“Description of a Dynamometer, or an Instrument for measuring the Friction on Roads, Railways, Canals, &c.” By Henry Carr, Grad. Inst. C. E.

Dynamo-
meter.

The object of Mr. Carr's modification of the dynamometer is to obviate the irregularity of the common indicator arm, caused by the jerking motion of the tractive power or any inequality of resistance. The instrument consists of a cylinder half filled with mercury, and containing a piston connected with the spring of the dynamometer, so as to be lowered or raised as the tractive power is increased or diminished. Two tubes of glass, connected by a passage with a regulating valve, stand in front of the cylinder, one of them communicating freely with it, and in this tube the mercury is raised or lowered proportionally to the power applied; while in the other, an average of the variations is obtained as the facility of communication between the tubes is increased or diminished by the opening or closing of the stop-valve. The instrument must be graduated by actual experiment, and the results of the average power may be read off from the scales placed behind the tubes. The paper is illustrated by a detailed drawing of the machine.

“An Account of a proposed Suspension Bridge over the Haslar Lake at Portsmouth.” By Andrew Burn, Jun., Grad. Inst. C. E.

Suspension
Bridge
with
Cast-iron
Chains.

The usual calculation for the maximum load on each superficial foot of the platforms of suspension bridges is 70 lbs.; but, as in the event of a crowd of persons assembling the pressure may increase to nearly 100 lbs. per foot, and by the passage of soldiers marching in regular time the strain may be greatly augmented, the projector assumed 200 lbs. per superficial foot as the amount of load to which the platform might be subjected. The peculiar feature of this bridge is the substitution of cast-iron chains for the wrought-iron ones generally used. This deviation from the usual practice is adopted as a measure of economy, and with a view of increasing their stability and durability, cast iron being much less influenced by atmospheric action than wrought iron. Cast-iron beams, when well proportioned, will bear a very considerable tensile strain. As these chains would be proved beyond the weight they are intended to bear, no doubt is entertained by the author of their security. The platform, which is formed of transverse iron girders carrying cast-iron plates $\frac{3}{4}$ of an inch thick, with dovetails falling into holes cast in the girders, is suspended by wrought-iron rods $1\frac{1}{2}$ inch

square from two lines of chain only, as the strain is more easily brought to bear on them than on a greater number of chains. They are trussed laterally to prevent oscillation, and the balustrade is so constructed as to prevent the undulation so prejudicial to suspension bridges generally. To insure a perfect bearing, each pair of links of the chains are in manufacturing cramped together, and the holes bored out to receive the pins which are turned to fit them accurately; they are of a larger size than usual, being 4 inches diameter, and a less number are employed. The piers on which the chains pass are of cast iron, 33 feet high above the level of the roadway.

	Feet.
The extreme length of the bridge is	632
The breadth of the roadway	17½
The clear waterway between the piers	300
The clear headway of the platform above the high water line	18½
Ditto ditto above low water line	33

The tension on the chains is calculated as equal to 991.4143 tons. To sustain this tension, the section of the chains is 256 square inches, and taking 7 tons per square inch as the elastic limit of cast iron, the resistance of the chains will equal 1792 tons, leaving a surplus of 800.6 tons after the calculated strain has been deducted from the real strength of the chains. Three elaborate detailed drawings accompany this paper.

Mr. Smith, of Deenston, explained a new system of Lockage for Canals proposed by him, a model of which he presented to the Institution.

To avoid the present expensive construction of locks and their waste of water, the author proposes to divide the canal into a series of basins, the water levels of which should be from 12 to 18 inches above each other. The extremity of each basin is so contracted as to permit only the free passage of a boat; in this is placed a single gate, hinged to a sill across the bottom, the head pointing at a given angle against the stream, and the lateral faces pressing against rabbets in the masonry. The gate is to be constructed of buoyant materials, or made hollow so as to float and be held up by the pressure of the water in the higher level; on the top is a roller to facilitate the passage of the boats. When a boat is required to pass from a higher to a lower level, the bow end, which must be armed

New
System of
Lockage
for Canals.