

**DESCRIPTION OF A PRACTICAL
AND ECONOMICAL METHOD OF
EXCAVATING GROUND AND
FORMING EMBANKMENTS FOR
RAILWAYS**

Published @ 2017 Trieste Publishing Pty Ltd

ISBN 9780649237326

Description of a Practical and Economical Method of Excavating Ground and forming embankments for railways by W. Brunton

Except for use in any review, the reproduction or utilisation of this work in whole or in part in any form by any electronic, mechanical or other means, now known or hereafter invented, including xerography, photocopying and recording, or in any information storage or retrieval system, is forbidden without the permission of the publisher, Trieste Publishing Pty Ltd, PO Box 1576 Collingwood, Victoria 3066 Australia.

All rights reserved.

Edited by Trieste Publishing Pty Ltd.
Cover @ 2017

This book is sold subject to the condition that it shall not, by way of trade or otherwise, be lent, re-sold, hired out, or otherwise circulated without the publisher's prior consent in any form or binding or cover other than that in which it is published and without a similar condition including this condition being imposed on the subsequent purchaser.

www.triestepublishing.com

W. BRUNTON

**DESCRIPTION OF A PRACTICAL
AND ECONOMICAL METHOD OF
EXCAVATING GROUND AND
FORMING
EMBANKMENTS FOR RAILWAYS**

DESCRIPTION

OF A

PRACTICAL AND ECONOMICAL METHOD

OF

EXCAVATING GROUND

AND

FORMING EMBANKMENTS

FOR

RAILWAYS,

&c.;

WITH

PRACTICAL OBSERVATIONS

ON THE

CONSTRUCTION OF RAILWAYS.

By **W. BRUNTON,**
CIVIL ENGINEER.

LONDON:

JOHN WEALE,
ARCHITECTURAL LIBRARY, 59, HIGH HOLBORN.

1836.

*Palmer
april 1836*

LONDON:
J. S. HODSON, Printer, Cross Street, Hatton Garden.

129426
MAY 21 1909

CSFP
E23

6402575

ON
EXCAVATING GROUND
AND
FORMING EMBANKMENTS
FOR
RAILWAYS,
&c. &c.

FOR several years the subject of railways has constantly been before the public, and there are very few who need to be informed that the cutting and removing of ground in order to obtain straight and level lines, constitute a very large proportion of the expense incurred in the formation of them; whilst the experience of every day is adding more value and importance to these properties, demonstrating the propriety of avoiding, as much as possible, curves and declivities. Any method, therefore, which will lessen the cost of excavating and removing ground becomes more and more desirable.

With the exception of the dredging engine, mechanism has left this subject almost un-

touched, but it is worthy of remark, that by that useful machine ground is excavated even from under twenty feet of water, and delivered into barges, at less cost than it has usually been done for on dry land.

Having been practically engaged in bringing the dredging machine into effective and beneficial operation in the deepening and improving of several harbours, and having had more than an ordinary share of experience in the application of machinery to new purposes, I approach this subject with the confidence of effecting an important public benefit, having invented a system of machinery suited to the purpose, viz., an apparatus to facilitate and improve the excavation of ground and the formation of embankments, for which I have obtained His Majesty's letters patent.

In offering further observations on this subject, I beg leave to notice particularly, that in excavating ground I bring its specific gravity in aid of that operation, and the consequence of this will appear from the following considerations :

Suppose the tenacity of the ground to be - 10

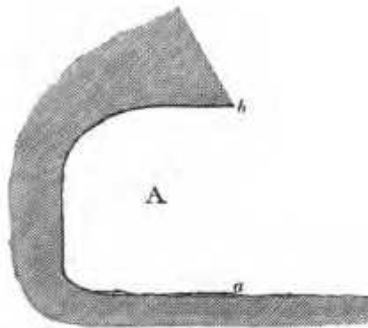
The specific gravity of the same to be - 5

If both are to be overcome they will be

equal to a resistance of - - - 15

But if we can bring the specific gravity of the ground (or its natural weight) to oppose its tenacity, then we have only to overcome a resistance of 5, or $\frac{1}{2}$ of the former as

tenacity	10
sp. gravity	5
	5



To illustrate this more familiarly:—the tenacity and weight are both to be overcome in digging up the bottom of the excavation A at a, whilst in digging down the roof at b, the weight assists in overcoming the tenacity.

This operation may receive yet further illustration by considering the great quantity of ground which a common plough, worked with horses, will disengage in a few hours, and then imagine the effect of a plough if it were worked *across* the face of a piece of ground so steep, that the earth or mould as it is detached would,

by its own gravity, fall away from the plough-share to the bottom; and still further suppose the effect of the plough if it were turned upside down, and cutting the roof of the excavation, where the ground would not only fall or roll away when cut, but would act with all its weight to detach itself; and where, if the adhesion of the ground were only equal to its specific gravity, it would fall away at a touch.*

In the study of this subject I soon found that if mechanism be admitted at all, it will take a wide range, and will claim an application more or less extensive and advantageous in every department of the process of forming railways. For the quantity of earth which an excavating machine, or men working upon this principle upon stages constantly elevated to the work, would displace, rendered it needful to adopt a more expeditious mode of removing it. This accomplished, a better means of depositing the stuff becomes necessary, and the whole made it

* I would beg leave to recommend, as a sort of demonstration of this principle, that a workman be made to excavate a space in the face of a sloping bank, and there let him extend the space upwards by cutting the roof of it, as at *b*, this may be done in a few minutes, and though the workman must necessarily be placed in disadvantageous circumstances with regard to his work, yet a trial of this kind will point out what may be done by a well arranged means of excavating earth upon this principle, and the importance of carrying it into practical operation.

desirable to adopt some efficacious mode of consolidating the embankment as the work proceeds.

The first part of the apparatus referred to, is a machine consisting of a series of cutters fixed to a beam, which, on its being longitudinally moved, urges the cutters into the ground and displaces it, after the same manner as a plough, in which movement the cutter-beam is guided by what I call the guide-frame, which lies upon the face of the cutting, and is moveable in the direction across the line in which the cutters act, in order to bring them into fresh hold with the ground every succeeding stroke. A, A, fig. 1, plate 1.

This guide-frame, A, A, is supported at one end upon a moveable standard B, and is capable of being moved in the direction of its length to suit the nature and shape of the excavation.

On this moveable standard, also, is fixed a vertical spindle and chain barrels, from which, chains, passing over suitable guide-pulleys, and fixed to the cutter-beam, give a reciprocating motion to it.

The other end of the guide-frame is supported upon the face of the cutting, suspended by a chain from a moveable crane, D, fixed upon the surface of the ground at the head of the cutting, by this crane the guide-frame is raised at every