A TREATISE ON THE STABILITY OF RETAINING WALLS. ELUCIDATED BY ENGRAVINGS AND DIAGRAMS. FIRST PART

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JOHN MURRAY

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Trieste

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BY

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FIRST PART.

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1855.

ADDRESS.

HAVING on many occasions been required to make drawings of Retaining Walls for works brought under my notice as an Engineer, in Canals, Railways, Rivers, and Docks, I have, like others, only had experience to guide me. On referring to the meagre publications in the English language, I found their contents, for the most part, based on theory, with little or nothing practical on the subject. The French authors, who are more numerous, have entered minutely into the former, but have overlooked much appertaining to the latter: the theorems at last, are so complicated, that few engineers attempt to unravel them, and consequently no reliance is placed upon the results.

I have thus been induced to put some observations and notes into the form of a Treatise on the Stability of Retaining Walls. In commencing with simple, and arriving at more complex forms, I have made it my aim to give the principal theories in the easiest manner possible; and to draw conclusions from them applicable to practice. It will be seen how much the one is at variance with the other. If some of these theories be adopted, what a waste of material would be improperly

applied: if practice only be followed, how much money would be spent, on the notion of obtaining strength to the structure, by placing the material where it could not be of the slightest use. In this, as in most instances connected with Physics, the one must be combined with the other. I have deemed it advisable therefore, after investigating the proper method of ascertaining the resistance of Retaining Walls, to give profiles of those constructed by the most eminent engineers of this country, and of the continent, with calculations on the thrust to which each would be exposed, and their resisting power.

Professional duties have unfortunately interrupted my work; and, for the present, I have only had leisure to complete the First Part of the subject. The remainder, connected with Counterforts and Casemated Revetments, as well as examples of walls constructed by English and foreign engineers, must, therefore, form a Second Part; trusting to send it in a short time to the press, and that my labours so far will be of some use to Practical Science.

JOHN MURRAY.

11, Great Queen Street, Westminster,
June, 1855.

THE

STABILITY OF RETAINING WALLS.

CHAPTER I.

ON THE CENTRE OF GRAVITY OF WALLS.

PREVIOUSLY to entering on the subject of the Stability of Retaining Walls, it is necessary to understand in what manner the pressure is applied to them, and how they are able to resist it. A knowledge must therefore first be acquired of the centre of gravity of the pressing power; and then, further, how the position of that point affects differently formed walls.

If a power be applied to a pivot or fulcrum of a given body, and so support it without disturbing the remaining parts, the point acted upon is in the direction of the centre of gravity.

The stability of the body depends upon the position in relation to the base of the line of direction of the centre of gravity. If that line fall within it, the body will stand firm; if on its edge, it is in a state of instability; and if it fall without the base, the body will overturn.

Its stability also depends upon the height of the centre of gravity. If that point be near the base it will remain firm: but if the base be small in reference to the height, causing the centre of gravity to be elevated, a slight force will overthrow it.