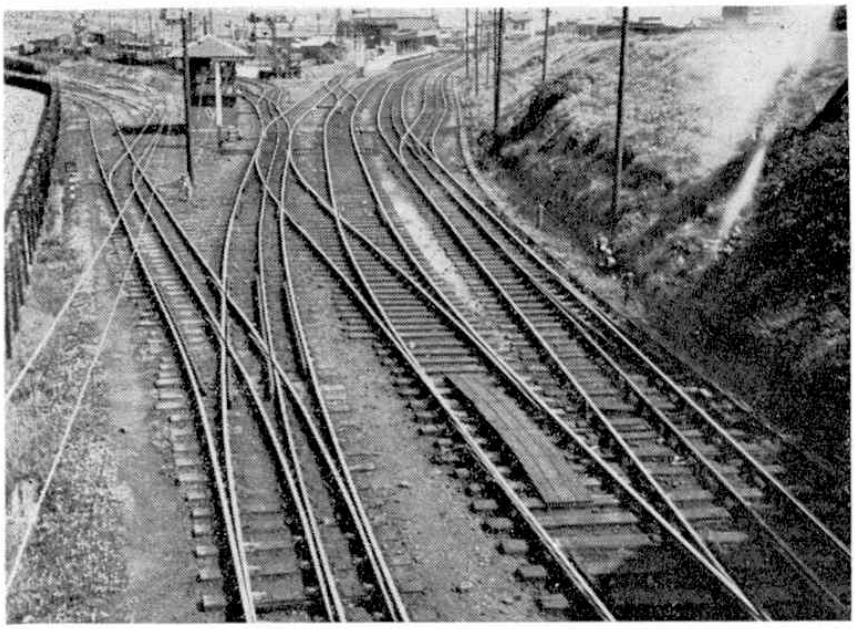


THE A.B.C. of MODEL RAILWAYS

SCALE & GAUGE

Left: Mixed narrow (3 ft.) and broad (5 ft. 3 in.) gauges in Ireland, at Larne Harbour. Below: A working party of enthusiasts ride a trolley along an intricate timber bridge on an Australian 2 ft. 6 in. gauge line. See "Australia's Puffing Billy" on page 40.

THE MODEL railway hobby, like most technical subjects, has its own language which, although it is well understood by the "experts," can be very confusing to newcomers. Some people have been so terrified by the "technical terms" that they have fled the hobby altogether, and taken up knitting or tropical fish. The purpose of this series of articles will be to explain *all* the terms used in railway modelling from a beginner's point of view, and to clarify a few common misunderstandings. Some of the terms discussed will be purely modelling terms, others will apply equally to both model and prototype.

Most MM readers will be familiar with the terms "scale" and "gauge," and, indeed, they are probably the most frequently used terms in the hobby. "Gauge" is the distance *between* the inside faces of the head of the running rails and *not*, as some people believe, between the centre line of each rail. Most main line railways in Britain, and throughout Europe, are built to the gauge of 4 ft. 8½ ins., which is known as "standard gauge" and was adopted by George Stephenson with the birth of railways in the early nineteenth century. Any line with a gauge of more than 4 ft. 8½ ins. is termed "broad gauge" and any gauge less than that figure is "narrow gauge." In fact, only one main line in England was ever built to a broad gauge; the Great Western Railway was engineered by I. K. Brunel with the magnificent gauge of 7 ft. 0¼ in., which, as might be expected, made for very roomy carriages, big and powerful locomotives, and steady high speed running. The only drawback was that all the other railways in the country were of standard gauge, which meant that passengers had to change trains and freight be transhipped wherever the Great Western met another line. This proved to be so inconvenient and uneconomical that the Great Western company was forced to slowly convert its lines to standard gauge, and by 1892 the broad gauge had disappeared altogether. All this happened so long ago that few modellers ever have the desire to model a broad gauge Great Western train but, nevertheless, the story is an important episode in the history of gauges.

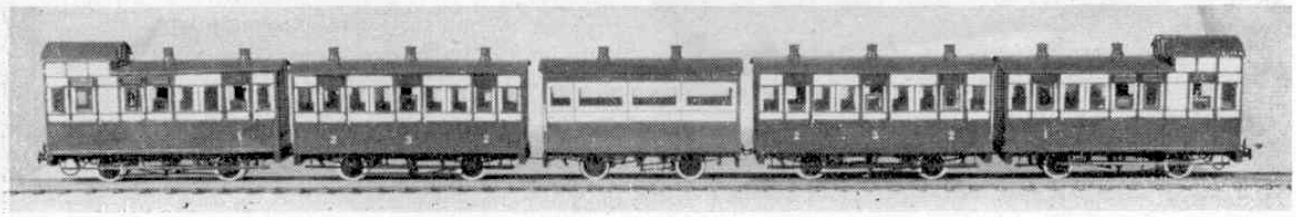
Narrow gauge railways in Britain have had a happier history than the unfortunate broad gauge, and many are still operating, particularly in North Wales. Most of these were built as local industrial lines, to link remote slate quarries with the nearest standard gauge main line. In mountainous country, narrow gauge railways are cheaper and easier to construct than standard gauge lines; earthworks and bridges can be of lighter construction because of the smaller trains, and curves can be made much sharper. These factors, combined with the attractive scenic aspect of most such lines, makes the narrow gauge railway a firm favourite with many enthusiasts, but the many different gauges employed, mostly between 3 ft. and 2 ft., pose some problems to the modeller, which we will look at later.

