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Restoration of the Spooner Graves



Above left and centre - the Spooner family grave before and after completion of the recent restoration work. Above right, the grave of Elizabeth Preece - the proximity of the graves can be seen in the centre and right-hand images.

Photographs by David Bolton and David Roberts.

There is a certain irony in that the grave of Charles Easton Spooner (1818 - 1889) lies in the village of Beddgelert, a destination that the company of which he was engineer, the North Wales Narrow Gauge Railways Company, never reached, despite attempts to do so. Charles was the third son of James Spooner, a surveyor and the engineer largely responsible for the building of the Festiniog Railway and its development in the first 20 years of its life. In addition to his work for the NWNCR, Charles was the Secretary and Engineer of the Festiniog Railway for 30 years; responsible for the surveying and civil engineering of the Croesor Tramway; and a highly influential figure in the development of narrow gauge railways worldwide, publishing a book on the subject in 1871. The magazine *'Engineering'* wrote in 1872, that Charles "... shows an earnestness and enthusiasm, we may almost say an absolute devotion for the Festiniog Railway". Yet his last resting place lies largely forgotten, and with few visitors, in the churchyard of St Mary's Church, Beddgelert.

The Spooner's family grave reflects the importance of those who lie beneath it. One slab commemorates Spooner himself and his eldest son John Eryri (1851-1877), a Civil Engineer, who died aged only 26. The other slab is dedicated to Charles's wife Mary (1823-1860), their six week old son James and their daughter, Mary Elizabeth. She died of typhoid in 1864 aged only five. The plot is surrounded by iron railings, made in the FR's Boston Lodge workshops and set in substantial concrete footings. Each upright is topped by an ornate cast finial with a larger version on the four corner posts. At the eastern side, a section has been modified to form an entrance gate, sadly rusted shut for many years.

Anecdotally, the grave was originally a vault with steps leading down from the gate.

Between the church and the main grave lies that of the young Mary's nurse, Elizabeth Preece (or Price) who died two days after the five year old child, also of typhoid. The grave, in a similar style to that of the Spooner's reflects the esteem in which she was held as highly respected family servant.

In 1998, with interest in the heritage and personalities of the NWNCR and Welsh Highland growing, the Welsh Highland Railway and the Festiniog Railway Heritage Groups undertook the restoration of the Spooner Grave. The late John Keylock and the WHRHG's membership secretary and archivist Dick Lystor spent several days dodging rain, clearing up and cleaning the very overgrown grave including disposing of the remains of an ash tree. A comprehensive rubbing down and painting of the railings followed, with help from Lewis Esposito and Graham Howland. Inspired by the result, Peter Jarvis subsequently tackled the grave of Elizabeth Preece.

Some twenty one years later, the weather and nature had continued to take its toll on both graves and an email in the February from Val Blake, a Churchwarden at St Mary's, winged its way to me, via Dick Lystor, requesting help. Both graves had reverted almost to their pre-1998 state and in the case of some of the iron railings, the condition was now much worse, with significant wasting away of the metal where wet vegetation had grown up around them. What to do?

Mike Hadley of the WHRHG's committee agreed to look into matters and with the help of David Bolton, a member who stays in the area regularly, we secured some detailed photographs of the condition of both graves. It was quickly

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Afterthoughts on the Incline

(Full of speculation! - by Dave Rogerson)

In my last article, entitled “*Operating the Bryngwyn Branch*” and published in *WHH* 87, I took a broad look at how the branch might have operated. This piece looks more specifically, and speculatively, at the incline.

On pages 177 to 179 of his book “*Slate Quarrying in Wales*”, Alan John Richards reports the outputs and manning of all North Wales Quarries in 1883. Some of this production came down the inclined plane to Bryngwyn and I wondered if a broad estimate could be made of the daily activity.

The four quarries using this route at this time were Alexandra, Moel Tryfan, Braich and Fron and their outputs, as given by Richards, are shown in the second column of the table below.

1883				
Quarry	Annual	Weekly	Daily Load	Wagon Loads
Alexandra	3,721 tons	72 tons	13 Tons	6
Moel Tryfan	1,781 tons	34 tons	6 tons	3
Braich	2,200 tons	42 tons	8 tons	4
Fron	650 tons	13 tons	2 tons	1

There would be variation in the production from week to week but in the next column I have simply divided by 52 to look at what this meant for an average week.

In 1883 the manager was Robert Livesey. The closest known timetable from his period is from 1882 and shows three trips up the branch each weekday with three additional trips on Saturday, one of which was after the usual finish of work. Making allowance for lunch and other breaks, as agreed with the management, this must have left less time to operate the incline on a Saturday. For this reason, I have spread the production over a 5½ day week to obtain the next column.

The second piece of speculation is the load carried by a wagon. Boyd describes two types of nominal size 2 tons and 3 tons. The reality is of course not so simple. Large slates, small slates, tightly packed wagons and not quite full wagons would all affect the actual load. An average load just over 2 tons would give the final column in the table.

An average of about 14 slate wagons a day coming down the incline is as good an estimate as I can make for the activity on the incline in 1883. A similar exercise for the main line indicates that, in the same year, about four wagons a day would be needed to shift the production from

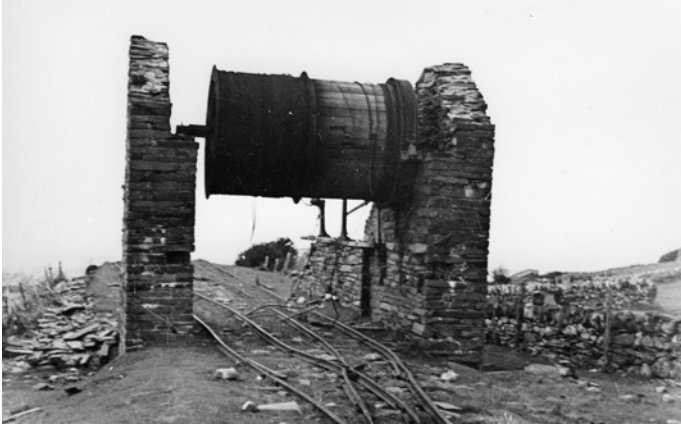
Glanrafon and Plas y Nant, the only quarries working in that area.

Returning to the annual figures in Alun John Richards table, the total tonnage down the incline in 1883 was 8,352 tons and on the main line it was 2,397 tons, giving a total of 10,749 tons of slate carried by the railway in that year. Boyd, on page 261 in my copy of “*Narrow Gauge Railways in South Caernarvonshire, Vol 1*”, gives the Annual Returns made by the railway over the years. In 1883 it shows Minerals 15,598 Tons. Hence the considerable amount of 4,849 tons of non-slate minerals was also being carried. This must have been mainly coal for domestic and quarry use. The only time coal gets a separate mention in Boyd’s table is many years later when he notes that 4,353 tons of coal were carried in 1913. To assess the amount which travelled on the incline two assumptions must be made. Firstly, that this coal was roughly equally split between the quarries and domestic use each needing just over 2,000 tons a year. Secondly, that the quarries needed coal roughly in proportion to their output with a lot more going to Drumhead than up the main line. As it was carried in the 5-ton wagons mentioned by Boyd then about 9 wagons of quarry coal would be delivered each week – 2 to Glanrafon and 7 to Drumhead with an occasional load for Plas y Nant.

Boyd’s table also contains 647 tons of “merchandise” per year, which is the equivalent of a couple of wagons a day or, more likely, a lot of small items in the guard’s van, larger goods in a covered van and an occasional five-tonner for a big item. Included in this, of course, is the gunpowder. I don’t know how you would handle it, but I would want it off my premises as quickly as possible. I assume barrels would arrive at Dinas by LNWR, be offloaded onto a wagon which was kept as far as possible from everything until the next run up the mountain, travel up in the middle of the train as far from the driver, fireman and guard as possible then sent up the incline on its own. Once it was on its way to the quarry everybody could breathe a sigh of relief. Or were they less concerned in the days before we were so conscious of health and safety?

To return to my main theme. As well as the fourteen or so slate wagons on their way down each day, there would be maybe two empty coal and goods wagons returning from the quarries. This ties in well with John Hughes’s memories of a Bryngwyn Journey in Chapter 10 of “*The Bryngwyn Branch*” in which he describes the train on which he travelled in the 1890’s as “two carriages...., a covered van, a large coal carrying wagon and sixteen empty slate wagons and finally a guards van”.

We have little information about the number of wagons on each run of the incline except Goronwy Roberts’s memory, from a much later date, of the top loco signalling by whistle to indicate whether he thought three or four wagons per run to be appropriate. At this rate it would take four or five runs



The remains of the Bryngwyn winding house, looking towards the top of the incline. Note the left-hand half of the drum 'full' of wire whilst the right-hand half was empty, indicating the direction of the last operation. Also note on the right-hand side beyond the drum the elevated platform that afforded the operator a view down the incline. The brake can be seen at the right-hand end of the drum WHR 82 - J.F. Bolton - October 1941.

plus possibly another because of the goods wagons. I am sure that on busy days they could shift five per run, but the brakeman might fear he could not control an even heavier load particularly on the downhill side.

