the limited precision of his bearings. Not unexpectedly, given the meandering nature of the track, all of the bearings between his waypoints are to the nearest multiple of 5°. His 18 major bearings to distant landmarks, however, appear to be more carefully measured and are accurate to the nearest multiple of 2.5°, with half degrees rounded (e.g. 7.5° to 7° and 32.5° to 33°).

That the outline of Howitt’s track needed to be rotated clockwise before it aligned with the modern route (Figure 5) suggests the bearings on his map are magnetic rather than geographic. The north point labelled ‘M.N.’ for Magnetic North confirms this. According to von Neumayer’s generalised Magnetic Declination map (von Neumayer 1869: inside back cover), the declination for this region of the Alps was about 9° 45’ east of true north in the epoch 1858–64, meaning that 10° would need to be added to any magnetic bearing to give the geographical bearing. It may be that the reason Howitt had not corrected the bearings on his 1868 sketch map was that he was awaiting publication of von Neumayer’s book, with its declinations for the whole of Victoria.

Correcting Howitt’s bearing on Mount Kosciuszko from N45°E to N55°E, then reversing it gives a true bearing of S55°W. Knowing that the design of Howitt’s circumferentor enabled him to reliably estimate a bearing only to the nearest multiple of 2.5°, and allowing a further margin for any reading error or local magnetic disturbance, even though the route taken was ‘basically magnetically clean’ (D. Morrison pers. comm. 2018), a bearing spread of S55±2.5°W from the top of Mount Kosciuszko was plotted on a scan of the combined Tom Groggin and Willis topographic maps (cf. Keir 2017: 7). That margin of error encompasses a 5 km section of the Tom Groggin Track.

Collating the clues

Taking into account all of the clues cited above, the location of the View Point clearing should be:

• under the 1400 m contour of the topographic map (given the maximum potential error of von Neumayer’s altitudinal calculation)

• above the 1200 m contour and have an unobstructed view of the Kosciuszko massif with Dicky Cooper Bogong just visible above the left flank of Mount Townsend, and the tops of Knob Hill and Paddy Rush Bogong visible through Dead Horse Gap (given the detail in the panoramic sketch that von Guérard made at that spot)

• on or close to the present track (given the modern route follows the original stock route that Howitt mapped)

• somewhere along the stretch of the track intersected by the bearings S52.5°W and S57.5°W from the top of Mount Kosciuszko (based on reversing Howitt’s bearing and allowing for a generous margin of error), with the assumption, however, that Howitt actually took the bearing at View Point.
Figure 9: Six possible locations of View Point along a section of the Tom Groggin Track (red flags). The heavier brown line is the 1200 m contour. Waypoint #2 with the blue circle is the most likely location of where Howitt took his first bearing on Mt Kosciuszko. The yellow flags indicate sites where the drone camera was used, and the green flag, the most likely location of View Point where von Guérard made his sketch. Tom Groggin topographical map, 8524-N, 1:50,000 (detail).
Locations along the track that meet, or are close to meeting, the above criteria, were marked on a section of Memory-Map’s digital topographic map – six in total (Figure 9, red flags). Although waypoints #5 and #6 are outside the area encompassed by the margin of error allowed for the bearing, they were included as they are close to The Grassy Knob (the only named point along the Tom Groggin Track) and the expected altitude, and because the assumption that Howitt took his bearing from View Point might not be sustained. Even though features of the distant Kosciuszko massif in PeakFinder’s virtual view at each of the waypoints match features in von Guérard’s panoramic sketch rather well, the fore and middle grounds fail to align to a lesser or greater degree. Waypoint #4 is the most promising general location and, despite testing nearby sites further north and south along the track, no better vantage point was located.