Now we come to the term "scale," and once again we must take a trip back in time, this time not to look at real railways, but at models. Although model railways of a sort have existed for almost as long as railways themselves, it was not until the early years of the present century that reasonably accurate models were readily available from such famous firms as Bassett-Lowke, Märklin and Hornby. The smallest of these models were built to a scale of ¼ in. to the foot, and ran upon a track of 1¼ ins. gauge. This was O gauge, which survives to this day, although now the scale and gauge are expressed in metric measurement: 7 mm. = 1 ft., 32 mm. gauge. After the last war O gauge lost most of its original popularity owing to competition from the smaller gauges, but many serious modellers have always remained faithful to it, and today the introduction of the Tri-ang "Big Big Train" seems to indicate a revival.

The end of O gauge popularity dates from the early 1930's, when there arrived in this country from Germany the *tiniest* model train anyone had ever seen. It was exactly half the size of an O gauge model, and ran upon a track of 16.5 millimetres. The scale was 3.5 millimetres to the foot; HO, or Half O gauge, had arrived. The newcomer sold very well indeed, because enthusiasts found that they could lay out a sizeable layout on an ordinary table-top, a thing that had been quite impossible to do with O gauge, which had really required a large loft for anything like a reasonable "main line." As the popularity of HO gauge increased, British model manufacturers took an interest in the possibilities of the new small trains, but they doubted that successful electric motors could be fitted into such small locomotives. As a result, the British models were built to a scale of 4 millimetres to the foot instead of 3.5, although the track gauge used was still the 16.5 mm. of HO gauge. In this way, OO gauge was born, and to this day it remains a uniquely British phenomenon, HO gauge being standard in America and the Continent. Although the terms "OO gauge" and "HO gauge" are in constant use by both enthusiasts and the model railway trade itself, the terms are very confusing to the newcomer, because the *gauge*, of course, is the same in both cases, that is 16.5 mm. It is really the *scale* that is different, and "OO scale" and "HO scale" would be much more sensible definitions. However, there is yet another sequel to the confusing story. Those enthusiasts who are sticklers for absolute accuracy in their models soon realised that the scale-to-gauge ratio of OO was quite wrong. The 16.5 mm. gauge, coupled to a scale of 4 mm. to the foot, gives a track gauge equivalent to only 4 ft. 1½ ins.—a scale seven inches too narrow for the standard gauge of 4 ft. 8½ ins. The "purists" had two choices open to them; to return to the more correct HO, and therefore build almost all their locomotives and rolling stock themselves, or to use a completely new track gauge, to which existing proprietary models could be converted. They decided upon the latter course, and the gauge they chose was 18 mm., or EM gauge. Although many successful layouts have been built to EM gauge, it remains very much the preserve of the die-hards, as the average enthusiast is quite prepared to "live with" the incorrect scale-to-gauge ratio of OO, which is really only apparent when locomotives and rolling stock are viewed from "head-on." No ready-to-run models are available in EM.

The third part of our story takes us up to the latter half of the 1950's and the introduction of TT gauge. This gauge had been popular in Europe for some years, and used a gauge of 12 millimetres with a scale of 2.5 millimetres to the foot. The small size of the models made even OO scale look enormous, and very ambitious layouts could be fitted into small spaces—an ideal characteristic in an age of small houses and flat-dwellers. Then a funny thing happened; the events of twenty years earlier, the OO/HO controversy, were almost exactly repeated. British TT appeared, using the established 12 mm. gauge, but a scale of 3 mm. to the foot. This, of course, gave a track gauge equivalent to only four feet, and a scale to gauge ratio worse even than that of OO! Oddly enough, though, this large discrepancy is hardly noticeable in so small a scale, and TT has been deservedly popular, and many fine layouts have been built using it.

When TT arrived upon the scene, many people nodded their heads wisely. "This is it" they said. "Model railways will never come any smaller. They wouldn't work properly, and anyway, you could hardly see 'em." Well, as enthusiasts sometimes are, they were wrong. On page 47 of this issue you will find reviewed some of the latest N gauge products of Wrenn/Lima, built to 1:160 scale and running on a gauge of only 9 millimetres. They *do* work, very well, and you certainly *can* see them! However, for the third time in thirty years, there is more than one scale for the same gauge. Some favour 1:148 scale instead, while a few enthusiasts have been building models to 2 mm. to the foot scale for many years. This scale was, and is, OOO. All use the 9 mm. gauge, which is a blessing!

The introduction of the very small gauges like TT and N proved a boon to those who like to model narrow gauge railways. The 12 mm. gauge of TT gives a gauge of three feet in 4 mm. scale, and many actual lines, like the Isle of Man Railway and many of the Irish lines were built to this gauge. For the two foot gauge lines of North Wales, the 9 mm. gauge of N is just the job. For those who like their models a bit bigger, 7 mm. scale using OO gauge track (16.5 mm.) is a good combination, giving a track gauge of about 2 ft. 3 ins. The formula for expressing these narrow gauge scales is quite simple. An OO *scale* model (i.e. 4 mm. to the foot) representing a three foot gauge prototype (using 12 mm. gauge) is designated OOn3. A model of the same scale modelled upon a two foot gauge original (using 9 mm. gauge) would be OOn2. Very simple really—if you're in the know!

Below: A train of tiny narrow gauge coaches by Mr. Don Boreham. They are to 7mm. scale, on 16.5 mm. gauge.