In the 1882 timetable, the weekday time allowed at Bryngwyn was 75 min. in the morning, 50 min. mid-afternoon and 75 min. on the final run. At Rhyd Ddu the equivalents were 33 min., 10 min. and 35 min., so maybe the additional time of approximately 40 min. was planned to be enough for two runs of the incline. As I am speculating, let me guess that they tried to shift what was presented at the Drumhead in four runs if they could. To plan six runs and then have a problem such as a runaway or trouble with the cable run would lead to chaos at the end of the day so this would be sensible thinking (and give them time for an extra break etc). I will assume two runs in the morning and two in the afternoon on this timetable.

On the basis of all this speculation, I am drawn to imagine a day in 1883 on which my average load to come down the incline was matched to an arrival at Bryngwyn guarded by Owen B Thomas (with his trolley tied on behind the train) exactly like John Hughes's train. I would guess that the staff would then have well defined roles. Robert Hughes, the Bryngwyn Stationmaster and incline supremo, would concentrate on what had to go up to the quarries, while Owen Thomas focused on the goods to be distributed from Bryngwyn. Robert Hughes's first concern would be whether the covered wagon was amongst his responsibilities. John Hughes makes it clear that the main cargo in the covered van was flour (and that is probably what brought Bob Siop from Fron to Bryngwyn). Other boxes might have been for Tomos Elias to be taken away by his wagon which, as John Hughes remembers, was waiting. There might have been a few small items for the quarries from the van and the guards van, maybe some lamp oil, candles and fuses, but these could be put into an empty slate crate and covered with a tarpaulin to go up. Having taken out the quarry bound goods, the van could be shunted to the goods shed and handed over to Owen Thomas. Robert Hughes' next consideration would be the coal truck. John Hughes states

that the coal siding contained a number of wagons hence we can assume the local domestic demand was under control and the coal was for the quarries. Hence the load to go up the incline was a coal truck plus 16 slate empties, one of which contained a few goods.

Meanwhile the train crew would be preparing for a smooth operation by shunting the passenger carriages, guards van and covered van out of the way into sidings to leave as many through roads as possible for stuff going up, stuff coming down and a run round loop.

Robert Hughes had done this many times. Before he left Bryngwyn to go to Drumhead he would have assessed the load and intuitively be developing a plan to get it all up safely. I need more data to model his thinking as I do not have his experience. Let us assume each empty slate wagon weighs three-quarters of a ton and an empty five-tonner weighs a ton and a half. The total load to go up is then 12 tons for the sixteen crates and 6.5 tons for the coal, a total of 18.5 tons.

When he reached the top of the incline, Robert Hughes might have discovered that ten full two ton nominal slate wagons and two empty large wagons had arrived and been informed that four more slates would be ready to be brought down for the afternoon run. He then would have fitted this into his plan and revised it accordingly, taking into account that a few more empties might come up from Dinas on the afternoon run. My model indicates a total of fourteen loaded slate wagons at 2.75 tons and two empty wagons at 1.5 tons each – total 41.5 tons. Hence the available motive force is 41.5 tons minus 18.5 tons, which is 23 tons. Divide this over four runs, we need to allow about 5 or 6 tons excess on each journey remembering that heavier loads need a bit more so as to gain enough momentum to get through the dip in the incline mentioned by Goronwy Roberts and a bit of spare might be needed for the extras in the afternoon.

So my plan for the day would be to get the coal wagon up first. The heaviest load of the day at 6.5 tons needing to be matched by 5 loaded slates weighing 13.75 tons: but the 7.25 tons excess is too great so two empty crates need to be added to the up-load to reduce the driving force to 5.75 tons. Run two might clear four empties from the bottom dragged by three full descending wagons – excess weight of 5.25 tons on the 'down' side should work. This would leave 10 empties to go up matched by 6 fulls and two wagons to come down – two loads both with 6 ton excess and a bit of spare for the afternoon arrivals. With the morning's runs over, and the afternoon planned, they might then have had time for a panad and a chat before Owen Thomas set off on his trolley to sort out delivery and collection of the goods he had dropped off at Rhostryfan on the way up, collect fares from the few waiting passengers and then go on to Tryfan Junction to prepare for the arrival of the trains from Rhyd Ddu and the branch. Once there, he would hand over fares, fees, paperwork and messages to Tom Morris, the main line guard, and then to lunch with his singing birds.

There is a lot speculation in this article but it is based on real data and memories and does allow a vision of real people working real loads on a real incline which adds, for me, interest to the industrial archaeology.

Peter Liddell's Photo Analysis

WHR 171 - An Analysis Special

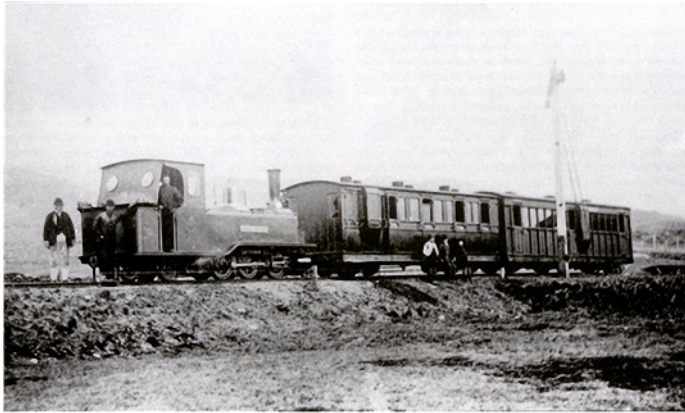


Figure 6) *Moel Tryfan* with a train of two carriages - both Brake Composites, the leading carriage by Ashbury, either no. 1 or 2, the other a Gloucester 'Cleminson', either no. 6 or 7.

The train was waiting to depart a relatively newly-opened Rhyd-ddu, so probably circa 1881/2.

(WHR 171)

Introduction.

Following the publication of the notes on NWNGR double-Fairlies in *WHH 87*, I have received correspondence regarding the caption to WHR 171 (see *WHH 87* p 9). This photo's location has previously been identified both as Snowdon Ranger, taken at the time that station served as the temporary terminus on this branch of the NWNGR, that is between June 1st, 1878, and May 14th, 1881, and as Rhyd-ddu at sometime after the latter date when that station was opened. However, after my own analysis and some discussion, in *WHH 87* I identified the location as Rhyd-ddu. (The photo and caption from *WHH 87* are reproduced above.)

I will expand on the photo analysis at length, but a few key features might be identified here. We see tracks laid on an apparently artificial embankment with flat, but not necessarily level, land between that and the photographer's position. The combination of the embankment height with any slope there might have been between photographer and railway appears

to set the camera almost exactly at rail-top level. To the right we see a signal, in the 'off' position and the reflection of what appears to be a building in the windows of the Cleminson Brake beyond the signal post.

The major comment I have received is contained in the letter from David Woodcock, reproduced below. He presents a strong argument that the train was indeed standing at Snowdon Ranger, based on his analysis of the early development of signalling facilities on the NWNGR and concludes by describing the photo caption in *WHH 87* as 'incorrect'. Unfortunately, however much David might wish it otherwise, whatever the location of WHR 171, it cannot, as I will demonstrate, have been at Snowdon Ranger.

Given the controversial nature of my last statement, a rigorous examination of the photograph is required. The following notes should develop an understanding of both the locations referenced above, from which understanding a resolution of this dichotomy will hopefully emerge. I will also take this opportunity to discuss some of the methods and processes adopted when I carry out my analyses.

I would appreciate any comments, I would prefer 'constructive' but I emphasise the word 'any', that readers might wish to make in response to these notes.

Dear Peter

I write to correct the caption for the photograph (WHR 171) which appears as Figure 6 on page 9 of *WHH 87*. Some fifteen years ago, and after considerable research work, I established beyond all doubt that this photograph was taken at Snowdon Ranger during the period June 1878 to May 1881 when that station was one of the termini of the North Wales Narrow Gauge Railway. The results of that research were published in a contemporary issue of Roy Link's *Narrow Gauge and Industrial Railway Modelling Review*, one immediate consequence of which being that John Keylock contacted me and I became a member of the Heritage Group.

I understand that someone, misled by the scenery visible, has reattributed the location of the photograph to Rhyd-Ddu and, while I would be the first to admit that the scenery is (almost remarkably) similar at both locations, a number of distinct features appear in the full and original version of the photograph, as published in *The Locomotive* magazine in 1904 as a half-tone print, which uniquely identify the

location as Snowdon Ranger during its time as a terminus. The washed out (sepia) nature of that print, typical of publications of the era, and the fact that it was mis-captioned as being at Dinas, slowed the process of identification and, perhaps oddly, on this occasion computer-enhancement of the photo hindered as much as it helped.

