

Report to the Sub-Committee of the Canal Association upon Canal Boat Gauging

by Mr. John Glass, Traffic Manager, River Lee, Enfield Lock.

The System of Weighing and Ganging Barges as introduced by me from the Regent's Canal to the River Lee in the year 1839, has been in operation upon the Grand Junction Canal about 55 years; the first Barge weighed in the year 1802, being one from Bow, on the Lee River.

Before the adoption of this system upon the Grand Junction Canal, there does not appear to have been any more correct method of ascertaining the weight of goods carried than by the "Index," a plan now very generally abandoned, in consequence of its numerous defects and total inapplicability to Barges of heavy tonnage.

A method somewhat similar to the Index is still practised upon the Wey and Arun Canal, and others south of the Thames, but it gives at best but an approximation to the actual weight, is easily subject to fraud, difficult of access, and is equally objectionable to large Craft as the system of Index.

The mode of indexing a Boat requires it to be weighed and loaded down to its extreme capacity, and marked at every ton and quarter of a ton on three places upon each side, and six strips of lead marked with divisions, exhibiting tons and quarter tons, are then let flush into the sides of the Boat in deep grooves cut for the purpose. When a Boat so indexed arrives at a collecting lock, the Collector is obliged to stoop down on his hands and knees to copy off the figures cut by the water's edge on the six plates or "indexes"; the sum of these divided by six, gives the weight on board in "long weight," or at 1201bs. per cwt, being 1/14th less than the standard of 112lbs, per cwt.

There are many objections to this plan. The process of weighing and marking is extremely slow and tedious, and there is great liability to damage by cutting grooves in the sides of the Boat to let in the six plates, which are often torn off and defaced by accident, and are sometimes removed altogether or shifted, for the purpose of fraud; and there being no register kept of the Boat, this cannot be detected, nor can any alteration be made in the Index to allow for the Boat's getting heavier from age, or for any difference that may be made in her capacity of burden by repairs, &c.

The mode of checking off the "Indexes" is difficult for the Collector, and consequently often times omitted altogether, especially in windy weather, when the surface of the water is rough. The system, in fact, at its commencement, requires the same outlay for weighing apparatus as the regular and more scientific system of gauging, is more expensive, and takes up more time, damages the Boat to a certain extent, and is, after all, very uncertain and open to fraud, without the proper means of detection. And for deep and capacious Barges that sink about 4/10ths of an inch (only) to a ton, quite impracticable, as it would be impossible to make the divisions On the "Indexes" in so small a space sufficiently plain to be seen by the Collector at the distance he is necessarily obliged to be from it.

The System of Gauging as now practised upon most of the Inland Canals, and the River Lee Navigation is, I think, as perfect as any system of weighing can. be, as Barges of 100 tons may be weighed and correctly gauged to a certainty within 1 cwt.; and as a perfect register is kept of every Barge so weighed, say, the least alteration, caused by age, accident, or fraud,

Can be detected immediately; or should any difference be made in her burden by addition or repairs, the necessary alterations can be made in the original Table or Register at once, and without any re-weighing.

A Barge or Boat being once weighed and registered, any number of copies can be made of these Registers and transmitted by Post to the Collectors of the respective Canals upon which the Barge or Boat trades. These Tables or Registers are bound up in books of 100 each, and any Barge can be easily found by reference to its number.

The practice of the Gauging Rod in taking the dry inches, is pleasant and convenient to the Collector; the Rod or Indicator being close to his eye, he can always see clearly the precise number of divisions shewn by the Indicator, whether the Vessel be either heavily or lightly laden: nor does the ripple on the water at all interfere with its accuracy. To facilitate and ensure the correctness of this system of Gauging, I have at various periods made such improvements in the construction of the Gauging Rod and Float as were found by experience to be desirable.

