

P R E F A C E .

THE first part of this work was published in the beginning of the present year, having been written about a year before. At the time of that publication, the preparation of the subsequent portion of the work, had not been commenced, nor had its preparation and publication been fully determined on, though an intimation of such a purpose, was therein expressed.

Some fifty or sixty copies of the first Essay were circulated among friends, and persons who, it was thought, would feel an interest in the subject, for the purpose of calling attention to a matter on which I had bestowed a considerable amount of study and investigation, and on which I believed myself in possession of some valuable information.

The encouraging reception which that Essay met with from a number of engineers and others of high standing, whose opinions on the subject were worthy of the first consideration, determined me to suspend the distribution of more copies, until I could prepare and publish an additional part, or Essay, going more into practical detail than had been previously done, which it was thought, would add greatly to the utility and value of the work, and render it, in some measure, worthy of the attention of those interested in the subject treated of.

Under these circumstances, the work does not show that unity of design, and uniformity of plan, which would be expected in a work prepared and published all at the same time. But, though this may detract a little from the external appearance of the book, it is believed not to impair its convenience or utility.

It will be seen that the first part is illustrated by wood-cuts, distributed through the body of the work, as nearly as might be to where the figures are respectively described and referred to. It was found not so convenient to carry out the same plan in the second Essay, and therefore, I have obtained lithographic figures to illustrate that part, which are annexed to the end of the work. The figures to the last part are distinguished by numbers continued on from those in the first part; and when reference is made in the last part, to figures in the first, the pages are usually given where such figures will be found.

The numbers of the articles or sections, also, run from the first part to the second, in the same system. By the way, the numbers to articles X.