

## WAGONS OF THE A & G DRAMWAY

Keith Thomas

The most reliable source of information of the types of wagon used. one the Avon and Gloucestershire Dramroad is John Cornwall's Photograph of the Bath Road crossing at Willsbridge Wharf. The photograph was taken about 1900 and shows three types of wagon which were being used by the California Colliery. Utilising an enlarged print the following observations were made:

- i) The buildings in. the photograph are still standing so the camera position could be relocated quite accurately (see map).
- ii) Three separate types of wagon can be seen which, from left to right, will be referred to as Types A B and C.
- iii) The wheels on all three types are of the same diameter and have eight spokes. The apparent difference in size of the left hand wheel of wagon B is an optical illusion as a straight line can. be drawn through the front axles of wagons B and C.
- iv) The right hand end of the wagons are facing the wharfs at the Avon so they will be referred to as the fronts.
- v) Wagon A is of a different design to wagons B and C in that the body is situated inside the wheels which are equally spaced. The sides and ends of the wagon are vertical.
- vi) Wagons B and C have the main body higher and wider than the wheels, and the bodies are resting on large buffer beams which are chamfered at each end.
- vii) The body of wagon B is inclined to the front by  $3\frac{1}{2}$  Degrees, this may be due to distortion from heavy use; at the front of the body the planks can be seen to be protruding beyond the vertical support which suggests that the body has been subjected to lateral forces, possibly caused during tipping operations.
- viii) The body and Buffer beams of wagon C are tilted upwards at the front by  $2\frac{1}{2}$  Degrees, again possibly due to heavy useage and tipping

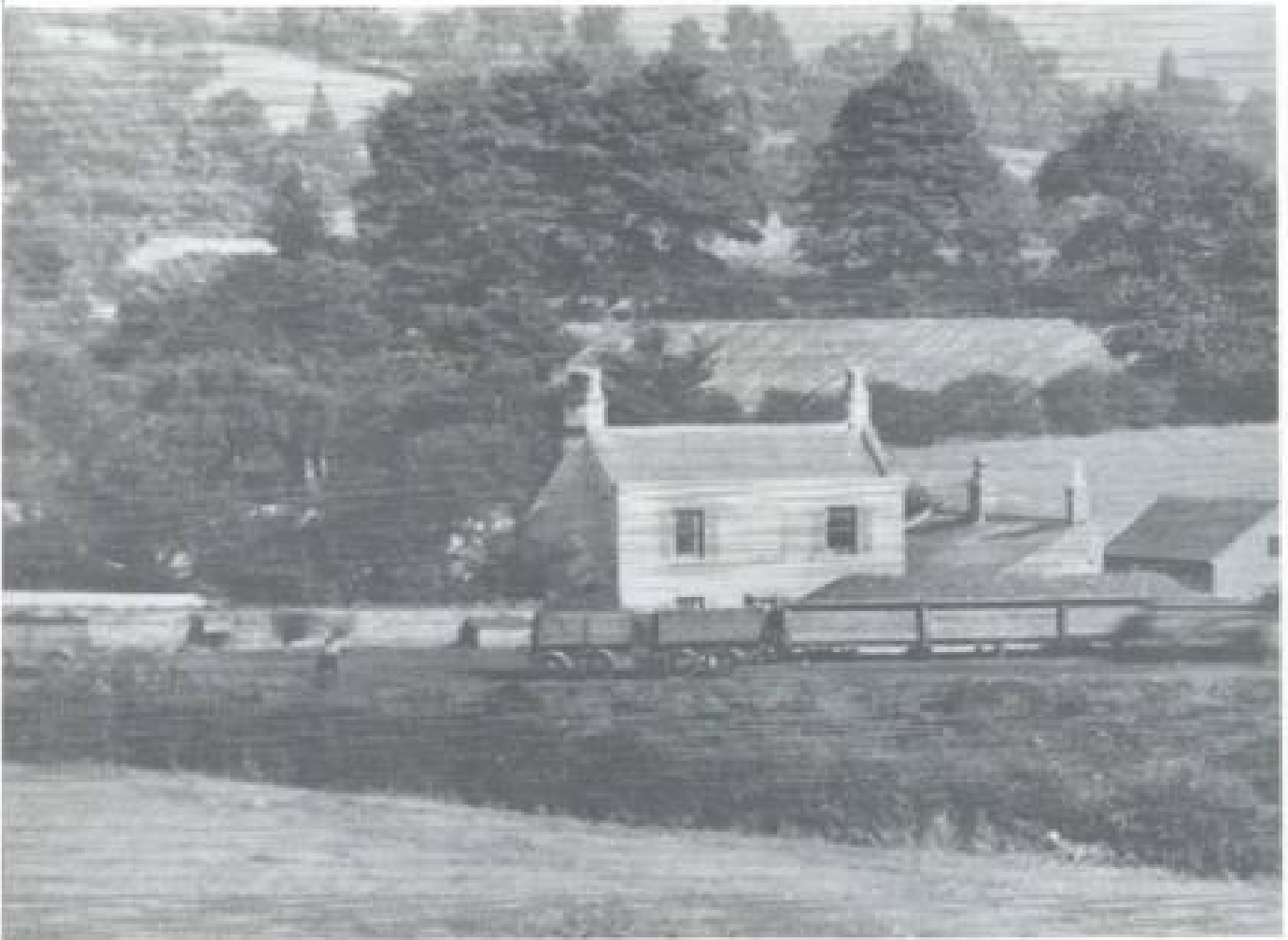
operations. The front of the wagon is sloping by 9 Degrees and the rear of the wagon is vertical to the buffer beam.