Nevertheless, there were several features in the original print which were crucial to the identification of the location as Snowdon Ranger, none being present at all at Rhyd-Ddu and most not being present at other NWNGR stations even if the scenery had matched, which it doesn't. Those features all relate to the signalling equipment visible, a McKenzie and Holland stop signal (the down home, and pulled off, despite the fact that it is for the opposite direction of travel to that of the train), a signal wire (for the down distant) and its supporting posts, and (not visible in the cropped photo printed in *WHH*) Snowdon Ranger "signal box" which was an open-air eight lever frame with a signalling diagram mounted on two posts behind the frame (the only "signal

box", as identified on the 1889 25" OS map, on the NWNCR of this nature although there were, of course, similar ones on the LNWR), two levers (down home and down distant) being reversed.

All the original signalling on the NWNCR, including that for the belated completion of the final short stretch from Quellyn to Snowdon Ranger, was provided by McKenzie and Holland (McK&H) of Worcester. Distinctive features of that company's signals include an "umbrella" finial, a ladder mounted in rear of the signal post and arms which drop more than 45° when pulled off, the signal depicted here has all these features. In addition, their lever frames were always in multiples of four levers, with eight the minimum size, again exactly as depicted in the photo.

For the extension to Rhyd-Ddu in 1881, the signalling work was contracted to the Gloucester Wagon Company of Gloucester (GWCo), who had, of course, built the three Cleminson six-wheeled carriages and who also most probably provided the goods shed at Rhyd-Ddu. There were three separate signalling contracts, worth £ 193, £ 20 and £ 56, and these covered the provision of a replacement down home (on the other side of the track and a little closer to the station building), plus new up home and up distant signals, at Snowdon Ranger (and doubtless changes to the interlocking and point connections in the extant McK&H frame), point levers at Glanrafon, and down home and distant signals, plus the levers to work both them and the single point, at Rhyd-Ddu. It isn't clear why the down home at Snowdon Ranger had to be replaced, perhaps for improved sighting or perhaps to bring it closer to the locking bar for the siding point, but replaced it was as it can be seen distantly, but distinctly as a GWCo signal, in a photo depicting Samuel Tanner and his son with a platelayers' trolley a little the Dinas side of Snowdon Ranger (or Quellyn Lake as it had probably become) station; The 1889 edition of the 25" OS map also depicts it in its new position. GWCo signals were distinctively different to those provided by McK&H, featuring a ladder in front of the post, a ball finial and arms that only dropped about 40° when off.

The signalling installed at Rhyd-Ddu poses an interesting question as to how the signals were worked, the home being close to the station building but the distant (which became the home post-1892) being the Dinas side of the level crossing, and with no particularly obvious (or verifiable) site for the levers which must have been together to be interlocked, GWCo lever frames came in multiples of five levers, but the lack of such a frame in any photos suggests that just two GWCo ground levers were provided, perhaps within, perhaps closely alongside, the station building; the single point was certainly worked from such a lever situated on the opposite side of the line to the building. Furthermore no photo of Rhyd-Ddu, no matter which side of the line it was taken from, shows any sign of the wire which must have been present to work the down home; the only possible explanation being that it must have been buried in a covered timber trough, presumably to minimise the mal effects of wintry weather.

It has been said that the photo WHR 171 includes a depiction of the rear of the "PATH TO SNOWDON ►" sign present at Rhyd-Ddu, but, of course, what is actually depicted is the

much smaller signalling diagram provided by McK&H, comparison with the boys standing alongside the train making this clear. Ironically, when name-boards (including that Snowdon path sign) were provided on the NWNCR in early 1891 using cast-iron letters provided by the LNWR, Snowdon Ranger was the only station where the sign could not be attached to the station building because of lack of space. It was installed instead, free-standing, behind the lever frame (with the signalling diagram doubtless suspended below it), the posts surviving until at least the 1950s as supports for a washing line for the occupants of the former station building.

Taking all these distinctive features into account, even while accepting that the scenery is remarkably similar at both stations, the scene depicted can ONLY be of Snowdon Ranger during the 1878-1881 period when it was the terminus of that branch of the NWNCR. Doubtless the original plate had been held (for some 25 years) by the publishers of *The Locomotive* with the note that it depicted the terminus of the NWNCR (which was true when the photo was taken), hence their erroneous attribution of "Dinas".

With such precise dating possible, and it is almost certainly the earliest reliably datable photo of a NWNCR train, the photo tells us quite a lot, and raises a few new questions, about the early days of the railway. However this letter is not the place expound on this.

Finally, may I say how much I regret the amount of time that I have had to waste on putting your miscaptioning right, particularly after it was all settled and written up in the public domain fifteen years ago. I am also not a little annoyed at the lack of courtesy shown by the person who has been responsible for that miscaptioning in totally failing to contact me to discuss the matter. None of us are perfect and I have many interests beyond the WHHR, which in this case helped me to recognise the distinct differences between the signals produced by the two companies, but I am always ready to rethink issues in the light of even tiny bits of new information, and there are countless examples of such issues in respect of the NWNCR. This is not such an issue though, this location can only be Snowdon Ranger.

Yours

David Woodcock

Champlon, Belgique

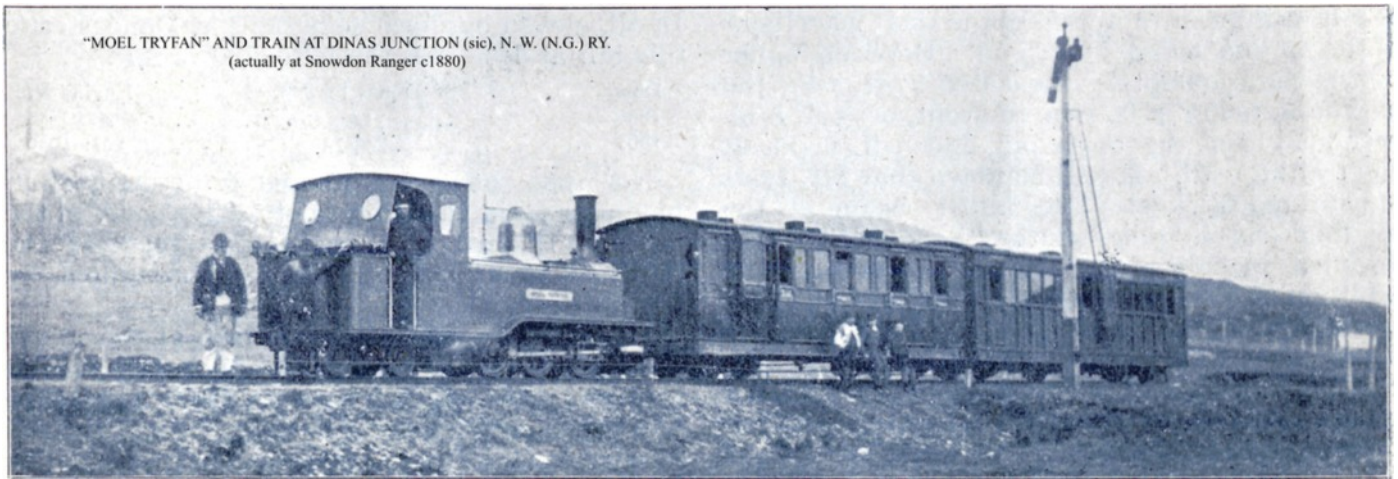
Neil Evans of the WHHR has been in touch to remind us that services on the railway commenced at the beginning of August 1980.

He is planning to produce a special anniversary issue of the WHHR Journal and is looking for assistance with photographs. He is looking in particular for photographs taken on that first weekend of operation. If anyone has, or knows of, any such photographs, would they please contact Neil at:

neilsdevans@outlook.com

Thank you

Peter



Analysis of WHR 171

The photograph in question, published in *The Locomotive Magazine*, No. 56, July 1900, I reproduce here using the version of the image which David included in his comment package. As originally published in the magazine the location was identified as Dinas Junction. The amendments to the photo caption at top left are, I presume, David's and indicate Snowdon Ranger as the 'correct' location.

With readers' permission, I intend to treat this an 'ab initio' analysis without any preconceptions as to the actual location. All we have to go on is what we see in the photograph. Quite often in photo analysis, what we see in the background can be as helpful, sometimes more helpful, than the image's main subject. However, having wiped all opinion as to the location as a precursor to this work, the background is, at least to start with, meaningless.

The photograph's subject is a two-coach train headed by the single-Fairlie *Moel Tryfan*. Both vehicles were Brake Composites, the first, next to the locomotive, Ashbury Brake Compo No. 2 with one of the NWNCR's two Cleminson Brake Composites behind. The locomotive had not been fitted with its air brake system and from its orientation we know that the photographer was located to 'the west' of the track. As used in these notes, 'west' is a generic description of the left-hand, or 'up', side of the railway when facing Dinas Junction.

My usual first step in these analyses is to determine, if I can, the position of the camera relative to the subject. When analysing images, there are occasions where it is possible to 'see through' objects allowing the alignment of features at the front and the rear to determine a sight line from the camera. Of course, this is dependent on knowledge of the subject's geometry. Where the object is well-known, for instance a particular railway carriage, this geometry is often readily available. If sight lines can be generated from two or more areas of the object, projection of these lines to their intersection indicates the likely camera location. Where this technique is not available, as in WHR 171 for instance, an alternative approach is necessary.

