The Port of Bristol Workshops
at the Underfall Yard
F. Douglas C. Jeffery

The following article is a summary of the detailed survey made by Mr. F.D. C. Jeffery ad Mr S.J. Jacobi for the National Record of Industrial Monuments.

The Underfall Yard is used by the Port of Bristol Authority as a base for its engineering workshops and machinery in the City Docks, and for the storage of large pieces of machinery. It is also the centre for the hydraulic installations in the City Docks, and it provides a dock for maintenance work on PBA vessels. The Yard is on reclaimed land behind the dam which William Jessop constructed across the old course of the River Avon to make the Floating Harbour in 1804-9. This dam provided an embankment for the new Cumberland Road, and below the level of the road Jessop constructed an overfall which seems to have been located approximately along the lane which runs down to the Floating Harbour from Cumberland Road on the outside of the present Underfall Yard wall.

Subsequently, various works were carried out which put culverts under the dam to provide more adequate means for controling the water level in the Harbour, and I. K. Brunei put a deep culvert under the dam as one of his solutions to the silting of the Harbour. Mud scraped and dredged from the Floating Harbour was deposited in a dumping pit near the head of the culvert, through which it was scoured into the New Cut. This is still the method used for keeping the Harbour clear of mud, and the plant which controls the sluices in the culverts is housed in the Underfall Yard. It is the existence of this plant which gives the Yard its name.

The work on the underfalls involved a lot of infilling and many tons of clay were dumped which eventually made up the area of the Underfall Yard. It is difficult to determine the exact date at which the Yard was occupied forr its present purposes, but there were definitely some buildings there in the 1840s. Practically the whole of the machinery,workshops, and the blacksmith's shop, however, were installed about 1885. In the Engineer's Report to the Docks Committee of 29 January 1885, John Ward Girdlestone pointed to the need for a planing machine and a steam engine and boiler to drive it (Tideway, January 1965). At that time the Underfall Yard must have been a well established area. The earliest of the present buildings and equipment were the result of this Report by Girdlestone. The steam engine and boiler were installed adjacent to the fitting shop, which contains the machines driven by two lines of shafting along the side walls. The steam engine drives the shaft on the inner wall through a direct extension into the engine house, and a crossover belt alongside the intermediate wall carries the power to the countershaft on the outer wall. There was an extension shaft through a universal joint which drove a mortar mill and a circular saw in the shipwright's shop. Another heavy duty on the engine was the drive to the original twin shears and punch in the blacksmith's shop, arranged parallel to the fitting shop.

the machinery and equipment

STEAM ENGINE
This is a two cylinder horizontal steam engine made by Tangye of Birmingham in 1885. It was originally installed to drive a planing machine, but at the zenith of its working days it drove twelve machines and a medley of milling, shaping machines, and small lathes. It is still working regularly to drive at least six large machines.

CORNISH BOILER
Made by T. Beeley, with tubular firebox and flue with Galloway tubes, and natural draught. The original safe working pressure of 20/50 p.s.i. has been raised to 80 p.s.i. The boiler is in

excellent condition and still working regularly. In addition to driving the steam engine the boiler now supplies steam to drive the twin punch and shears, the steam hammer, and the heating for workshops and offices.

FEEDWATER PUMP

The feedwater pump supplying the Cornish boiler was made by J.G. Mumford of Colchester. There is nothing very unusual about its design - most donkey pumps incorporate similar features - but this type of pump may go out of use and therefore disappear rapidly when the older steam boilers are superseded.

PUNCHING AND SHEARING MACHINE

The date of manufacture of the present cam and lever punching and shearing machine by John Cameron was 1885. This particular machine was installed at Underfall Yard about 1925. Before that it was working at G. K. Stothert's shipyard in Hotwells, Bristol. The machine installed in the blacksmith's shop until 1925 was belt driven from the line shafting driven by the Tangye engine. This machine was moved to Avonmouth where it is s611 working. It is a John Cameron machine also made in 1885. The principle interest of the present machine is its integral steam engine drive.

