the Council installed electric traction (1913), the Lancashire and Yorkshire Railway inaugurated an electric train service from Bury to Holcombe Brook (which survived until 1951). This was a sure indication of how important this mode of transport was then regarded.

In the summer of 1922 Railless Limited of Moorgate Street, London, E.C. demonstrated a new type of single motor railless car at Dover. The car had just been completed for Ramsbottom. It was brought to Dover for inspection and tested on very steep gradients, including a 1 in 10 stretch. The demonstration made a great impression on Mr. E. H. Bond, the Manager of the Dover Corporation Tramways, who declared himself to be in favour of replacing the town's tramways by this form of traction—this suggestion as early as 1922. Track renewals were heavy and it appeared, at the time, that Dover would adopt the trolleybus. This straw did not indicate the direction of the wind, however, and the trams succumbed to East Kent buses in 1937.

In Bolton, trials were carried out pre-1914 with both petrol and steam buses. Services commenced in 1908 to Darcy Lever and Brownlow Fold, operation continuing until the tramways were opened on these sections in 1910 and 1911. Bolton's second and more successful attempt was in 1923 with three Leylands. Rawtenstall ran buses as early as 1907, when an Orion, 'The Rossendale', was put on the road. This was followed by Ryknields the next year. Like Bolton, however, these early efforts were failures. Rawtenstall had to wait until 1924 before bus operation began in earnest. It was no surprise, therefore, when Ramsbottom's first buses, Thornycrofts, entered service in 1923. Five years later Leylands, the subsequent mainstay of the fleet, came onto the scene. By now it was evident that the days of the trolleybus in Ramsbottom were numbered; the solid-tyred vehicles must have contrasted strongly with the recently acquired, and more modern looking buses. In addition to this, the system was running down. So on 31st March, 1931, the town said farewell to the small venture in electric traction. The poles remained in place for some years afterwards and to trace the route, even if one did not, in fact, have any knowledge of the former system was not difficult. The bus fleet increased as the years went by and in 1947 double-deckers were introduced.

Had Ramsbottom's tramway plans materialised the route would have been from Holcombe Brook to Edenfield (as the trolleybus one), but the tramway plans included Rawtenstall. The gauge was to have been 4 ft. 8½ in. Bury, where electric tramways were constructed during 1903–04, had proposals for extensions to Holcombe Brook and Stubbins as well as to Rawtenstall via Edenfield. The aforementioned would have affected Ramsbottom and, as the Bury gauge was also 4 ft. 8½ in., through running would have been possible.

Now a little about the system itself. The fleet consisted of seven R.T. vehicles. Details exist of Nos. 1 to 6. The cars had six windows and an open platform at the rear. The words 'Ramsbottom Urban District Council' appeared on the lower panels. The maximum weight, when loaded, was five tons. The trollies permitted a radius of 16 ft. from the centre of the trolley wire. The seating capacity was 28 and transverse seats were used. The cars had direct chain drives, each with two 20 H.P. motors and series parallel controllers. Electrical equipment was by Siemens and the bodies were built by Lockwood and Clarkson of Leeds. The vehicles were of a special composite construction. 'Garcke' for 1928 states that all seven cars had two motors, but the last one No. 7 (already mentioned) appears to have been a single motor car. Messrs. Clough Smith erected the overhead which was of the tramway type, the poles being of bracket arm construction. Overhead junction work of the E.M.B. type was designed and manufactured by Electro-Mechanical Brake Company. The power was at 10,000 volts, transformed at the substation to line voltage of 500 and supplied eventually by the Lancashire Electric Power Company.

The proposal for a free trial of a Cedes-Stoll vehicle in Ramsbottom in 1913 came from the Council and this must have been the case with several municipalities at that time—always ready to obtain better rolling stock and equipment for the system, ears always tuned to any new development.

In the late summer of 1938, whilst on the way to Bury, the writer encountered the remnants of the Ramsbottom trolleybus system, seven years after its demise. The poles were indeed very similar to tramway ones. As a matter of fact Edenfield–Holcombe Brook could well have been taken for an abandoned tramway route. The poles themselves were on the heavy side with lamps suspended from the brackets. The colour was dark olive and the appearance was not too pleasing on the eye. That was all that remained of an Urban District Council's pioneering efforts in the field of trolleybus operation a quarter of a century earlier.

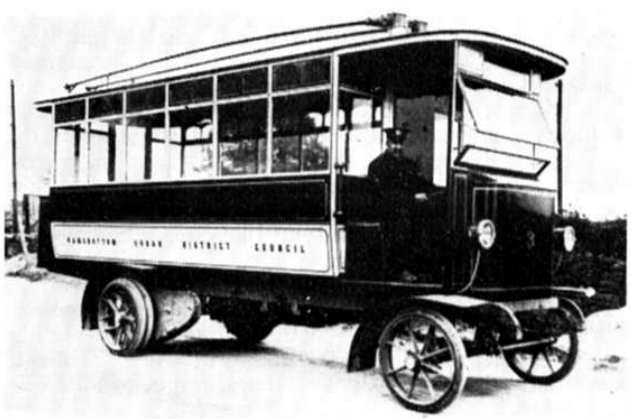
Most of the early trolleybus systems did not last the distance—Dundee closed in 1914, Stockport in 1919, Keighley's first routes in 1921 and Aberdare in 1925. Ramsbottom was, so to speak, the last of the lights to go out. Various factors, such as difficulties in obtaining replacements and the ever developing motorbus, contributed to the downfall of the early trolleybus pioneers. It seems that, in the early days, the trolleybus held great promise. What might have been a boon to municipal transport never really 'arrived'. In view of the fact that trolleybuses in the pioneering era had a future less certain than that of the tram, Ramsbottom certainly took a courageous step in adopting this form of transport.