Close to the centre of the image, a preferable location for the following analysis, we have the image of the Ashbury Brake. We know the actual length and width of these vehicles and, although it is not necessary for this analysis, we also know their height. It is immediately obvious that the apparent height of the carriage body at the near corner is greater than at the rear, a good example of perspective effect. Of course, the

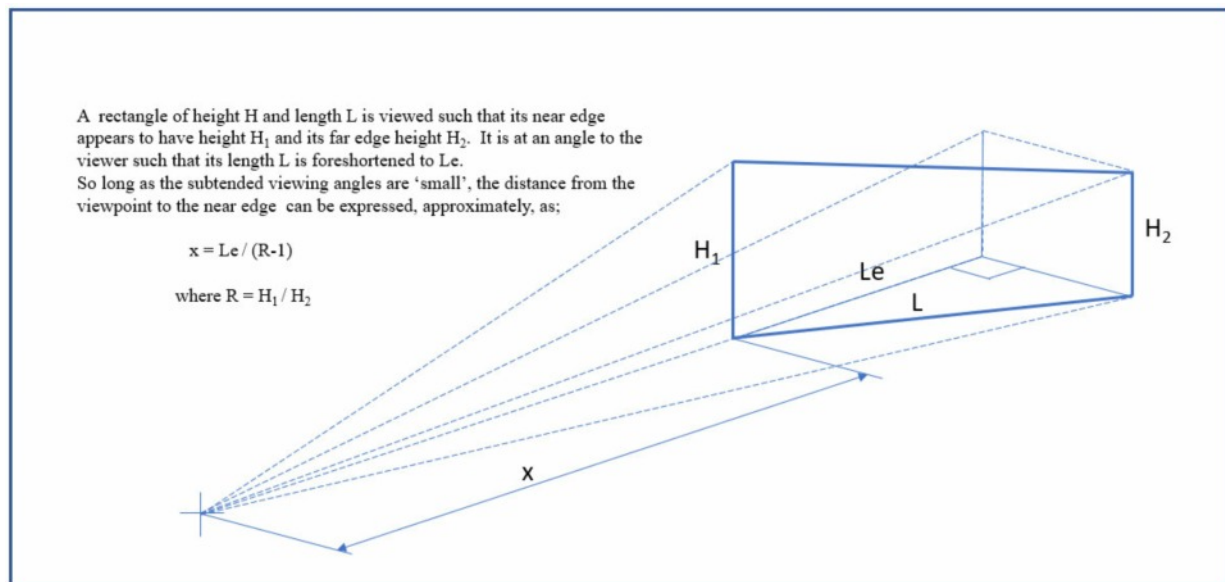
actual heights are the same and this apparent difference gives us a strong indication of the camera's distance from the subject.

Before proceeding, I would like to define what I term the 'apparent' dimension, be that length or width, and the 'effective' dimension. I can best demonstrate this by considering what happens as we change our viewing angle progressively from end-on to side-on, which I will conventionally specify as changing from 0° to 90° . At 0° we see the carriage end with each edge equally distant from the viewing point. Consequently, there would be no perspective distortion of the edges. However, were we able to see the carriage side, which strictly at 0° we cannot, we would perceive an 'apparent' carriage length of zero, the front and rear corners would coincide visually, but we would see a maximum perspective effect as the actual difference in the distance of each corner from the viewing point could not be greater. At a viewing angle of 0° , the 'apparent' visual width would be the same as the 'actual' width whereas the 'effective' width would be zero. As the viewing angle progressively rotates to 90° , the 'apparent' width will reduce to zero whereas the 'effective' width will increase to its maximum, where the 'effective' width is the same as the 'actual' width.

Meanwhile, as regards the carriage side, the reverse is true. The 'apparent' length progressively increases whereas the perspective 'effective' length reduces to zero.

To capitalise on these characteristics, we first need to measure various dimensions from the image. Here I use an image processing package – which particular package is immaterial so long as it offers direct x and y pixel counts for each cursor position. When I analyse the image shown above, which is not high resolution by any means, I find it is 1279 pixels wide by 438 high. The Ashbury extends from pixel 549 to 885 (the far edge of the carriage end to the far end of the carriage side).

It is clear that the carriage is positioned at an angle and, if we are to derive information from perspective effects, we need to know that angle. Without it we cannot properly establish the 'effective' length of the vehicle. As a first approximation we can compare the carriage's 'apparent' visual width and its 'apparent' visual length. As the viewing angle increases towards 90° the former reduces and the latter increases, offering a continually varying ratio. The 'apparent' lengths can be measured from the image so, from the ratio of those measurements, we can determine an approximate viewing angle. I say 'approximate' because, as should be immediately obvious, the actual viewing angles on the carriage end and side from any fixed point will actually be different, varying



either side of our 'nominal' viewing angle. Thus, an iterative process of progressive refinement is required properly to determine the angle. My current 'best estimate' of the mean viewing angle on the carriage side is 31.21° . However, an essential health warning is called for here. I find that initial conclusions such as this can be temporary, as they can be subject to subsequent refinement, but, typically, it is just that – refinement.

Let us now turn to the perspective effect. If we see two objects whose size we know to be the same but which, from our point of view, appear to be different, and if we know how far apart they are, we can calculate by simple trigonometry how far away they are.

If we return to measurements derived from the image, the height of the near corner of the carriage, measured from the underside of the roof down to bottom of the sole bar, is 118 pixels. The same measurement at the far end of the vehicle is 95, a ratio of 1.242. I will call this 'R'. Here, the advantage of a hi-res image will be apparent, increasing the refinement of measurements such as these. However, there is no point making a high-resolution scan of a poor image so, pending the acquisition of a good original WHR 171 image, should such even exist, we have to accept a small degree of uncertainty – 1 pixel error represents an approximate 1% error.

Next, we need the 'effective' length of the vehicle as seen in this image. Given the carriage's actual length of 25.17 feet and the visual angle deduced earlier, we calculate an 'effective' length of 21.52 feet. I will call this length 'Le'. This is the difference in the distance of each corner of the carriage from the camera if our viewing angle is correct.

A further approximation, to ease the calculations, is to treat the measured height of each corner as a direct measure of their subtended angle. For small angles this is a perfectly valid approximation and typically in analyses such as this the angles are, mathematically speaking, small.

As shown in the figure above, the distance between the viewer and the the object can be determined using the following expression;

$$x = L_e / (R-1)$$

which in our case, with $R = 1.242$ and $L_e = 21.52$, yields an 'x' value of 89 feet.

Now we have a camera position in terms of an estimated distance and angle from the near corner of the Ashbury carriage. This position can be refined by checking other viewing clues, for example the view of Moel Tryfan's rear bunker, the projected view angle to the near corner of the bunker through to the far side of the cab, the relationship between the locomotive's chimney and the far corner of Ashbury carriage end, and so on. If we were confident of our location, which for present purposes we are assuming we are not, background features could provide a useful check as, for each location, we would know the orientation of the track from which we could construct, or assess, actual compass bearings.

My current estimates place the camera 131 feet ahead of the rear of the train and 53 feet from the track centre line.

Having positioned the camera relative to the train, we can analyse the reflection seen in the Cleminson's windows. Knowing the angle from the camera to the carriage side at that point, we can construct the reflection angle and deduce the position of that carriage relative the building, if indeed that is what was being reflected. Wherever this photograph was taken, there would have to be some explanation for that reflection. It is also worthy of note here that the lines of sight to the signal post and to the 'building', via the reflection, are the same. This could prove valuable when determining the distance between the signal and the 'building'.

Finally, having explored the horizontal plane we might well require some vertical parameters for correlation purposes. I will later be looking at the terrain visible in the image and I note here that the only complete view of the terrain lies to the left of the locomotive. As we have good information regarding the dimensions of *Moel Tryfan*, we will look at the angles subtended by selected features on the locomotive assuming that the camera was, as appears to be the case, at rail-top level. I have chosen six points on the loco; the near and far corners of the rear of the footplate, the near and far corners of the rear of the bunker, measured just below the start of the flare, the centre line of the rear of the cab roof and the top of the chimney. For each of these six, the measured distance from the camera position to the loco, coupled with the known height of each feature above the rail top, yields an angle of elevation to that point. I will return to this later, noting then the actual vertical angles measured to these points on the locomotive.

NWNGR Geography.

When NWNGR rails crossed the Afon Gwyrfai for the third and last time at Plas-y-nant, they had risen to an altitude of 465 feet, a climb of 290 feet since leaving Dinas. After the bridge over the river, the geography opened out into the wide valley wherein lies Llyn Cwellyn with, visible in the distance, the pass leading to Rhyd-ddu and the Gwyrfai/Colwyn watershed beyond. The station at Rhyd-ddu was, as the crow flies, less than 2½ miles from, and over 160 feet above, the Plas-y-nant bridge. By adopting a gradual climb up the east flank of the valley and by taking advantage of the local contours, extending the actual route mileage to 3½ miles, the required track gradient was eased significantly.