STEAM HAMMER

This steam hammer has presented quite a problem, for at some time in its history the standard had fractured and, although a very neat job was: made of the repair by plating on both sides, any trace of a maker's name or reference number was eliminated. Definite identification is therefore impossible, but the model which it seems to resemble most closely is that of the- Davis and Primrose self acting hammer. There are two pieces of equipment ancillary to the' steam hammer:

1. A heating hearth of conventional open circular form, blown by three tuyeres.

2. A pintle type swinging jib crane . A heavy casting grouted into the floor forms the base, from which rises a slender 'pintle' integral with the base casting. This carries the jib frame bearing at its apex, about fifteen feet high. The bottom of the jib frame rests on two rollers running on a track machined around the waist of the pintle, about 30 ins off the ground. The jib frame carries a travelling jockey with a modern chain block hoist.

SLOTTING MACHINE

The versatility of the J.Whitworth slotting machine is its salient feature. Built in 1884, No.258, the drive is variable through four pulley cones and a back gear. The stroke of the tool slide is adjustable by $^{1}/_{2}$ ins. positions on the slotted drive wheel. The connecting rod gudgeon is widely adjustable in a slot running nearly the full length of the tool slide. The tool is positioned by cramps on the tool holder allowing a variety of positions and tools. A ratchet drive to the table provides backwards, forwards, and sideways movement and rotation of the table during operations. By suitable gearing all these movements may be made continuous during the machining sequence. This is a truly remarkable machine for its age, and is still working.

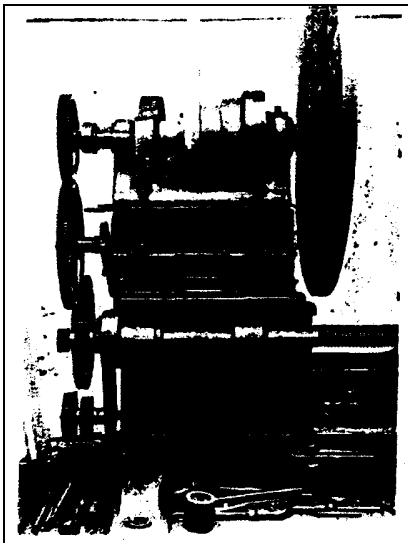
SHAPING MACHINE

A sliding-head machine by Hulse & Co. of Manchester, this dates from the period 188090. Its solid construction has ensured its long life. The machine is interesting because of the provision which will allow it to accept large, small, or awkwardly shaped material. In addition to the normal straight cut in one plane, a rotating arbor is provided which allows for a straight cut to be made on a circular plane. There is automatic feed through a series of gears and ratchet and pinion movements. A nice detail is the pad footbrake applied to the flywheel.

PLANING MACHINE

This is the machine requested by Girdlestone in his Report to the Docks Committee in 1885 mentioned above. The date on the machine is 1884, suggesting that it was bought from stock-

J.Whitworth of Manchester had drawn up designs about 1860 for a new type of planing machine which aimed at reducing the 'idle time' during the reversal of the table, when the cut operated in one direction only. Larger machines had two reversing boxes providing two tools cutting *in* both directions. Smaller machines, of which this is one, had quick reversing gear operating the table. The Underfall Yard machine is still in use and the reversing gear is most effective.



long bed gap lathe by Kendal and Gent, number 1037 dated 1884

wheelbarrow hydraulic test unit by W H Bailey

vertical slotting machine by J Whitworth, number 258 dated 1884

planing machine dated 1884

HYDRAULIC TESTING UNIT

There is an obvious need for a unit of this type for 'on the spot' testing of hydraulic pipelines etc where a large network of hydraulic mains and machinery is working, as in Bristol City Docks. The main feature of this W.H. Bailey testing unit is its mobility - it is mounted as a wheel-barrow - and its small size, allows it to be easily man-handled. As the hydraulic pipeline network is rapidly disappearing from the City Docks, this unit is worth recommending for preservation.

LATHE

The usefulness and interest of the long bed gap lathe by Kendal and Gent, dated 1884, No. 1037, is that apart from the long bed which is one casting, there are a number of attachable units which allow the machine to take larger and more difficult work.