Visiting the Mount Hope range

Before a trip to the Victorian Alps to examine the actual view from each waypoint was undertaken, the route from Tom Groggin station to The Grassy Knob was traversed in the satellite view of Google Earth. What is immediately apparent is that thick forest is growing on either side of the entire length of the track. The only clearing along the track is about 400 m north of where The Grassy Knob is marked on the topographic map, and even that clearing appears to be surrounded by tall, thick bush. Although it might be possible to spot a few openings among the trees lining the route that would allow a panoramic view of the Kosciuszko massif and part of the range to the right of Dead Horse Gap, it would be highly unlikely that such a gap would occur at or close to each of the six waypoints. In order to overcome this problem, a drone camera was taken on the trip so that the view above tree-top level could be recorded, even if that raised the altitude of putative vantage points by 50 m or so, and altered the perspective somewhat. Such an elevation would lower the middle ground ridges of the Mount Hope range relative to the background, but features of the more distant Kosciuszko massif would not be altered by this small change in perspective.

As the northern end of the Tom Groggin Track is often closed by Parks Victoria during winter months, the trip was planned for April 2018. The weather on the scheduled day was sunny and still, with a crystal-clear atmosphere after early morning fog. For much of the 20 km drive south straight to The Grassy Knob, the track is overhung by the crowns of tall eucalypt trees. A digital topographic map on a tablet mounted on the dashboard tracked progress and made it easy to spot when each waypoint was passed. Along the entire length of the relevant section of the track, no completely unobstructed opportunities for photographing the Kosciuszko massif presented themselves.

Eventually, the southermost extent of the trip at The Grassy Knob was reached, which as expected from the satellite imagery is completely surrounded by tall, dense bush. The drone camera was sent up and wide-angle photographs of the Kosciuszko massif were taken from a height of about 40 m above the grassy clearing. The intention on the drive back to the Murray River was to repeat this exercise at each waypoint if there was clear space overhead and, if not, to do so at the nearest open space (Figure 9, yellow flags), until middle ground features looking like those in the sketched views were spotted. Near waypoint #4, the shapes of the foothills of the Mount Hope range visible in the drone camera view clearly resembled the profiles in the sketches, and only a small distance further north a view of the Kosciuszko massif was spotted through gaps in the foliage, and a series of overlapping telephoto shots was taken from left to right across the entire massif. From the shape and location of the nearest ridges of the Mount Hope range below the road, it was obvious that von Guérard’s vantage point must be close by but no longer in a clearing. No other vistas of the Kosciuszko massif were observed on the return journey.

Confirming the site

After the trip, the telephoto images were stitched together using the Photomerge function of Photoshop, and the resulting panorama dehazed in Camera Raw so that features of the distant massif were enhanced as much as possible. Unfortunately, the view of Mount Kosciuszko itself was obscured by the crown of a large Mountain Gum Eucalyptus dalrympleana (L. Costermans pers. comm. 2018) adjacent to the road. The crown was clipped and replaced with another image of that peak and the lesser peaks in front of it, taken from an unobstructed spot a few metres away (Figure 10). While the middle ground ridges of the Mount Hope range (dark green) resemble those in the large drawing (Figure 3), they are clearly shifted to the right, suggesting that von Guérard’s vantage point would have been somewhere to the south-east, off the track, but not far away.

That insight led to a more intensive use of PeakFinder where the vantage point of the program was systematically shifted in a south-easterly direction away from waypoint #4. Eventually at a distance of approximately 300 m (Figure 9, green flag) the topographical profile matched most of the features of the large drawing well and, most importantly, accurately positioned the foreground ridges laterally relative to the massif in the background — the feature that is critical for determining von Guérard’s vantage point.

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4 It should be noted that all of the waypoints are outside of the boundaries of the Kosciuszko National Park.
That the drawing needed to be rotated 2.5° anti-clockwise to align with the profile (Figure 11) is probably accounted for by the difficulties of completing the panoramic sketch on which the large drawing is based in a small sketchbook balanced on the artist’s knees.

There is little doubt that View Point, where von Guérard sketched, is located close to Global Positioning System (GPS) co-ordinates 36°35'30″S, 148°2'44″E, bearing in mind that a latitudinal measurement to the nearest arc-second represents an interval of about 31 m,
and the longitudinal measurement at 37°S gives an interval of about 16 m (Measuring in Arc-Seconds 1999). As the satellite view of Google Earth indicates that location is in the middle of dense bush, there would be no possibility of getting a clear view of the Kosciuszko massif from ground level.