ix) Part of the inside of wagon A can be seen, but not wagons B or C. As the camera position was about 50 feet higher than the wagons, and studying the angle of the shadow to the rear of wagon B, it seems that the far sides of wagons B and C are lower than the near sides. This may have been to assist in. loading or "unloading operations. (see Sketch 1)

x) The coal bunker behind the wagons appears to be raised off the ground. How the coal was unloaded from the wagons or loaded into carts is not clear.

Assessing the size of the wagons is difficult. The first method used was to take the figure standing between wagons A and B who appears to have his right foot resting on the nearside tramline making the same relative scale as the wagons. Using a measurement of 30 inches as the average Male inside leg, a wheel diameter of 42 inches is obtained and an overall length of 10 feet 6 inches. A more accurate method was then tried where the building, dramway and camera position were plotted out to a very large scale, and by projecting lines from positions on the house which wagon C obscure, the true scale length of the wagon can be measured where these lines cross the dramway. A measurement of 10½ feet was obtained, thus proving the original estimates to be reasonably correct, and a complete table of measurements based on a 42 inch wheel are reproduced in Table 1.

With the front axles of wagons B and C being closer to the centre of gravity than the rear axles this would enable the wagons to be tipped forwards more easily. The chamfer on the front ends of the buffer beams form a tangent with the front wheels, which lends support to this theory (see Sketch 2). Also referring to the 1882 O.S. Map (Scale 25 inches/Mile) both the Londonderry and Avon Backs wharf s show the dramway lines meeting the riverside at right angles which also indicates end tipping.



