

**INSTRUCTIONS FOR THE
ANALYSIS
OF SOILS, LIMESTONES,
AND MANURES**

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Instructions for the Analysis of Soils, Limestones, and Manures by James F. W. Johnston

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BY
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a "Oration on Agricultural Chemistry and Geology,"
"The Chemistry of Common Life, &c."

THIRD EDITION



WILLIAM BLACKWOOD AND SONS
EDINBURGH AND LONDON
MDCCLV

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PREFACE TO THE THIRD EDITION.

THIS little work is not intended to compete with treatises on chemical analysis, such as those of Rose and Fresenius, which are the text-books of the accomplished analyst. Originally published as an Appendix to my *Lectures on Agricultural Chemistry and Geology*, it has been much in demand also in a separate form. I have, therefore, given to this third edition a more-widely practical bearing, by including *limestones, clays, ironstones, manures, and natural waters*, among the substances to be analysed. I have briefly explained, also, the principles on which analysis by measure is founded—a method which is susceptible of many simple practical applications. The Instructions are as few and simple as the subject well admits of, and the advancing student will proceed from this little manual to the many larger works which are within his reach.

To the schoolmaster, the farmer, the pharmaceutical chemist and druggist, the youthful student, and to the rural, the training or normal school, and the agricultural laboratory, I offer it as a **FIRST HELP TO PRACTICAL AND ECONOMICAL CHEMICAL ANALYSIS**. Though small in size, it will materially aid them in those chemical investigations which, in connection with agriculture and the arts, are every day becoming more sought for, and more necessary.

With a view to easy reference, I have added a copious Index.

DURHAM, *March* 1855.

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1. The first part of the document discusses the importance of maintaining accurate records of all transactions and activities. It emphasizes that proper record-keeping is essential for transparency and accountability, particularly in the context of public administration and government operations. This section outlines the various methods and tools used to collect, store, and analyze data, ensuring that all information is readily accessible and up-to-date.

2. The second part of the document focuses on the implementation of these record-keeping practices. It details the specific steps involved in setting up a robust system, including the selection of appropriate software, the training of staff, and the establishment of clear protocols for data entry and management. This section also addresses the challenges that may arise during the implementation process and provides strategies to overcome them, such as regular communication and collaboration between different departments.

3. The third part of the document discusses the ongoing maintenance and review of the record-keeping system. It highlights the need for regular audits and evaluations to ensure that the system remains effective and efficient over time. This section also covers the importance of staying updated on the latest technologies and best practices in the field of record management, as well as the role of external consultants in providing expert advice and support.

4. The final part of the document concludes with a summary of the key findings and recommendations. It reiterates the importance of a strong record-keeping system for the success of any organization and provides a clear call to action for all stakeholders involved. The document also includes a list of references and a glossary of terms to facilitate further research and understanding of the subject matter.

INSTRUCTIONS

FOR THE

ANALYSIS OF SOILS, LIMESTONES, MANURES, &c.

CHAPTER I.

PHYSICAL PROPERTIES OF THE SOIL.

Why a soil should be analysed.—Usefulness of knowing the proportions of lime, organic matter, and sand or clay in a soil.—More refined inquiries.—How to select a soil for examination.—To determine the physical properties of a soil; its density, absolute weight, proportions of sand and gravel; its absorbing power; its power of retaining water; rapidity with which it dries; power of absorbing heat from the sun, and rapidity of cooling.—The sandy deserts.

§ I. WHY A SOIL SHOULD BE ANALYSED.

1°. THE benefits to be derived from the chemical examination and analysis of a soil are by many misunderstood. Some have represented it as the only sure guide to successful cultivation; while others have not scrupled to pronounce the analysis of soils to be entirely useless, and unfitted to lead to any profitable practical result. Both of these extreme parties are in error. For while it is often very difficult, from an analysis alone, to explain either the