Even though it turned out that the location where Howitt took his first bearing on Mount Kosciuszko (Figure 9, waypoint #2) is nearly 2 km NNE of View Point, Howitt’s map proved instrumental in confirming that the Tom Groggin Track followed the path of the old stock route, and reversing Howitt’s bearing helped to restrict the search area for View Point to a limited section of the track, adjacent to which its location was eventually determined to be.

**Resolving the error**

The elevation reported by PeakFinder for a particular pair of GPS coordinates is based on Shuttle Radar Topography Mission (SRTM) elevational data (F. Soldati pers. comm. 2018) which, according to the current consensus, is accurate to ±16 m at a 90% confidence interval (Makul et al. 2017: 1–2). Even though this is not as accurate as the 5 m elevational data available from Geoscience Australia, the 1262 m determined by PeakFinder for that spot close to von Guérard’s vantage point is still approximately 110 m lower than the 1369 m calculated for View Point by von Neumayer. An altitudinal estimate that is 9% higher than the actual height is difficult to account for given that his other readings are all 1–2% lower than the peaks involved. As the shuttle’s radar sampled every 1 arc-second (NASA 2014), to some extent the altitudinal discrepancy could be accounted for by the sloping topography, although in fact it is only gently sloping at that location (Figure 9, green flag). Other possible explanations include a reading, recording, calculating or typesetting error. The relevant page of a handwritten copy of von Neumayer’s excursion diary (von Neumayer 1868: 241) authenticated by the scientist himself, on which the narrative section of Results of the Magnetic Survey of the Colony of Victoria is based, excludes the possibility of a typesetting error and indicates that this particular elevation was based solely on aneroid barometer measurement. Given that the scientist made corrections to five of the aneroid measurements on that page, a measurement error seems likely, perhaps due to a calibration issue. The transposition of numbers in a measurement is also a possibility, given that in the same paragraph the air temperature is recorded as 17.5° when clearly the figure was meant to be 71.5°.

**Comparing the views**

Given that the eucalypt oil-tinged, blue foothills of the Kosciuszko massif visible in the photograph are 15 to 20 km away, the difference between the panoramic photograph view (Figure 10) and the view that would be visible 300 m away at View Point, if the original clearing had still been in existence, would involve a minimal perspective shift as far as the massif is concerned. For the purposes of this research, the photographed view of the massif itself is considered to be essentially the same as what von Guérard beheld, other than the impact of recent bushfires. Of particular interest is the question of how faithfully the artist rendered the topography of the massif and, if there are any significant differences, whether they were deliberate or incidental. As the large drawing is clearly based on part of the small panoramic field sketch, the comparison is made with the latter (Figure 12).

To facilitate a valid comparison, the drawing has been scaled so that Mount Townsend and South Rams Head align with the same peaks in the composite photograph. In this panoramic photograph, the crown of the Mountain Head Range can be seen on the foothills, but replaced this time with imagery taken by the drone-mounted camera about 25 m above the road, as no telephoto image of that part of the massif was available. What is immediately apparent is that the sketched massif dominates the extended landscape much more than it does in reality, a difference that was quite noticeable when the sketch was held up and compared with the view at the spot where the photographs were taken.

While the sketched profiles and contours of many of the peaks and foothills of the massif tend to align with those in the panoramic photograph, and have therefore been rendered relatively accurately by the artist, there are some significant topographical differences, including the following:

- Mount Kosciuszko is more to the right relative to Mount Townsend and Rams Head, so that the summit becomes more emphatically the central focus of the massif.