Acknowledgement

The writer wishes to express his thanks to the Librarian of the Institution of Electrical Engineers for the use of the library facilities. Amongst these were the bound volumes of both 'The Tramway and Railway World' and 'The Tramway and Light Railway Journal' for the year 1913.

Certain details on Ramsbottom have also been taken from the excellent publication 'Great British Tramway Networks' by W. H. Bett and J. C. Gillham.

In addition I send my sincere good wishes to Miss U. B. Murphy, B.A. A.L.A. of Ramsbottom Public Library for kindly providing me with points of information contained in the captions.



(Right), Here can be seen the influence of the tramcar in the early trolleybus designs.

Trolley Bus in Meccano

A British Industries Fair Exhibit

SINCE the War increasing attention has been paid to trolley buses, that is vehicles which derive their motive power from electric current collected from overhead wires, but do not run on a fixed rail track. As compared with the tramcar, the trolley bus scores by reason of its flexibility, which is almost equal to that of the petrol bus. It is capable of a deviation of about 15 ft. to either side from the centre of its trolley wires, and thus is able to load and unload its passengers at the kerb instead of in the middle of the road. In many respects it is a more comfortable vehicle than either the tramcar or the petrol bus.

The photograph on this page shows a fine model trolley bus built by Meccano Ltd., to the order of the Whitecross Co. Ltd., of Warrington, the well-known makers of overhead trolley wire for trams and buses. The model formed a notable feature of the Whitecross Company's display at the Heavy Section of the British Industries Fair at Birmingham in May last, where it attracted widespread attention and admiration. The current supply available for running the model was alternating current at 230 volts. It was not considered desirable to use this high-voltage current for the overhead wire supply, and therefore it was transformed down to 20 volts. On the other hand, it was found advisable to use a high-voltage motor for driving the bus, and therefore the 20-volt supply from the overhead wires was re-transformed before reaching this motor. The transformers employed were Meccano products.

A fine trolley bus in Meccano. It runs in a most realistic manner on current taken from overhead wires.

The model is not controlled in any way either for speed or steering, as such control is not necessary in the case of a demonstration model of this type. The bus runs round a circular track 9 ft. in diameter, with standards supporting the two overhead wires. A short distance from the outer edge of the track is fitted a continuous flange ¼ in. in height, against which runs the outside front wheel of the bus. The bus is set to travel in a very slightly larger circle than the track, and by means of the flange is prevented from deviating from its course.

The Electric Motor, which is mounted in two spring supports, carries a ½″ Pinion on its armature shaft, and this drives the cardan shaft through a 1½″ Contrate and a 3 : 1 spur gear reduction. The cardan shaft drives the rear axle through one ½″ and one 1½″ Bevel Gear, the large Gear being connected directly to a slip clutch mechanism. The outside pair of rear wheels are driven through this clutch, which slips when any undue strain is placed on the transmission. The inside pair of driving wheels are free to rotate on the axle, a Collar being used to retain them in place. Semi-elliptic springs are fitted to both front and rear axles.

The lower saloon floor of the model is built up from Strip Plates and Angle Girders of suitable sizes, the slope down over the rear axle being reproduced by bending the Plates slightly. The platform at the rear is secured to the lower deck by means of 1½″ × 3″ Flat Plates. This floor, which is not finally secured in place until the body work is completed, forms a base on which the remainder of the model is built. The sides, front and rear of the lower deck consist of Strip Plates edged with Strips and Curved Strips.

The driver's compartment is isolated by means of two 5½″ Strip Plates, and a doorway leading into the lower compartment at the rear is formed by using two 2½″ × 2½″ Strip Plates and 5½″ and 2½″ Strips. The seats have been cleverly represented by making use of the motor car seats found in Meccano Motor Car Outfit No. 2. Each of these seats is secured to the floor by means of two 1½″ Angle Girders. The two seats nearest the door have their backs to the windows, while the remaining eight seats are arranged in a double row with a central gangway. The driver's seat is made by halving a motor car seat and supporting it on two 1″ × ½″ Angle Brackets. The driver's cab contains, in addition to a seat, a dummy steering wheel, brake handle and master controller.

The upper deck to the model is supported on a series of Strips forming the window frames. Two of these frames, on each side, are made double thickness in order to represent the trolley-platform supports of the actual bus.

The floor of the upper deck is built, with slight modifications, in a similar manner to that of the lower deck, the most notable difference being the cut-away section for accommodating the stairs. Seating is of the central gangway type, the side on to which the stairs open having six seats. These are placed fairly close together, while the seats on the opposite side, seven in number, are spaced well apart. By this means, in actual practice the balance of the bus is not disturbed.

At this point the stairs were built-up and fitted. The shape and small size of these necessitated the use of sheet metal for their construction, as a set of stairs of this nature built in Meccano were not sufficiently neat and in keeping with the remainder of the model. The complete roof is secured to the body of the model by means of a number of Flat Brackets.

The trolley arm frame consists essentially of two curved girders built up from a number of short Angle Girders and Curved Strips. These two members are connected together by four 7½″ Angle Girders supporting the trolley pivot frames. Each of these pivot frames is constructed from 1½″ Angle Girders, and one complete frame is insulated from the remainder of the model. A short Rod carried in each pivot frame has at its upper end a Coupling that is fitted in its longitudinal bore with a 2″ Rod. It carries also at each side a 2½″ large radius Curved Strip, these two Strips being fitted at their outer ends with a Coupling supporting one of the trolley arms. The inner end of each Curved Strip is fitted with a strong spring, the opposite end of which is secured to the 2″ Rod already mentioned. These springs always tend to keep the trolley arm in a raised position. The trolleys consist of ½″ Pulleys each of which is mounted in a frame built up from sheet metal.