Ordinance Survey Map, 1/2500 Scale, First Edition, Surveyed 1882

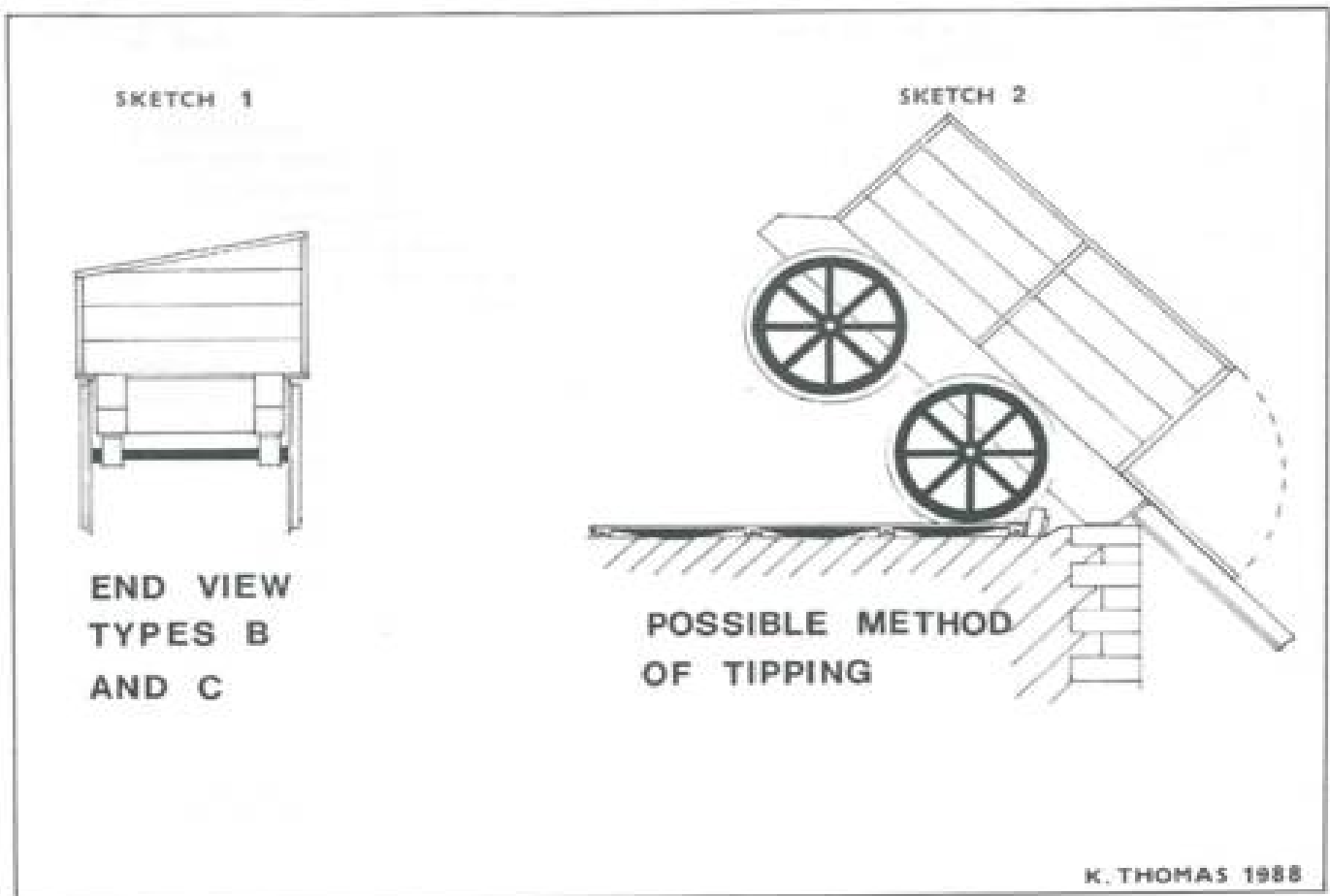
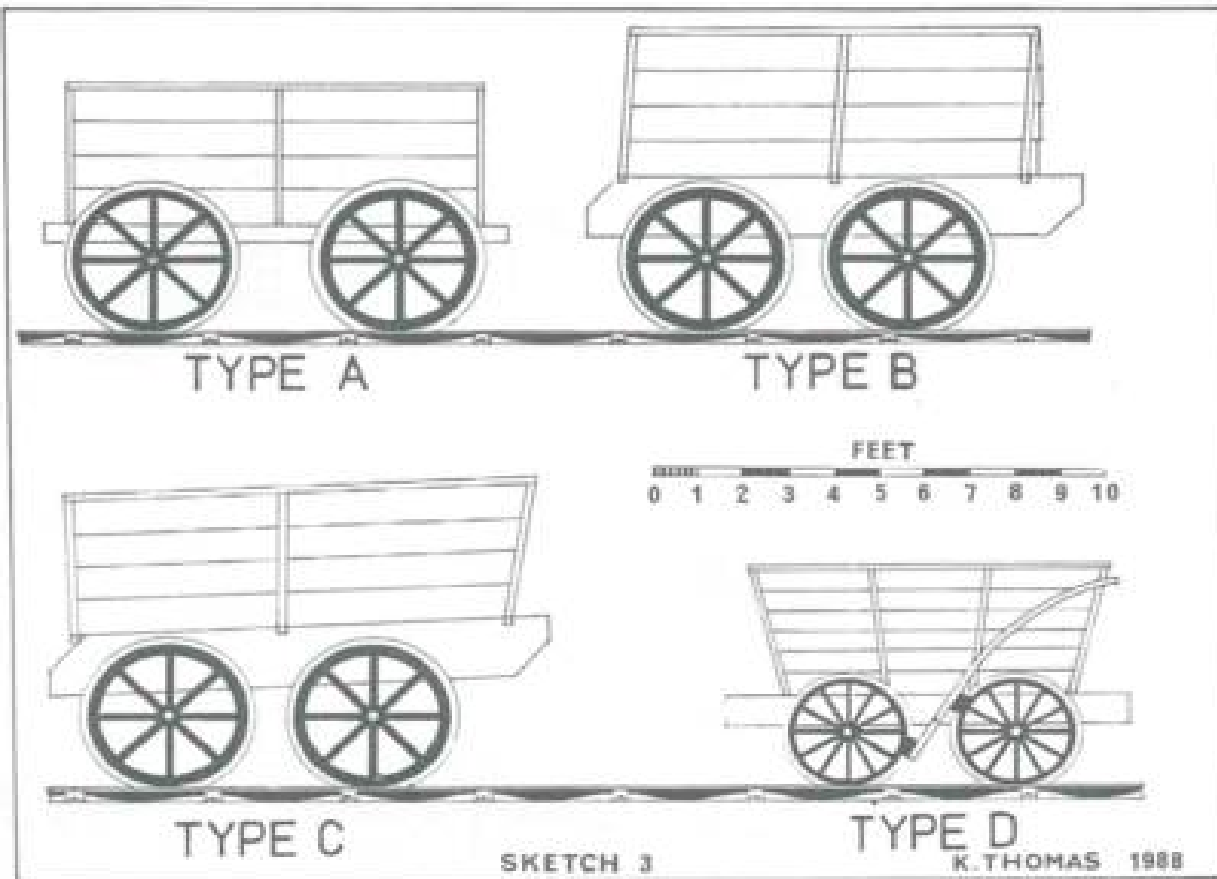