After passing under the Carnarvon to Beddgelert road at Castell Cidwm, beyond which was the original temporary branch terminus (from August 15th 1877 to May 30th 1878), the track began a slow and steady climb along the slopes of Snowdon's foothills, initially the slopes of Foel Goch. Just short of 1500 yards from the road bridge the line reached Snowdon Ranger station, which was to serve as the branch terminus from June 1st 1878 until the line finally reached Rhyd-ddu, where the station opened on May 14th 1881.

Snowdon Ranger.

We shall consider Snowdon Ranger and Rhyd-ddu geography in rather more detail, given the overall substance of these discussions, starting with SR. From Llyn Cwellyn to the summit of Foel Goch the climb is relentless from lake level (463 feet) first to the railway, at just under 520 feet, and then on to the summit at 1,985 feet.

Walkers setting off towards Snowdon's summit up the Snowdon Ranger path cross the railway at the north end of the station and, in the first instance, climb to the farm at Llwyn-on, just 130 yards beyond, but 74 feet above, the railway crossing. Llwyn-on lies 315 yards from the lake shore 127 feet below. Beyond Llwyn-on, the path zig-zags up the increasingly steep slope until passing the 1000 ft. contour, still less than ½ mile from the lake shore.



Disused NWNGR trackbed 470 yards north of Snowdon Ranger station - Arch 4572 - Bill Rear - 1948

The railway's location on a shelf cut into the side of the mountain is as well demonstrated here as at many other locations along this part of the route. Whilst perhaps not as dramatic a demonstration as at Glanrafon Sidings further up the valley the principle is just the same. The nature of the shelf may vary from place to place but levelling is usually achieved by transferring material from the uphill side of the site to the lower creating even steeper short slopes either side

of the route. This effect can be seen quite clearly at Snowdon Ranger if we examine historic photographs of the site.



Snowdon Ranger station building - Arch 4575 - Bill Rear - 1948

The view from behind and below the station building offers, to the right of the building, a glimpse of the boundary fence that ran, indeed still runs, along the east side of the station site. Note how this fence is visible even though the camera was so obviously well below the level of the railway. It also shows clearly the steepness of the slopes below the railway. There have been extensive building developments behind and below the station building so this clear view from the rear is not readily available today. However, anyone walking up to the new Snowdon Ranger Halt would be all too well aware of the gradient.



Snowdon Ranger, looking south - Arch 2436 - D. Allan - 2003

In this picture taken in 2003 close to the point where the Snowdon Ranger path crosses the station's eastern boundary, we can see, even this close to the railway, how far the photographer had already climbed above it. Indeed, the camera was at a greater altitude than the station building's roof-ridge. It should also be apparent from this view how much the new railway has risen relative to the old, sitting as it does on a far more substantial ballast bed than ever was enjoyed by the NWNGR or the WHR.

If WHR 171 had been taken at Snowdon Ranger, and if the reflection seen in the carriage window was indeed of the station building, the train would have been standing between that building and today's Snowdon Ranger Path crossing, that is to say it would have been in the area to the bottom right of this image.



Snowdon Ranger, looking south - Arch 3202 - J.I.C. Boyd - 1947

We can see this same area in this 1947 image by Boyd, taken before the vegetation growth seen in the previous image. We should note the rising land towards the left, again the apparent height of the camera is evident here, and the falling slope that commences only a short distance beyond the track, whose former position is clearly identified by the sleeper indentations left after track removal.



Snowdon Ranger, looking south - Arch 4018 - C.R. Clinker - 1920/1

Photographs showing the station building with the original track in situ are rare but this admittedly poor-quality image, which we believe was taken by C.R. Clinker in 1920 or 1921, does just that, confirming the original level relative to the building and, again, the apparent vertical elevation of the camera so close to the track.

Hopefully this photographic review has painted an accurate picture of the nature of Snowdon Ranger station, built on its shelf cut into the flank of Foel Goch, but also the detailed aspects of track installation and features that would have been found in the area between the station building and the point where the Snowdon Ranger Path crosses the railway a short distance further to the north. We have further photographs which emphasise the points identified here but, in the interests of brevity, I will avoid further repetition here.

Rhyd-ddu

Leaving Snowdon Ranger to continue the climb up the flanks of Snowdon, passing the slate quarry at Glanrafon, crossing the 600 ft contour below Rhos Clogwyn Quarry and negotiating the Ffridd Curves, the NWN GR made one final left-hand turn to enter the station at Rhyd-ddu at an altitude of 627 feet.

In contrast to the situation at Snowdon Ranger, the station area at Rhyd-ddu was established in the shallow bowl surrounding Llyn-y-gader. Llyn-y-gader and the Afon

Gwyrfaï exiting its northern edge sit in a pan-shaped loop in the 600 ft contour line – the surface of the lake lies only a couple of feet below this level. Whilst the immediate surrounding area is not level the gradients are modest. However, examining photographs and maps of the Rhyd-ddu station site it is evident that a significant degree of levelling was involved when preparing the track bed, and that this progressively was expanded as the original single-track layout was extended to the east to allow a passing loop and to the north to support the additional buildings that were later to amplify the single NWN GR ‘standard’ building provided initially.

Photographs taken in the earliest days of the layout are, perhaps unsurprisingly, rare. However, the nature of the site can hopefully be sensed from these later images.



Rhyd-ddu station from the south-east - Arch 4933 ca. 1892

In the first of the Rhyd-ddu images, this from circa 1891 looking in a north-westerly direction towards the station building, we can see how the track level either was taking advantage of a natural rise in the land level or had been installed on a low embankment created to provide a level surface along the track alignment.



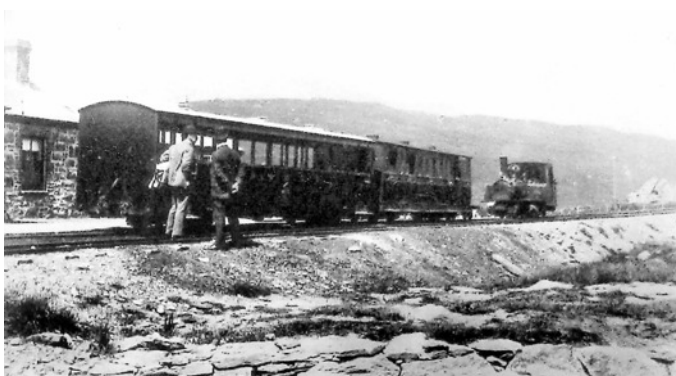
Snowdon (Rhyd-ddu) Station from the south east - WHHG 16 - Topical 2477 - 1923

In the second image, a similarly-angled view from 1923, we can see the widened level surface later provided to accommodate the passing loop together with the more obvious fall in the level beyond the eastern edge of the installation.



Snowdon Station from the north-east - WHR 33 - LPC 5631 - taken between 1897 and 1902

In this image, looking towards the south-west, the view shows that the track bed was also set at a somewhat higher level relative to the natural terrain at this end of the layout.



The 'exit embankment' looking north-west - Arch 4876 - ca 1895

On leaving the 'formal' station area, the track ran on a significant embankment, seen here looking north-west. The window in the building seen behind the rear carriage marks the northern part of the Station Master's cottage. The roof of the refreshment room can be seen through the carriage windows.



The 'exit embankment' from the north-west - Arch 4397

The western side of that same embankment can be seen here with the ends of the Station Master's Cottage and the Refreshment Room visible on the right. The undulating nature of the land is visible noting the varying local heights of the embankment.

Again, it is to be hoped that this brief photographic survey paints a picture of the local geography at Rhyd-ddu.

Further Analysis

To address the apparent dichotomy in the identification of the location where WHR 171 was taken, I will now presume first that it was taken at Snowdon Ranger. Having analysed the

photo's main subject, we now have no option but to review the terrain visible in the image. As noted earlier, the only clear and uninterrupted view of the terrain to be had lies to the left of the rear of the locomotive. Taking a mid-point across this area, I have measured the land profile that we should be seeing.

To do this, given that we know the angle from the camera to various key points in the view, we can derive the angle of this 'mid-point' line relative to the track centre line. My analysis indicates that this angle is just over 49°. As we know the bearing of the track at Snowdon Ranger – between the Snowdon Path crossing and the station building this was, and sensibly still is, 148.2° (31.8° east of south) – we can calculate the 'real' bearing of our mid-point line. Simple arithmetic gives us 99.13°, just short of 10° south of east.

If the train had been standing at Snowdon Ranger we know, from our previous work, where the camera would have been located and we can lay out our bearing line and develop terrain profile data from that point. The profile data are summarised in Table I (on page 12).

The most interesting characteristics of note here are in the foreground, rather than the background. In order to achieve a horizontal sight line at the level of the track top, the camera had to be raised 6.6 feet above the ground level at the calculated camera location. By way of observation, this is the ground level as measured today and this is not necessarily the same as it was in the 1880s. Note for example the developed access to Llwyn-on and provisions for the re-routed Snowdon Ranger Path. Quite how, and indeed why, the camera might have been located at this height is a matter for some conjecture.

As we look across the top of the track, the first feature of any significance is the embankment beyond the rails leading up to the fence delineating the east side of the station site. Photographs presented earlier showed how this boundary sat, and still sits, well above the track level. The measured profile, allowing for the 'skewed' angle relative to the track centre line, shows this boundary 60 feet beyond the track and 9.8 feet above the rail tops. Measured from the camera, this is an elevation of 4.18°.