When a barge is first weighed, a careful measurement is made of her extreme length and breadth, also the length and breadth of her stowage, and four small iron plates about 6 inches long by 1.5 inches in width, are fastened on her gunnel at equal distances from each end of her stowage, namely, one-fourth from the head and one-fourth from the stern; these plates being first stamped with the number of the Barge's register and the initials of the Canal upon which she may be weighed, as R.L.T. for the River Lee Trust, &c. The whole of the moveable tackle, such as sacks, gratings, tarpaulins, &c., is then taken out of the barge and carefully weighed; the wet and dry inches are then taken in four places, measuring the dry inches from the plates on the gunnel to the water's edge, and the wet inches from the Barge's chine upwards at the same places; this is done both with and without the tackle on board.

The Barge is then loaded down to her extreme capacity, or as far as experience may dictate to be necessary, the dry inches being taken from the four plates at regular intervals of four tons, six tons, or eight tons; this, however, depends upon the size and shape of the Barge. A calculation is then made of the Barge's rate of sinking per ton in decimals of an inch; the Table is then completed and entered in the Register, one of which I send herewith. (See page 4)

These Registers amount on the Grand Junction and Regent's Canals to upwards of 8000; but as this number has been fifty-five years in accumulating, there has never been at any period more than 1000 required for reference, any one of which is readily found, for as 100 Tables are bound up in a Volume, 10 Volumes are all that are wanted for reference at any time.

Upon the River Lee there are at present but 3 Volumes in use, the number of Barges weighed being 250, all of which are local traders.

The Gauging Rod used by the Collector for taking the dry inches, is a tube of brass, 7 feet long, having about midway a square rest to stand on the plates upon the Barge's gunnel, the lower end of the tube being then immersed in the water, the float inside flies up, driving the rod or indicator through the top of the tube to the number of inches and tenths the Barge measures from the plates to the water's edge,

To this system of Gauging there are no exceptions : it applies to Barges and Boats of any shape or dimensions; and I am of opinion that even large Ships, of any amount of burden,

could be registered by this method with far more accuracy than is done at present.

The plan in operation upon the River Lee formerly was most ineffectual. In fact, it was worse than taking the weight by guess, as by its application false quantities were given, and the Trustees constantly defrauded by their own system.

The wet inches or draught of a laden Barge were taken by the Collector with a Gauge Stick, (a wooden measure having a square hook at one end and divided into inches and half inches) a deduction of 12 inches was then made, and the remainder doubled and taken as Tons, allowing half an inch to every Ton.

Thus if a Barge when laden showed by this Gauge Stick a draught of water of 38 inches, 12 inches were deducted for the draught of water when light, leaving 26 inches or 52 tons for her cargo, whereas the truth was in many instances that the Barge had on board with such a draught of water upwards of 65 tons, or 18 tons more than charged; this was caused by the Barge when empty drawing only 9 inches, and sinking only $\frac{45}{100}$ ths of an inch to a ton, instead of, 50 or half an inch.

This plan being in itself so defective and false, it followed, almost as a matter of course, that frauds were practised to a ruinous extent. No better proof of which can be given than the great increase of tons and tolls that took place immediately the present system was adopted. Even at the present day, I believe that upon some of the old Canals in the Mining Districts, this loose and incorrect system of taking the tons by the wet inches, is still in operation.

In the year 1838 the Surveyor of the River Lee made application to the Regent's Canal Company, (my then Employers), to allow me to Weigh and Register the River Lee Barges, in their Weighing House at the City Road Basin. This permission being granted, by the first, of June in the same year I had weighed 55 of the principal of the Trading Barges on the River Lee, and then commenced giving such instructions as were required in gauging to the Collectors appointed on that Navigation.

The Trustees and their Officers previous to embarking in any further expense for Weights, Cranes, &c, for establishing the system generally, had the correctness of the Gauges most severely tested by weighing out, &c, and I believe found the system to exceed their expectations as to its correctness and simplicity. Consequently in the latter part of the following year 1859, I was appointed by the Trustees of the River Lee to introduce and carry out the plan upon their own Navigation, they having provided 56 tons of Weights, and four moveable Cranes, dispensing with the greater expense of a Weighing House and Dock, making use instead thereof of the Lock at Enfield for the purpose; and as the great bulk of the Barges trading upon the Lee had been already weighed by me on the Regent's Canal, it has hitherto answered very well; and all New Barges have been weighed and tried from time to time without much detention to the trade, especially as with the aid of the four Cranes any Barge can be weighed in about two hours.

