



**Federation of Model
Engineering Societies**

This article is provided by FMES for your interest thanks to the kindness of the original publishers. FMES makes no representations or warranties of any kind, express or implied about the completeness, accuracy or reliability with respect to this document and any sentiments expressed are not necessarily supported by FMES. Any reliance you place on this document is therefore strictly at your own risk

Brighton L class Baltic tank engines

This document was written by Mike Wheelwright and was originally published by Worthing and District SME in their newsletter in the Winter of 2012.

This time, Mike recalls his association with a late and much respected founder member of our Society and his links to a Brighton loco class.

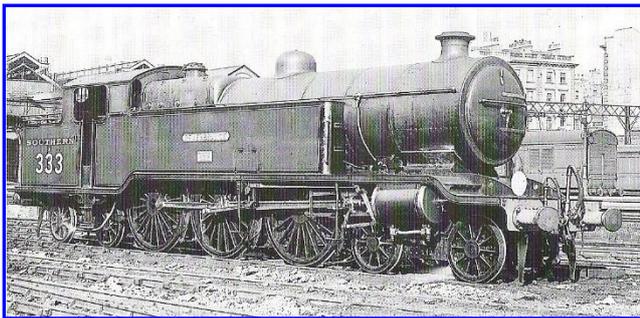
At a recent show I came across the booklet "The Brighton Baltics" by A C Perryman. Although in poor condition the modest price made me put my hand in my pocket and I became the owner of an autographed copy, although as later pointed out to me, in this neck of the woods the unsigned ones have a greater scarcity value. The work was published in 1973 about the time that Bert was finishing his 5" gauge version of No. 333 "Remembrance", the final locomotive built by the LB&SCR before amalgamation. I met Bert shortly afterwards at the preliminary meetings prior to forming the W&DSME and I soon found out that he had known these engines as a schoolboy and later at Brighton Works where he began an apprenticeship in 1928.



The Brighton "L" class of seven 4-6-4T engines figured large in Sussex railway folklore but north of the Thames, where classes ran to several hundred engines, they were virtually unknown, so the Baltic was new to me. The very size of Bert's No 333 was impressive, however in the back of my mind there lingered a doubt as to why a small regional company would need seven such beasts. Bert's book is partly storytelling but it also contains a lot of technical data including indicator diagrams so it gave me a feel for the engines. Clearly the design was a "special" for fast services between London and the coast, this much was pointed out forty years later by their designer Lawson Billinton in a talk to the SLS, but then nearly all engineers of the lesser companies said their line was special, presumably to fend off pressure to slim down the works and drawing office and purchase cheaper "ready to run" designs from the big private builders. Having said this, London to Brighton fast services like the Southern Belle did have some particular features. The engine had to cover 51 miles in 60 minutes pulling about 200 tons, although this would sound pretty easy to the blokes at sheds like Camden who took over 350 tons for long runs, the Brighton road was considerably different. First the distance was short so there was little opportunity for long uninterrupted fast running to make up time, next it was a switchback cramming in the three summits of the South Downs, High Weald and North Downs so that almost the entire route ascends or descends on a gradient of 1 in 264, finally about 1/3 of the entire run lies in an outer suburban area much of which was created by joining up odd bits of local routes abounding in curves and junctions. As the London end cannot be covered at the scheduled average speed, time must be regained by a combination of high speed running downhill and doing over 51 mph going up.

