CRONSTADT ENGINE.

DIRECTIONS to be observed in adjusting the Engine for Cronstadt to its work*.

1ſt. THE whole of the engine being put together and in place, but the buckets without leathers, and the piſton without wad or ramming, lay 32 cwt. upon the piſton, and try by levers or ſmall tackle, whether the beam, with all its accompaniments, are in balance, that is, whether the reſiſtance to motion be equal both ways; if it be, it is well, if not, put as many of the balancing weights on one or the other of the great beam as ſhall bring the whole to a balance, or indifference to motion either way, there fix the balancing weights and take away the 32 cwt. from the piſton, and the engine when at work will be in proper trim. N. B. It is expected that with full ſteam the engine will go quicker out than in, and if ſo the balance muſt not be altered on that account.

2dly. Take the mean diameter of the valve of the puppet clack or ſafety valve in inches and decimal parts, and multiply it by itſelf, and the integral parts of the product will be the number of pounds, and the decimals the parts of a pound, that is to be the whole weight of the puppet clack with its load; thus, if the puppet clack is $5\frac{1}{2}$ inches, it will require its weight to be $30\frac{1}{4}$ lbs. including the weight of the moving part of the valve itſelf.

3dly. A ſmall cock, ſuch as are uſed for wine or ſpirit caſks, muſt be fixed upon ſome convenient part of the upper ſide of the ſloping ſink or eduction pipe, not only to give air to fill the cylinder when the work is over, but to give a ſmall quantity of air while it is working. On ſetting agoing this cock muſt be ſhut, and the ſnift cock open; when the engine is got ſteadily in motion, diminiſh the ſnift by cloſing its cock till there is not more appearance of ſteam in the whole of one ſtroke, than would amount to the apparent bulk of a hogſhead; when this is done, gradually give vent by the air cock till the beam will but barely come down to the ſprings at the cylinder end when the ſteam is full, and when weak to ſtrike ſhort by about ſix inches.

* This engine being conſtructed in the same manner as that of Chase Water, it would be unnecessary to give the design, it will be sufficient to state the following dimensions, in which alone it differs from the former.

Diameter of the cylinder - - -	5 feet	6 inches
Length of the ſtroke - - - -	8	6

4thly.

4thly. Choose a coal that affords a bright clear flame, such as the splint coal of Scotland. Small coal, approaching to dust, or round, in large pieces, are equally to be avoided; coal, from the size of a sparrow's to that of a hen's egg, answer best in proportion to their weight; feed the fire a little at a time and often, spreading the fuel equally over the grate; it is no matter how few red coals compose the fire.

Keep up the steam so as always to shew a little waste when strong, and as soon as ever the engine is found to fall off from its motion, repeat the feed.

N. B. This engine is expected to go at a mean rate of $9\frac{3}{4}$ strokes in a minute, of $8\frac{1}{2}$ feet each, with $7\frac{1}{2}$ chaldron of coals in twenty-four hours, London measure, of the best quality of Newcastle or of splint coals, which I account for working a fire-engine as equal thereto. This will produce 27,300 tons of water in twenty-four hours to the height of fifty-three feet, and is equal to the labour of 400 horses. But, if the engine goes $9\frac{1}{2}$ strokes in a minute, of eight feet each, this will more than satisfy my proposition to Sir Charles Knowles; that is, to raise 24,300 tons per day to the height of fifty-three feet, with $7\frac{1}{2}$ chaldron, London measure, of the best Newcastle coals, in twenty-four hours. This is an effect considerably greater than that of the largest engine yet built in Britain.

J. SMEATON.

Austhorpe, 1st March, 1775.