At the partial commencement of the system there were a few cases of attempted fraud; the practice of which had been so general, that the Bargemen at first found it difficult to believe that detection was certain.

In the year 1840, the system of Gauging was complete on the River Lee, and the possibility of fraud almost set at defiance, although great care was required, and rather more time taken up than at present, in consequence of the system of taking the Toll on Malt, Grain, &c, by

computed weights; the quantities having to be proved by the gauge weight agreeing with the weight of the grain as shown by the quantity declared, a sack of which was generally taken out and Weighed.

The fraudulent practice therefore of declaring for 300 quarters instead of 350 or 400 was entirely abolished.

The Increase of Tons and Tolls, as shown by the following. Statement, from the year 1838, will give some notion of the extent of fraud practised, and the fallacy of the old Stick System of gauging by the wet inches.

Comparative Statement of Tons and Tolls charged on the River Lee, in the Years 1838, 1839, and 1840.

Year	Tons	Tolls.
1838	240,833	£12,856
1839	263,755	£13,738
1840	300,598	£14,426

It would appear by this that the Trustees of the River Lee had been annually defrauded to the extent of about a £1000.

The cost of Weights and Cranes was about £350. Of course the erection of a regular Weighing House and Dock would have added materially to the outlay.

The Regent's Canal Company commenced the system at the opening of the Canal in 1820, having had a regular covered Weighing Dock erected, with fixed Cranes, Weights, &c.. at the formation of the Works of the Canal. They had also a complete set of Gauge Tables copied from the Grand Junction Canal books, adopting the same numbers; and when any new Barges are weighed, either at the City Road Weighing House, or at Paddington or Braunston on the Grand Junction Canal, copies of the Register are made for each Canal. The same course is pursued with any alteration that may be made from time to time at either of those places.

The Registers on the Grand Junction and the Regent's Canal are therefore in every particular precisely the same; this also is the case with most of the Canals connected with, and running into the Grand Junction Canal.

Having had an experience of more than twenty-five years in the Weighing and Registration of Barges, the Superintendence of the Collection of Tolls, and the Management of Canal Traffic generally, I have during that period weighed and registered some hundreds of craft, of almost every description of build, from 10 tons to 120, and can speak confidently as to the accuracy of the system.

The operation of Weighing a Barge may be seen either here at Enfield Lock, or at the Weighing Dock at the City Road Basin of the Regent's Canal, and the system more fully explained either by myself or my brother, who has had the Management of this System upon the Regent's Canal since the period of my services being transferred to the River Lee in the year 1839.

J. GLASS.

River Lee Trust, 18th April, 1857.

No. 232.

[H. H. G. LEE,] Owners, [Upper Clapton.]

Name of the Barge, [Reliance.]

The Date when Built, _____

	<i>Feet.</i>	<i>Inches.</i>		<i>Feet.</i>	<i>Inches.</i>
Length of Stowage.....	56	8	Extreme Length.....	78	7
Breadth of Stowage ...	11	9	Extreme Breadth ...	13	3
Draught of Water when light.....					<i>Inches.</i> 13.75
Draught of Water when laden with.....	79	Tons			

ARTICLES ON BOARD, WHEN WEIGHED.

	<i>No.</i>
Cross Beams.....	3
Mast and Case.....	2
Sails	2
Oars	2
&c., &c.	

Date when Weighed,

{29th} day {April,} 18{56.}

[W. TRUMAN,] Steersman.

No. 232.

[H. H. G. LEE,] Owners, [Upper Clapton.]

Name of the Barge, [Reliance.]

The Date when Built, _____

TONS.	Dry Inches.	Difference.	ALTERATIONS.	
			Deduct	DATE.
Light.	37.22		24	July 20, 1867*
1	36.75	.47		
2	36.28			
3	35.81			
4	35.34			
&c.				

* These Figures are merely inserted to show the use of this part of the Register.