At this stage it is appropriate to note the measured angles to the six features on *Moel Tryfan* discussed above.

Feature	Distance From camera (ft)	Angle of elevation (°)
Footplate, near rear corner.	72.7	1.49
Footplate, far rear corner.	77.0	1.41
Rear bunker, near corner at start of flare.	72.7	3.82
Rear bunker, near corner at start of flare.	77.0	3.61
Cab roof, rear edge, loco centre line.	76.6	6.25
Top of chimney.	87.7	5.70

Based on these angles, if this were Snowdon Ranger, the base of the boundary fence should be visible level with the top of the coal bunker. It seems clear that in WHR 171 this feature simply is not there. On the contrary, we can see a lot of land, spread over a range of distances, even at elevation angles below the locomotive's footplate.

I will discuss later how these short-range angular measurements might be adjusted in the context of knowledge gained through this analysis process.

Beyond the station boundary fence, the next feature of note on this bearing line is a dry-stone wall 282 yards from the camera at an elevation of 82 feet above the rail tops. This represents an elevation angle of 5.53° , which, were it there, would align with a point between the top of the spectacles and the centre of the cab roof. Again, this is not visible in the image.

Beyond this wall, the ground rises steeply, cresting approximately 1,200 yards from the camera at an elevation, again above the rail tops, of 521 feet, an elevation angle of 8.25° . These dimensions place this ridge visually significantly above *Moel Tryfan's* cab roof and, at just over half a mile from the camera it should be clearly visible. Beyond this ridge, the land is no longer visible until it reaches an altitude of 2,820 feet above sea level just 2.78 miles from the camera. Beyond that point we would see the final 600 feet of the climb to the Snowdon skyline, on this bearing a short distance to the south of its summit.

Whether or not the skyline matches that seen in WHR 171 seems irrelevant as the terrain immediately beyond the locomotive simply does not reflect this location. The first 200 feet from the camera offers sufficient evidence to demonstrate that the location could not have been Snowdon Ranger.

Turning now to Rhyd-ddu, we can repeat this exercise by resetting the track orientation, at Rhyd-ddu this was 157.39° , giving through the same calculation noted above a bearing of 108.35° for our line of study in the photograph. For this bearing and the camera location determined by the same geometry used previously, the same distance and elevation data are presented in Table II (page 13).

The 'lie of the land' displays a similar general characteristic here where we note a stretch of land invisible to the camera due to a crest at an intermediate point. However here that crest is 1,100 yards out, broadly similar to Snowdon Ranger, but lies only 350 feet above the camera, as opposed to 530 feet at S.R. The hidden land extends out to 3,100 yards, significantly closer to the camera, beyond which we see the land rise the final 550 feet to the skyline crest which, from this location, is the point on the ridge 580 feet to the south-west of the summit of Yr Aran.

As with our Snowdon Ranger analysis, points of immediate interest here lie just beyond the railway tracks. Here there is no sign of any immediate rise in the land, indeed quite the opposite - what appears to be the top of a dry-stone wall can be seen just above the rails. If this were a dry-stone wall this would be indicative of a lower level of land beyond the railway, implying that the tracks were laid on an embankment. Photographs of Rhyd-ddu presented earlier indicate that this is just what should be seen were this the location.

Beyond this, were this Rhyd-ddu, there should be further dry-stone walls at 222 and 475 yards from the camera. With our camera height assumption, the former should be at an elevation of 3.38° and the latter at 4.35° . Based on our assessment of elevation angles to various points on the locomotive, there is a wall clearly visible at about 2.52° , that is to say at neither of these two angles, raising, in my mind at least, questions as to the camera-level assumption used thus far.

At this stage, comparisons between my assessments of the Snowdon Ranger and Rhyd-ddu alternatives are, I believe, sufficient to confirm the location as Rhyd-ddu. If I accept this then the background clearly does come into play in further assessment. In short, we now know what we are looking at so we can utilise that knowledge. For example, if the skyline really is Yr Aran we can use measured elevations to various points along the ridge line to confirm, or perhaps to correct, our assumed camera location.

For example, in WHR 171 the top of *Moel Tryfan's* chimney projects just above the skyline. From our assumed camera location, the elevation to that point on the ridge should be 7.0° , and therefore to the top of the chimney about 7.1° , but our measured angle to that feature is only 5.70° . The implied parallax error tells us that, in fact, the camera must have been slightly below rail level. If we correct the camera height in our assessments accordingly there will be little or no impact on elevation angles measured to distant objects but potentially significant changes to nearby objects. Put simply, lowering the camera's assumed height would increase the measured angles to points on the locomotive without significantly altering angles measure to distant objects.

Accepting that the location was Rhyd-ddu, I consequently estimate that, rather than being at rail level as hitherto assumed, the camera was actually 2.1 feet lower than this. This adjustment increases the elevation angle to the top of the locomotive chimney from the 5.7° noted above to 7.06° whilst the effect on the skyline measurement is to increase the perceived elevation angle by 0.01° , sensibly no change. By way of intermediate examples, the elevation angle to the first dry-stone wall noted in Table II increases by just 0.180° , to 3.56° , and to the second wall by 0.084° , to 4.43° .

The following table shows revised angles to locations on the locomotive if the camera were lowered to 2.1 feet below track-top level.

Feature	Distance From camera (ft)	Angle of elevation ($^\circ$)
Footplate, near rear corner.	72.7	3.15
Footplate, far rear corner.	77.0	2.97
Rear bunker, near corner at start of flare.	72.7	5.46
Rear bunker, near corner at start of flare.	77.0	5.16
Cab roof, rear edge, loco centre line.	76.6	7.80
Top of chimney.	87.7	7.06

Using these revised figures we can see that these walls should both be visible above the footplate but below the start of the flare at the top of the bunker. I would contend that the more obviously visible wall is the second, 475 yards from the camera. The crest at 1,100 yards should be visible just above the level of the coal seen in MT's bunker.

If I were to return to the Snowdon Ranger analysis and make this same correction there, I would note that in that location, even with this correction, the top of *Moel Tryfan's* chimney would still have been well below the skyline, whose elevation on the same bearing as the chimney would be just slightly below 10° , 9.87° to be precise. Compare this with the corrected elevation to the top of the

Continued on page 14

TABLE I.

Elevations from Snowdon Ranger Station (Heading 99.69 deg – track 148.80 deg – diff 49.11 deg)							
	Distance		Elevation (ASL)		From camera locn.		(θ)
	(yd)	(ft)	(m)	(ft)	(m)	(ft)	
Camera location	0	0	155	508.5	0	0	
Track (today)	25.2	76	157	515.1	2	6.6	0
Upper Boundary	44.9	135	160	524.9	5	16.4	4.18
	100	300	164	538.1	9	29.5	4.38
	200	600	174	570.9	19	62.3	5.31
Dry Stone Wall	282.2	847	182	597.1	27	88.6	5.53
	300	900	184	603.7	29	95.1	5.62
	400	1200	199	652.9	44	144.4	6.55
	500	1500	214	702.1	59	193.6	7.11
	600	1800	226	741.5	71	232.9	7.17
	700	2100	241	790.7	86	282.2	7.48
	800	2400	258	846.5	103	337.9	7.86
	900	2700	273	895.7	118	387.1	8.02
	1000	3000	289	948.2	134	439.6	8.21
	1100	3300	298	977.7	143	469.2	7.98
	1200	3600	316	1036.7	161	528.2	8.25
Terrain hidden behind Crest	1300	3900	318	1043.3	163	534.8	7.71
	1400	4200	328	1076.1	173	567.6	7.61
	1500	4500	337	1105.6	182	597.1	7.48
	1600	4800	339	1112.2	184	603.7	7.09
	1700	5100	342	1122.0	187	613.5	6.79
	4600	13800	637	2089.9	482	1581.4	6.51
	4700	14100	695	2280.2	540	1771.7	7.14
	4800	14400	774	2539.4	619	2030.8	8.00
Ground visible to camera	4900	14700	859	2818.2	704	2309.7	8.90
	5000	15000	926	3038.1	771	2529.5	9.55
	5100	15300	973	3192.3	818	2683.7	9.93
	5200	15600	1020	3346.5	865	2837.9	10.29
	5282	15846	1055	3461.3	900	2952.8	10.53

Notes:

Measurements for the Snowdon Ranger profile were made originally from a datum at the lake shore. These have been converted to distance and elevation measurements from the estimated camera location. The heights in columns 4 and 5 are measured from sea level.

Subtended vertical angle (θ) calculations have been set to a horizontal camera sight-line at track-top level. Quite how the camera achieved this position is discussed in the text. The distance and height values in cols 6 and 7 have been zeroed to the camera location. In column 8, the camera height correction has been included in the angle calculations.

Data in red indicates terrain not visible from the camera location as the crest at just below 1000 ft altitude hides all land beyond until that reaches a height above 2200 feet ASL.