Billinton needed an engine that could maintain about 55 mph with 200 tons on 1 in 264, this is about 750 EDBHP so something like a Class 5 would do the job: of course, this classification system only existed on the Midland in 1914 but it was subsequently extended to all railways and we know what it means. In 1914 only the very biggest engines were Class 5's of which the best known were the GWR Stars and LNWR Claughtons,

both being 4-cylinder 4-6-0 designs with about 6'9" wheels weighing in at just under 80 tons plus 40 tons of loaded tender, axle loading was around 19 tons. Effectively the L Class was Brighton's equivalent, a 19 ton axle load Class 5 4-6-0 turned out as a tank engine so as to be a 4-6-4T. This was quite logical, not for the usual reason of avoiding frequent engine turning at suburban termini (in fact the Baltics always ran chimney first) but from the point of view of weight: a 120 ton tender locomotive would comprise 37% of the total Southern Belle weight whereas the 20 ton saving of the tank version reduced it to 32%. Water capacity was the critical factor, on the basis of working at, say, an average of 500 DBHP for one hour and taking the typical coal and water consumption of an Edwardian engine I estimate that something under 2000 gal per single trip would be used so the 2700 gallon design capacity provided a reasonable margin. Originally this was the volume provided by the two side tanks but somebody had qualms about rolling (which often occurred with large tank engines) so the tank height was cut down inside the decorative outside plate and the volume made up by installing a well tank, also some coil springs were replaced by leaves. Several tests were carried out but no evidence of instability was noted even at the high 70 speeds generally run through places like Horley at the foot of downhill stretches. It is thought that the excellent bogie design and springing materially contributed to this.



So how did they compare with the competition of the day? Cylinders were 22"D x 28", the largest used in this country, and necessary for working with a boiler pressure at only 170 psi, luckily the LBSCR loading gauge was fairly generous. Nominal tractive effort was 24,500 lbf. The Claughtons with 175 psi did the job with 4 cylinders of 16"D x 26" but the Stars working at a modern 225 psi only needed 15" cylinders to produce a tractive effort of 28,000 lbf. All engines used piston valves driven by Walschaert valve gear

but the difference lay in the size and travel of valves: the Baltics had 10" valves with 5.16" travel, the Claughtons had 8" valves (but for cylinders only half the size) with a paltry 4.31" travel while the Swindon contender had 8" valves with 6.75" travel for even smaller cylinders. Clearly getting the steam in and out of the cylinders would be a problem on our engine as can be seen from the records showing the late cut-offs that were used and this would affect coal and water consumption, although it was tolerable for runs of one hour. I remember Bert's model being lugged into a Bits & Pieces meeting and Himself explaining to us that due to certain features of the originals he had "Swindonised the valve gear". At that time I hadn't a clue what he meant, but 25 years later I applied the same treatment to my Claughton. Boilers showed considerable differences, although all were Belpaire type of about the same size, the Star had the No.1 taper boiler whereas the others had conventional parallel barrels. The Baltic grate covered 26.6 sqft, almost the same as the Star, but the Crewe engine sported over 30 sqft. The big difference lay in the heating surface as the 1690 sqft of the Brighton boiler was outclassed by the Star with 19% more and by the Claughton with 34% extra (much of it in the superheater). Obviously, the Crewe engine was going to boil a lot more water than the Baltic, which of course it would need to with almost twice the load! The Star would do the work without the boiler being pushed as much, the fireman likewise. Having acquired these engines, the Company did not work them a lot and utilisation was low, typically they ran 30,000 miles p.a., even assuming one month at works this is less than one round trip to London per day. This is not much to get out of an asset costing £8,000 in 1922 and indeed they were very expensive compared with the Arthurs turned out by North British Loco for £5,500. To put it kindly, the Baltics were a nice try that offered opportunities for improvement.

Certainly, the Baltics were notable engines, in 1914 they were big by any standard and of course the extra length of a tank engine and the immense side sheet made them look even bigger. They gained further prestige from the trains they ran, luxury Pullman cars from a snazzy bit of London to the South Coast. Most of the class were built after WW1 just before grouping and despite some design features not being up-to-scratch they did the job for which they were constructed until being replaced by electric motors, after less than 15 years service for most engines. Like many ideas from the Edwardian era they just did not fit into the post-war world, there was no service that needed a Class 5 tank so they were converted to tender engines, unfortunately they could not stack up against more modern designs and they were not much loved. They lingered on for another 20 years, a sad end for aristocrats.