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5 A major perspective shift would, of course, occur for the Mount Hope range foothills.
6 The skeletal forest that resulted from the intense fire during the summer of 2003 (Worboys 2003) can be seen on the foothills below Rams Head Range.
7 The substituted area of the photograph is more granular as the drone camera image has a much lower resolution than the stitched images taken with a large telephoto lens.
8 As a result, Australia’s highest summit comes to lie on the principal sight line of the painting.
The range to the right of the massif is lower in height, which gives the massif a more discrete and dominant appearance.\(^9\)

The main summits of the massif are more elevated, with steeper slopes.\(^10\)

Furthermore, the shadowing of the peaks and foothills in this view of the Kosciuszko massif from the southwest, introduced by the later inking in of the sketch and the application of a wash, implies the time of day is early morning, yet we know that the drawing was made mid-afternoon.

The second discrepancy may have occurred inadvertently as a consequence of completing the additional section of the panoramic view on the sheet immediately following the main drawing on the two facing pages of the sketchbook, which could have made it difficult to get the relative heights of two ranges correct.

These discrepancies are, however, surprising, given that at nearly every one of the 135 distinct sites of his Antipodean landscape paintings, lithographs and commissioned drawings that were located, visited and photographed as part of the wider research program, von Guérard sketched the landscape with the accuracy of a topographic illustrator on a geographical expedition. It could be argued, therefore, that the site has not been located. However, the effective alignment of the profiles of the summits and foothills of the massif, and especially those of the foothills of the Mount Hope range and the slopes in the foreground of the large drawing, with the virtual PeakFinder view (Figure 11) strongly discounts that possibility.

More typically, topographical transformations occurred as he created works of art based on faithfully rendered field sketches, primarily by elevating distant features such as volcanic peaks or parts of mountain ranges. This response enabled him to create dramatic works of art that countered the general flatness of the Australian landscape and the great distances to many of the geographical features visible in a view, which often made them appear diminutive.

It is puzzling that von Guérard should make similar modifications while he was sketching on paper in the field in front of his subject rather than when painting on canvas in the studio in front of his easel. Some of the differences between the sketched and photographed massif might have occurred because the artist was in a hurry to capture his ‘first glimpse of that highest point of the Australian continent’ before the party had to move on. But centring Mount Kosciuszko as well as elevating and isolating the massif does suggest he made a deliberate effort to dramatise the view, an effect which is more apparent in the large drawing. Perhaps as he made the small sketch of the view, von Guérard was already contemplating what a sublime scene the view could become if some topographic and temporal enhancements were made, which tempted him to practise a degree of pictorial licence in the field as well as the studio. As such, his drawings of the Kosciuszko massif are exceptions to the high degree of topographic fidelity normally evidenced in his field sketches and are therefore considered to be atypical.

\(^9\) Only Dead Horse Gap with the summits visible through it is, however, included in the painting, with the range to the right being omitted.

\(^10\) They are elevated even further in the painting.
CONCLUSION

The use of applications based on satellite, GPS or SRTM data, such as Google Earth, Memory-Map and PeakFinder, to locate difficult-to-find, isolated sites of views illustrated in paintings of wilderness and alpine areas, as many of the views in von Guérard’s paintings are, appears to be a novel approach for which no precedent has been found in the literature.

The potential for utilising this spatial technology, along with the other strategies described in this article, to find the vantage points of previously unlocated views that von Guérard sketched and then painted back in his studio, is fully realised in the research program that encompasses this study. This has involved locating isolated, undocumented sites in the Grampians of western Victoria and, elsewhere, finding previously undiscovered sites in more accessible locations by using these topographical tools in conjunction with geomorphological, geological and ecological clues recorded in the field sketches on which the artworks are based (Hook 2017). PeakFinder’s digital elevation model, in particular, proves to be a highly useful tool for locating the sites of views illustrated in von Guérard’s landscape paintings, and may find further application in the field of forensic cartography (Bunn & Nolden 2018).

Whether the spatial technology discussed in this article has a wider relevance for art historians interested in locating previously ‘unknown’ sites of views portrayed by other landscape artists, particularly nineteenth-century colonial painters whose wilderness or alpine sites may not be well documented, will depend on the extent to which researchers are willing to utilise the technology and go ‘off-road’.

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