TABLE 1

Type	Wheel Base	Wheel Dia.	Buffer Beam		Height	Front Axle to front	Body		
			Length	Depth			Length Max	Length Max	Height
A	66"	42"	123"	5"	72"	21"	108"	108"	42"
B	54"	42"	129"	18"	90"	45"	111"	111"	42"
C	54"	42"	129"	18"	90"	45"	126"	117"	42"
D	38½"	30"	108"	7½"	67½"	36½"	92½"	71½"	44½"

TABLE 2

Type	Body Volume	Capacity
A	113.5 cu.ft.	3.5 tons
B	164.6 cu.ft.	3.5 tons
C	180.2 cu.ft.	3.9 tons
D	93.5 cu.ft.	2.0 tons

The dimensions in Table 1 of 42 inch diameter wheels and 10 feet 6 inches long buffer beams do not agree with the dimensions quoted in Maggs<sup>(1)</sup> of 30 inches and 9 feet respectively. These dimensions may have been based on an earlier work by A.R.F. Trew published in the Railway Magazine<sup>(2)</sup> stating those figures, and also accompanied by a sketch of a wagon based on remains found at Avon Wharf. If the sketch and dimensions are accurate then this must represent a fourth type of wagon from an earlier period (Type D) conforming to, but half the capacity of the original 4 ton "pattern Wagon" hired out by the Company (see Maggs p58).