These data have not been corrected for earth curvature - over the short distances involved this is not really necessary. The altitude correction would be of the order of 6 ft over the greatest distance in this table.

TABLE II

Elevations from Rhyd-ddu Station (Heading 108.35 deg – track 157.39 deg – diff 49.05 deg)							
	Distance		Elevation (ASL)		From camera locn.		(θ)
	(yd)	(ft)	(m)	(ft)	(m)	(ft)	
Camera location	0	0	191	626.6			
Track	24	72	192	629.9	0	0.0	0
	100	300	195	639.8	3	9.8	1.88
	200	600	202	662.7	10	32.8	3.13
First stone wall	222	666	204	669.3	12	39.4	3.38
	300	900	212	695.5	20	65.6	4.17
	400	1200	218	715.2	26	85.3	4.07
Second stone wall	475	1424	225	738.2	33	108.3	4.35
	500	1500	227	744.8	35	114.8	4.38
	600	1800	239	784.1	47	154.2	4.90
	700	2100	253	830.1	61	200.1	5.44
	800	2400	266	872.7	74	242.8	5.78
	900	2700	277	908.8	85	278.9	5.90
	1000	3000	288	944.9	96	315.0	5.99
Crest	1100	3300	299	981.0	107	351.0	6.07
Terrain hidden behind Crest	1200	3600	300	984.3	108	354.3	5.62
	1300	3900	301	987.5	109	357.6	5.24
	2900	8700	454	1489.5	262	859.6	5.64
	3000	9000	476	1561.7	284	931.8	5.91
Ground visible to camera	3100	9300	502	1647.0	310	1017.1	6.24
	3200	9600	529	1735.6	337	1105.6	6.57
	3300	9900	557	1827.4	365	1197.5	6.90
	3400	10200	572	1876.6	380	1246.7	6.97
	3500	10500	587	1925.9	395	1295.9	7.04
	3600	10800	606	1988.2	414	1358.3	7.17
	3700	11100	632	2073.5	440	1443.6	7.41
	3800	11400	658	2158.8	466	1528.9	7.64
	3900	11700	674	2211.3	482	1581.4	7.70
Terrain hidden behind Crest	3926	11778	675	2214.6	483	1584.7	7.66
	4000	12000	670	2198.2	478	1568.2	7.45

Notes:

Measurements for the Rhyd-ddu profile were made from a datum based on estimated camera location.

Subtended vertical angle (θ) calculations have been set to a horizontal camera sight-line at track-top level.

Data in red indicates terrain not visible from the camera location as the crest at just below 1000 ft altitude hides all land beyond until that reaches heights above 1600 feet ASL.

The actual high point on the skyline ridge is hidden from the viewpoint by the land at 3900 yds from the camera.

These data have not been corrected for earth curvature - over the short distances involved this is not really necessary. The altitude correction would be of the order of 3.5 ft over the greatest distance in this table.

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chimney of 7.06⁰. Whether or not the skylines in the two locations might be similar, they are at quite different elevations from the observer.

Conclusions.

In his letter, David contends that the photograph caption in *WHH 87* was 'incorrect' and that 'beyond all doubt' the photograph's location was Snowdon Ranger. This conclusion stems purely from analysis of the signalling visible in the image. David identifies the signal as a McKenzie and Holland product that was, logically, installed during the period of their signalling contract, which covered all signalling work up to the establishment of Snowdon Ranger as a temporary terminus. When the line was finally extended to Rhyd-ddu, a new signalling contract was let to Gloucester Wagon Company. Later photographs of Snowdon Ranger, indeed the only verifiable photographs of Snowdon Ranger that show signals, appear to show GWCo products. David's analysis eliminates, for signalling reasons, all the NWNDR stations except Snowdon Ranger, hence, I presume, his conclusion.

The analysis presented here shows that the WHR 171 location could not have been Snowdon Ranger and that features visible in the photograph closely match Rhyd-ddu. Which, of course, leaves us with a problem.

David argues that, because of the signalling, this absolutely could not be Rhyd-ddu, yet, nevertheless, it is! Signalling, I admit, is not one of my strengths so I look to those readers of this journal who are blessed with such expertise to help explain this apparent anomaly.

Snowdon Ranger was signalled by McK&H, but the only photographs of this station appear to show GWCo products. Rhyd-ddu, on the other hand, which was signalled by GWCo, apparently shows a McK&H signal. I can think of one or more ways by which this circumstance possibly came to pass, however theories are not proof.

I suggest that, as a Group, we have here a question that we really cannot afford not to answer!

Continued from page 1

concluded that a volunteer run project was not practicable largely due to a lack of people to do it. Also, while in 1998 John and Dick were happy to climb over the railings, twenty one years later we were faced with significant weakening of the iron work quite apart from any health and safety issues. It was therefore concluded that we should appoint a contractor.

The state of some of the railings raised the issue of whether we should build them up with epoxy resin or some other product; however caution prevailed. Some years ago, I had met Geoff Wallis of Dorothea Restorations at an industrial archaeology conference. He is a bit of an expert on old ironwork, so I tracked him down and asked the question. He didn't exactly throw his hands up in disgust at the mention of epoxy resin, but firmly suggested that rust removal and application of a suitable anti rust treatment followed by painting was the way to go.

The other issue we potentially faced was that of having to get a 'Faculty' - the system by which the Church of England provides planning controls for churches and churchyards. Generally speaking, a Faculty must be obtained from the Diocese before most works to a church or churchyard are carried out. Fortunately, here this proved not to be the case, but we did ensure, through Val Blake, that the appropriate permissions were in place.

In the August, when I was in North Wales for the first of the year's 'Journey into the Past Trains', I took the opportunity to visit the graves and meet Val and was able to assess for myself the likely scale of the work. By this time, we were beginning to run out of time for doing anything in 2019 and trying to find someone to do the project was proving to be not as easy as one had imagined. Our 'go to' contractor, Cyril Williams, had died suddenly after a short illness and we had the devil of a job to find anyone to take on the work until the well known Cedric Lodge mentioned a chap who was doing some work for him, David Roberts. Correspondence ensued including a detailed brief on the work to be done and a price agreed. Then, the great lock-down occurred. Suffice it to say,

Mr Roberts completed the work in May including cutting back a rather large Berberis bush that was impeding access to the railings, rust removal, minor repairs, undercoating and a top coat of black gloss Hammerite. The memorial slabs themselves needed to be treated carefully and while the temptation was to attempt the removal of all the lichen etc, some of which seemed to be embedded in the slate, they were in the end just brushed with water to remove loose material but without damaging the slate or the inscriptions. The quality of the end result is such that David has been commissioned by a local resident to undertake further work in the churchyard. We hope that occasional weeding and grass cutting around both graves will slow down further deterioration and wasting of the railings.

While it would have been good to have volunteers to do the work we made the right choice to engage a local contractor on this occasion, particularly as the Covid-19 lock-down would have severely curtailed completion. As for the price, the raw material cost was not far off my original estimate when initially we were considering putting together a group of volunteers. However, we have all saved ourselves a significant amount of money in terms of overnight stays, mileage and our own time!

We shared the cost of the project equally with the FR Heritage Group, for which I thank the chairman Glenn Williams and his committee. My thanks are also extended to everyone else who helped in the successful restoration of the graves. I hope that the readers of this article when next in Beddgelert will make a pilgrimage to both graves and reflect that but for Charles Spooner (and a few others) we might not now have either railway. Both the church and the churchyard are, by the way, places of great tranquillity and visits are a good way to escape from the hustle and bustle of Beddgelert from time to time.

Nick Booker

(With thanks to Dick Lystor for access to the previous article on this topic - see <https://is.gd/WHH02>)

A Run in North Wales.
THE SNOWDON RAILWAY.
[BY ARFONYDD.]

The majority of those who visit Snowdonia fail to see what may fairly be described as one of the best parts of that charming region; and the failure is due, like many other failures, to ignorance. It is not set down in the guide books that those in search of scenery should take "a trip on the two-foot," and the visitors are unaware of the existence of the two-foot. They do not know that there is a railway running for miles upon Snowdon itself. Indeed, a very fair measure of the popular conception of Y Wyddfa may be gained from the lately published statements anent "sale of Snowdon," and this for £5,000 or £6,000! Sir Edward Watkin would be a very lucky man if he could buy "Snowdon" for £5,000; or for even ten or twenty times that amount. He has bought a charming estate, but he has not bought Snowdon. If he had done so, that weary five-mile ascent from Llanberis would be shorter than travel-worn climbers find it to be. Now, however, that Sir Edward has purchased a part of Snowdon, we are likely to hear much more of the little railway on the mountain and the more its existence and the advantages it has to offer are made known, the better will it be for holiday-makers who wish to combine the maximum of sight-seeing with the minimum of hard work.

Starting from Dinas Junction, three miles from Carnarvon, the North Wales Narrow Gauge Railway runs across country in the direction of Moel Tryfan. Its gauge is under two feet, this width having been adopted to accommodate traffic to the sharp curves of the line. At the beginning the gradient is by no means steep. There is no great rise in the first run, which is to Tryfan Junction, where a branch is carried up Moel Tryfan, and opens out magnificent views of land and sea. Right away on that mountain's top is an old sea beach, which has been the theme of learned disquisition, not of British geologists alone, but also of American and foreign writers, the remains of no fewer than 57 different species of mollusca being found 1,400 feet above sea level.

