

**PRACTICAL FARM
DRAINAGE; A
MANUAL FOR
FARMER AND STUDENT**

Published @ 2017 Trieste Publishing Pty Ltd

ISBN 9780649677665

Practical Farm Drainage; A Manual for Farmer and Student by Charles Gleason Elliott

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

CHARLES GLEASON ELLIOTT

**PRACTICAL FARM
DRAINAGE; A
MANUAL FOR
FARMER AND STUDENT**

WORKS OF C. G. ELLIOTT, C.E.,

PUBLISHED BY

JOHN WILEY & SONS.

Engineering for Land Drainage.

A manual for laying out and constructing drains for the improvement of agricultural lands. Second Edition, Rewritten. 12mo, xvi+339 pages, 60 figures. Cloth, \$2.00.

Practical Farm Drainage.

A manual for farmer and student. Second Edition, Rewritten. 12mo, ix+188 pages, 46 figures. Cloth, \$1.50.

PRACTICAL FARM DRAINAGE

A MANUAL
FOR FARMER AND STUDENT

BY
CHARLES GLEASON ELLIOTT, C.E.

Member American Society of Civil Engineers; Consulting
Drainage Engineer; Author of "Engineering for
Land Drainage."

SECOND EDITION. REWRITTEN
TOTAL ISSUE THIRD THOUSAND

NEW YORK
JOHN WILEY & SONS
LONDON: CHAPMAN & HALL, LIMITED

1912

27 found in 1884
260562
DEC. 4, 1922
RMP
.EL5
P
.3

5702

P R E F A C E

TWENTY-FIVE years ago "Practical Farm Drainage" was prepared by the author to meet an urgent demand for a simple manual upon the draining of farm lands. At that time the value of under-drainage was only beginning to be appreciated, but soon became recognized as an improvement of great importance in the development of agriculture. The book was cordially received, and the demand for it has been continuous. Now, after an added experience of twenty-five years, during which the author has been closely identified with many and varied drainage projects throughout the United States, he has entirely rewritten the book, bringing it up to date and adding much valuable matter. This new edition he herewith presents for the use of farmers and students. For a more complete discussion of drainage engineering and the larger problems connected with the subject, the reader is referred to the author's work on "Engineering for Land Drainage."

C. G. E.

WASHINGTON, D. C.
April, 1908.

1. The first part of the document discusses the importance of maintaining accurate records of all transactions and activities. It emphasizes that this is crucial for ensuring transparency and accountability in the organization's operations.

2. The second part of the document outlines the various methods and tools used to collect and analyze data. It highlights the need for consistent and reliable data collection processes to support informed decision-making.

3. The third part of the document focuses on the role of technology in enhancing data management and analysis. It discusses how modern software solutions can streamline data collection and provide valuable insights into organizational performance.

4. The fourth part of the document addresses the challenges associated with data management, such as data quality, security, and integration. It provides strategies to overcome these challenges and ensure the integrity and availability of data.

5. The fifth part of the document discusses the importance of data governance and the role of leadership in establishing a strong data culture. It emphasizes that effective data governance is essential for maximizing the value of data and ensuring compliance with relevant regulations.

6. The sixth part of the document concludes by summarizing the key findings and recommendations. It stresses the need for a holistic approach to data management that encompasses all aspects of the organization's data lifecycle.

7. The seventh part of the document provides a detailed overview of the data management framework proposed. It includes a clear definition of the framework's components and how they interrelate to support the organization's data strategy.

8. The eighth part of the document discusses the implementation plan, including the timeline, resources, and responsibilities. It outlines the steps required to successfully roll out the data management framework across the organization.

9. The ninth part of the document addresses the ongoing monitoring and evaluation of the data management framework. It describes how the organization will track progress, identify areas for improvement, and ensure the framework remains effective over time.

10. The tenth part of the document provides a final summary and reiterates the importance of data management in achieving the organization's long-term goals and objectives.

CONTENTS

| | PAGE |
|----------------------------|------|
| PREFACE | iii |
| ILLUSTRATIONS | ix |
| INTRODUCTION | xi |

CHAPTER I

| | |
|--|---|
| SOIL AS RELATED TO DRAINAGE | 1 |
| Structure | 1 |
| Classification | 2 |
| Soil Water | 3 |
| Drainage Properties | 5 |
| Natural Drainage | 7 |

CHAPTER II

| | |
|---|----|
| ARTIFICIAL DRAINAGE | 10 |
| Action of Open Drains | 10 |
| Action of Covered Drains | 12 |
| Lands Requiring Artificial Drainage | 14 |
| Its Effects on the Soil | 16 |
| Practical Benefits | 20 |

CHAPTER III

| | |
|---------------------------------------|----|
| KINDS OF DRAINS | 23 |
| Open Ditches | 23 |
| Covered Drains | 27 |
| Subsoiling | 34 |
| Obstructions in Underdrains | 35 |

CHAPTER IV

| | PAGE |
|-----------------------------------|------|
| DRAINAGE SYSTEMS | 38 |
| Arrangement of Drains | 38 |
| The Outlet | 43 |

CHAPTER V

| | |
|-------------------------------------|----|
| LOCATION OF DRAINS | 46 |
| Preliminary Leveling | 47 |
| Locating the Drains | 48 |

CHAPTER VI

| | |
|--|----|
| WORK WITH THE LEVEL | 58 |
| Leveling Instruments | 58 |
| Leveling | 60 |
| Taking Preliminary Levels | 60 |
| Level Work in Laying out Drains | 62 |
| Computing Grade and Depth | 68 |
| Determining and Adjusting Grades | 72 |

CHAPTER VII

| | |
|--------------------------------------|----|
| DETAILS OF LOCATION | 75 |
| Diversity of Practice | 75 |
| Distance between Drains | 76 |
| Depth of Drains | 77 |
| Size of Drains | 82 |

CHAPTER VIII

| | |
|--|-----|
| CONSTRUCTION OF UNDERDRAINS | 89 |
| Excavating the Ditch | 89 |
| Grading the Bottom | 92 |
| Laying the Tile | 95 |
| Filling the Ditch | 99 |
| Difficulties in Construction | 99 |
| Letting Contracts | 100 |

CHAPTER IX

| | |
|---|------------|
| ACCESSORIES TO UNDERDRAINS | 102 |
| Silt Basins | 102 |
| Surface Inlets | 105 |
| Catch-basins | 108 |
| Protection of Drain Outlets | 109 |

CHAPTER X

| | |
|---|------------|
| RECORDS OF DRAINAGE WORK | 113 |
| Map of Drains | 113 |
| Memorandum of Drains | 120 |

CHAPTER XI

| | |
|-----------------------------------|------------|
| COST OF DRAINAGE | 121 |
| Of Open Ditches | 122 |
| Of Drain Tile | 124 |
| Of Trenching | 127 |
| Of Filling the Trench | 130 |
| Of Accessories | 131 |

CHAPTER XII

| | |
|---|------------|
| ESTIMATING THE PROFIT | 132 |
| From Land Already Under Cultivation | 133 |
| In Drainage of Waste Land | 135 |
| From Drainage of Rented Farms | 135 |
| Additional Profits | 137 |

CHAPTER XIII

| | |
|-----------------------------------|------------|
| COOPERATIVE WORK | 139 |
| By Mutual Agreement | 140 |
| Drainage Districts | 141 |
| Drainage Laws | 142 |
| Assessment of the Costs | 143 |