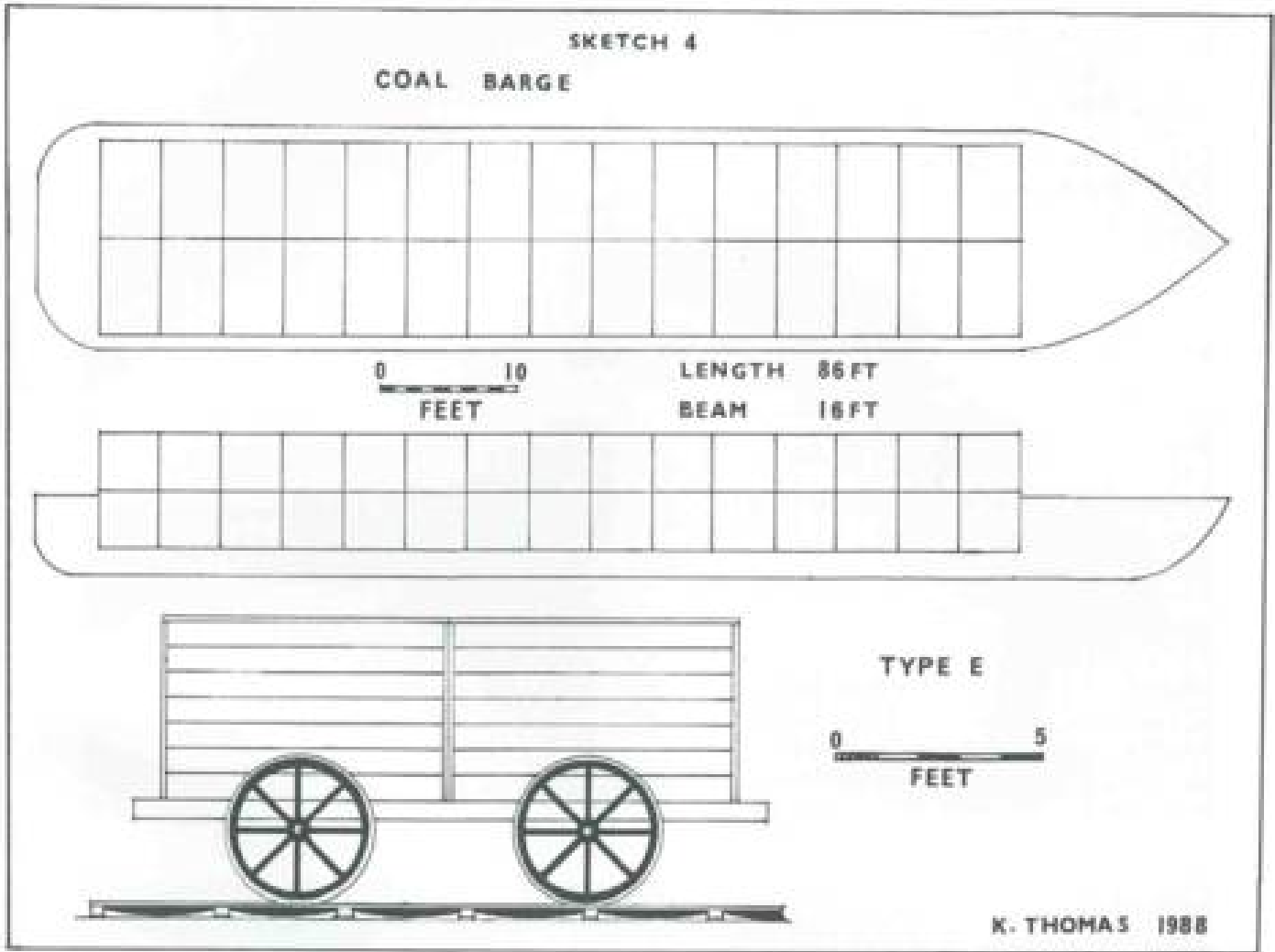
Calculating the internal volume of the four wagons, allowing one inch thick planks and a minimum width of 48 inches for Type A, 63 inches for Types B and C, and assuming that the sides of Type D slope outwards, gives volumes as in Table 2. Multiplying these figures by a factor of 46 cubic feet per ton gives the tonnage of coal each of these wagons could carry.

The sale of redundant items from the California Colliery after its closure in 1904 listed 20 four ton tipping wagons, 3 four ton wagons and 1 two ton wagon. The tonnage figures assessed in

Table 2 agree approximately with these so forming a third check on the dimensions.

The four types of wagon are reproduced to a common scale in Sketch 3. Although every effort has been made to ensure accuracy they cannot be relied on to "be entirely" correct due to the difficulties of obtaining measurements from an eighty year old photograph taken from a distance of over 1000 feet where foreshortening and lack of sharp focus complicate interpretation and obscure detail. Of the brake mechanism which these wagons certainly had there is no clear evidence - possibly they used a type of four wheel manual braking system similar to railway wagons of the pre vacuum era.

There appears to have been a fifth type of wagon (Type E) which consisted of a flat bed wagon carrying detachable coal boxes of three ton capacity; The coal boxes were loaded into a specially constructed barge 86 feet long by 16 feet beam, which carried two tiers of boxes with 30 boxes in each tier. This barge was built in 1832 and hired to the Coalpit Heath Company (together with carts for delivering the coal from the barge at Bath) for £320 per annum. The most likely arrangement would have been to have



two rows of fifteen boxes in each tier, this would give a maximum box size of 4½ feet wide by 7 feet long. Again using the figure of 46 cubic feet per ton of coal would give a height of 52 inches. A representation of the barge and the Type E wagon as they may have appeared are shown in Sketch 4.

In 1834 Hewitt, the Coalpit Heath Agent, asked if the A&G Company could dispose of some double box wagons and also the boxes. They were disposed of in April 1835 as below,

19 Long carriages for coal boxes at £13	£247
120 coal boxes at £13 10s	£420
81 trucks for coal boxes at £2	£162
	£829

(Maggs p59)

The reference to double box wagons could imply that the long carriages were some 15 feet in

length in order to carry two boxes apiece, or even that there were double length boxes 14 feet long, which would have been particularly difficult to handle and could explain their early demise.

The five types of wagon described in this article are only the ones of which anything is known, doubtless there were several other types details of which have been lost.

#### References

- (1) Colin Maggs The Bristol & Gloucester Railway, and the Avon & Gloucestershire Railway. The Oakwood Press. 1969.
- (2) A.R.F. Trew 'The Old Bristol and Gloucestershire Railway' The Railway Magazine Vol. XXVI No.151 January 1910