The main line turns more eastward and then southward after leaving Tryfan Junction and almost immediately the charm of the journey commences, beautiful views being obtainable of the woody dell through which gurgles the Gwyrvai [sic], dear to the fisherman, a very treasure-store for the artist, beloved of all who know its beauties. Placidly gliding in shady pools, or rushing past moss and lichen-covered boulders; sometimes completely hidden by the overshadowing trees, which give occasional pictures framed in living green; now dashing down in miniature waterfalls; and then broadening out to the proportions of quite a respectable river—all the way beside the line for miles it is most attractive to the tourist, who is bewildered in an attempt to catch the mountain views on his right hand, and not to miss the lovely river scenes on his left. The saloon carriages—and this is a hint from an old traveller—are the best to make a trip in. Their long windows permit of better views being obtained. Bettws Garmon, which is one of the villages whereat a station has been placed, was for centuries the situation of a religious "bead-house" dedicated to St Germanus, the British bishop renowned for his share in the "Hallelujah victory" over the invading Saesnag; he must have been a Celtic forerunner of General Booth and his Hallelujah warriors, although, if all

**As a rider to our earlier
 Rhyd-ddu discussions, Dick
 Lystor has drawn my
 attention to the following
 notes from The Cardiff
 Times from 3rd August 1889.**

accounts be true, not of such spotless reputation as the later-day general. Half-way up the line, which is about eleven miles long, is the pretty waterfall, which forms the subject of David Cox's famous picture. Why the distinguished artist should have painted the waterfall only and have left unheeded the silvery cascades of Moel Eilio

dashing down hundreds of feet on the left, and the tremendous precipice of Mynydd Mawr on the right, is not to be explained. Unquestionably he had a grand subject for his brush when he chose the waterfall; but the great rock of Mynydd Mawr, covered in the season from foot to summit with the blooming heather, and standing out at all times as a giant frowning guardian of the entrance to Quellyn, must surely have attracted his notice and have won his appreciation. Just here, where Moel Eilio, an outwork of Snowdon, runs to within a stone's throw of Mynydd Mawr, and the river dashes through the gorge to hurl itself over the fall, the railway, winding in corkscrew fashion round the great rocks, flies off to the left and mounts upon the side of Snowdon itself.

There is no hurry on "the two-foot." The guard never calls out, "Ten minutes for—picking flowers;" but he might do so. He will stop the train midway between stations, to permit passengers to get off and visit the falls; and if, whilst admiring the scene, they see a little open trolley [sic] dashing down the line at ten or twelve miles an hour, with a solitary figure thereon, swinging round the curves with headlong velocity, and appearing in dangerous probability of being precipitated down the hillside, there need be no cause for alarm; it will be only the manager of the line making the down trip impelled solely by gravitation. Hauled upward in the rear of the train, he has slipped the connecting rope at the point where his presence was required; has over-looked the work of the permanent-way men; and releasing the break of his trolley, is now sliding downhill at a pace few would like to risk.

A little above the water-fall, through the narrow pass, wherein is just room enough for river, road, and rail, we enter Quellyn. The great rock rising almost perpendicularly on the right, about a hundred yards in height, is Castell Cilcwm [sic] said to have been the site of a robber chief's fortress, and one of the guards of the entrances to Snowdonia. The difficulty of ascent has, however, prevented any examination as to whether traces of the fort are still in existence. Far away onward, to the left, rises Snowdon's summit, the houses on the top clearly visible; road and rail run along the side of the mountain; on the right is lofty Mynydd Mawr, a mountain which would be famous if it were not placed next to Snowdon—remarkable now for the troops of wild goats which bad weather drives downward from its summit; and in the valley between lies Lake Quellyn, over a mile long, and a quarter-mile wide, said to contain more and finer trout than are to be got elsewhere in the neighbourhood. The trout are many, and they *are* fine; but contemplative Waltonians who do not mind roughing it a little should go further up the line and try Llyn y Gader and its sister lake, whose name I have forgotten. On the side of Quellyn is Snowdon Ranger station and hotel. From far away Morganwg I salute the kindly landlord of the hotel—may he always have a full house; above all, may he forgive me for mentioning Llyn y Gader. He has the great lake, the ascent to Snowdon's summit, and the intensely peaceful surroundings of his house to recommend it; and there are few



Llyn y Dywarchen, once home of the ‘floating island’ described by ‘Arfonydd’, is seen in this view looking north-east from the north-western ridge below the summit of Y Garn. The full extent of the workings at Glanrafon are seen on the opposite side of the Gwyrfai valley beyond.

By David Medcalf, CC BY-SA 2.0,
<https://commons.wikimedia.org/w/index.php?curid=14261920>

spots whither a man would more readily choose to return than to Snowdon Ranger and Quellyn.

For four or five miles the railway runs on Snowdon’s side. After passing Snowdon Ranger Station, it is carried by a hundred-foot viaduct over a stream which is fed from the tarns high up in Cwm y Clogwen, the hollow of precipices. Now, I want to give a hint to that manager. Why should not the train go dead slow over that viaduct, and give passengers a better chance to see the falls? They can be seen from nowhere else. Into a thickly-wooded hollow, far below, dashes a bounteous stream with a great leap; meeting it at right angles is another fall of lesser magnitude; and the two uniting rush off to mingle with Lake Quellyn, about half a mile away. The railway is rising all the time, and as it lifts the spectator fairer and wider scenes are set before him, until at length, striking off at right angles at the head of the lake, he is carried far above the water, and there is spread out the magnificent [sic] panorama of lake, fields, and mountains, with Snowdon’s summit towering over all.

A very peculiar effect is here the result of the windings of the railway, the mountain top being seen first from one window and then from the window on the other side. This was a difficult portion of the line to construct, and in the endeavour to avoid heavy gradients, the rails have been laid in and out among the great rocks, seeming sometimes almost to return to the point whence they started. Rounding a sharp corner, the train palls up at the cheerless shed dignified by the name of Rhyd-ddu Station. This is the terminus, and the passengers alight.

Whilst a few bargain for guidance to the summit of Snowdon, and others mount the car for the four-mile drive to Beddgelert, those who are wiser stay first at Rhyd-ddu for an inspection of that locality. The mountain air is bracing, laden with the aroma of the turf; a marshy stretch between the road and the upper lakes is covered with beautiful white flowers resembling cotton wool; everywhere are ferns, heather, and hosts of wild flowers growing in luxuriant profusion.

Of course, the ascent of Snowdon is the chief business of tourists who arrive here. I have taken a solemn resolution not to describe an ascent; for particulars, see guide book and the productions of hundreds of scribblers who have preceded me. If the reader cannot get at any other description, let him send

sixpence for the guide book of the narrow-gauge [sic] line. But I have told and will tell of what the guide book omits.

The pass of Drws y Coed leads from Rhyd-ddu to Nantlle Vale, the best part of which—and it is rich in its grand mountain scenery—can be viewed in a quiet stroll from Rhyd-ddu. The traveller would, on the way, pass one of the prettiest sites in the kingdom for a mansion and park. Away high up in the rocky fastnesses sheltered by giant eminences, are gentle slopes of luxuriant greensward, and in one hollow is a translucent lake, sixty acres in extent, studded with rocky islets. Once upon a time, this lake contained a wonder of nature. For centuries there was to be seen in it a floating island, probably composed of turf. So long ago as 1188, Giraldus Cambrensis described it. Leland and Camden also refer to it in their works; and Speed, in 1602, and Bingley, in 1798, both mention the wonder. The last-named writer states that in his day there was a small willow growing on the island. During a drought in recent years the floating mass, which had drifted to the side, took root there, and has since been a fixture.

All about Rhyd-ddu can be found mountaineering and rural delights in endless variety, whether the seeker explore the unknown land to the westward and find his way through the mountains to the western coast, or choose a more limited area and find his way along Colwyn’s side to Beddgelert; downhill to Nantlle’s twin lakes; scale the heights of Mynydd Mawr or the adjacent mountains, or devote his whole time—and this alone would repay him—to Y Wyddfa itself.

Now that a railway magnate like Sir Edward Watkin has become a land proprietor in the district, it may be hoped that the little narrow gauge line will become better known; it requires only to be known to be highly appreciated. An extension at each end is desirable—from the upper terminus to Beddgelert, and from the lower end to Carnarvon. In regard to the latter a bill has been secured giving the necessary powers, and the amount paid on mineral traffic now transhipped at Dinas Junction for conveyance by broad-gauge to Carnarvon is sufficient to give a good return on the cost of constructing the extension. So far as regards the upper end, at Rhyd-ddu, if Sir Edward were to interest himself in the line and run a short branch from the present terminus towards Snowdon’s summit, it would aid the tourists in their climbs, and would also help to develop the mineral wealth of the great mountain. In any case, with or without extension, no traveller to the north should visit Snowdon and overlook the tiny railway running along its western flank.

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