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978-1-108-07030-0 - Practical Tunnelling: The Setting Out of the Works, Shaft-Sinking and Heading-Driving,  
Ranging the Lines and Levelling under Ground, Sub-Excavating, Timbering, and the Construction of  
the Brickwork of Tunnels  
Frederick Walter Simms  
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Practical Tunnelling

The engineer and technical writer Frederick Walter Simms (1803–65) ranked as a leading authority on tunnel construction for railways. After working for a time at the Royal Observatory, Simms assisted Henry Robinson Palmer and later Sir William Cubitt on the South Eastern Railway. He was awarded the Telford medal by the Institution of Civil Engineers in 1842 for his articles on tunnelling, and further employment on railways in England and France was followed by engineering consultancies to the East India Company and the London, Chatham and Dover Railway. He gained greatest recognition, however, as the author of authoritative engineering textbooks, notably this work, first published in 1844. Considered the standard textbook on the subject at the time, it sets out the approved practices of the day, using the Bletchingley and Saltwood tunnels, whose construction Simms supervised, as key examples. A number of technical illustrations accompany the text.

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THE WORKS AT BLECHINGLEY TUNNEL.

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*SUB-EXCAVATING, TIMBERING;*  
AND THE CONSTRUCTION OF THE  
BRICKWORK OF TUNNELS:  
WITH THE  
AMOUNT OF LABOUR REQUIRED FOR, AND THE COST OF THE VARIOUS PORTIONS OF THE WORK:  
AS EXEMPLIFIED BY THE PARTICULARS OF  
BLECHINGLEY AND SALTWOOD TUNNELS.

BY  
FREDERICK WALTER SIMMS, F.R.A.S. F.G.S. M.INS.C.E.  
**Civil Engineer.**

Author of a Treatise on the Principal Mathematical Instruments employed in Surveying, Levelling, and Astronomy, &c. &c.

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TO

WILLIAM CUBITT, ESQUIRE,

*F.R.S. M.R.I.A. F.R.A.S. F.G.S.*

VICE-PRESIDENT OF THE INSTITUTION OF CIVIL ENGINEERS,

*&c. &c. &c.*

THIS WORK

UPON

PRACTICAL TUNNELLING

IS MOST RESPECTFULLY

DEDICATED,

BY HIS MOST HUMBLE SERVANT,

FREDERICK WALTER SIMMS.

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P R E F A C E .

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It was originally my intention to have prepared a general history of Tunnelling operations, and to have given every particular that might be thought interesting or instructive of all such works, from the earliest period. Such a work would have necessarily been extensive, and have required more time in its preparation than I could, at present, devote to it. Upon explaining my plan, and shewing the memoranda that I had made, during the progress of the works under my charge at Blechingley and Saltwood Tunnels, I was advised that their publication, with a practical account of Tunnelling operations as practised at the present time, would be acceptable; particularly to the junior members of the profession, and to many contractors, whose experience has not hitherto been in the construction of such works. I therefore undertook the preparation of this volume, which has for the most part been written, and passed through the press, during the time that I have been actively engaged in my professional pursuits; and which must be my excuse for any trifling inaccuracies that may be detected in it.

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## PREFACE.

I do not profess to describe any new methods of carrying on the works necessary for the construction of Tunnels, but to give in detail that which I believe to be the most approved practice at the present time; and in order to accomplish this, and supply data for correctly estimating the cost of future works of the like kind, I have adopted, as my examples, the two important works executed under my superintendence, with the details and cost of which I am necessarily most familiar; and having as is my custom, kept minutes of the amount of labour consumed in the various parts of the work, I am thereby enabled to furnish the particulars contained in the Tables embodied in the following pages.

The prices paid for Materials are likely to differ in every locality, whilst the amount of labour required to execute any work will remain the same; for instance the article Bricks, which cost in the South-Eastern parts of the country from thirty to fifty per cent. more than they can be purchased for in the central parts of the kingdom; not but the amount of labour consumed in their manufacture or the value of that labour, is the same in both districts, or nearly so, yet the difference exists in the greater value of the fuel with which they are burned. The prices of Timber will also vary; and subsequently to the time when the works described in these pages were executed, a large portion of the duty on foreign timber has been taken off, which would make a considerable reduction in the expenditure, if the same works had now to be con-

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structed: the actual cost of the works described may, however, prove useful information.

I am not aware that any part of the *modus operandi* has been omitted; and if it be considered that I have gone more minutely into detail than was necessary, it will, doubtless, at the same time be admitted that the fault is on the right side,—as I do not expect that men experienced in Tunnel works will read these pages in search of instruction; and for those who have not had that experience, too much practical detail cannot be given. There is no royal road to Knowledge, either theoretical or practical; and it is therefore the duty of those who profess to communicate it, to smooth the rugged uphill path thereto, in every possible way. Such a course I have endeavoured to pursue in the preparation of the following pages: — how far I have succeeded must be left for others to judge.

F. W. S.

Hythe, Kent,

August 29th, 1844.

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