

**BURIUM OF SOILS; STUDIES
IN SOIL OXIDATION;
CHEMICAL NATURE OF
SOIL ORGANIC MATTER**

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Burium of Soils; Studies in Soil Oxidation; Chemical Nature of Soil Organic Matter by G.H. Failyer & Oswald Schreiner & M.X. Sullivan

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G.H. FAILYER & OSWARD SCHREINER & M.X. SULLIVAN

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Issued August 27, 1910.

U. S. DEPARTMENT OF AGRICULTURE,
BUREAU OF SOILS—BULLETIN NO. 72.
MILTON WHITNEY, Chief.

BARIUM IN SOILS.

BY

G. H. FAILYER.



WASHINGTON:
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1910.

BUREAU OF SOILS.

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LETTER OF TRANSMITTAL.

U. S. DEPARTMENT OF AGRICULTURE,
BUREAU OF SOILS,
Washington, D. C., May 10, 1910.

SIR: I have the honor to transmit herewith the manuscript of an article on Barium in Soils, by G. H. Failyer, of this Bureau, and to recommend that it be published as Bulletin No. 72 of the Bureau of Soils.

Very respectfully,

MILTON WHITNEY,
Chief of Bureau.

HON. JAMES WILSON,
Secretary of Agriculture.

The first part of the document discusses the importance of maintaining accurate records of all transactions. It emphasizes that every entry, no matter how small, should be recorded to ensure the integrity of the financial data. This includes not only sales and purchases but also expenses and income. The document provides a detailed list of items that should be tracked, such as inventory levels, customer orders, and supplier invoices. It also outlines the procedures for recording these transactions, including the use of specific forms and the assignment of responsibilities to different staff members. The second part of the document focuses on the analysis of the recorded data. It describes various methods for identifying trends, such as comparing monthly sales figures and analyzing the impact of seasonal fluctuations. The document also discusses the importance of regular audits to verify the accuracy of the records and to detect any potential discrepancies. Finally, the document concludes with a summary of the key findings and recommendations for improving the record-keeping process. It suggests implementing more robust software solutions and providing additional training for staff to ensure that all transactions are recorded accurately and consistently.

PREFACE.

There has been a marked tendency in the past to confine chemical investigation of the mineral constituents of the soil to those which are popularly recognized as of importance in fertilizer practice. It is coming to be recognized, however, that many elements other than those in the conventional essential plant foods are very widely if not universally distributed in the rocks, the soils, and the plants, and that it is of importance, both theoretically and practically, to trace the relationships between these substances, as shown by the passage of the elements from the rock to the plant, through the soil. Recently a very strong plea for more thorough examinations and complete analyses of rocks has been made from the laboratories of the United States Geological Survey, and a no less strong argument can be made in the case of soils and plants.

It no longer suffices to consider the soil merely as the source of a few mineral elements, needed in plant metabolism. We now know that the presence of a small amount of arsenic in certain animal organisms is essential to their proper functioning, and we also know that arsenic in small quantities is very widely distributed; yet no one thinks of arsenic as an animal food. Similarly we are learning that small amounts of various organic and inorganic substances can, and do, produce marked physiological changes in plants, and that some of these are to be found widely distributed in soils. That we yet know but little as to their theoretical importance and nothing as to their practical importance is no argument that they do not possess the latter.

One of the important lines of work which this Bureau now has in hand is a study of the distribution of the mineral elements (including the so-called rarer elements) and the minerals in the soils of the United States, and one publication (Bul. No. 54, Bureau of Soils) has already been issued. The work reported in the present bulletin, while considered primarily as a further contribution to knowledge in this field of the Bureau's investigations, has had an impetus from

and been guided in part by the interest of the Bureau of Plant Industry in the possibility that the presence of barium in the soils of certain regions might cause some kinds of plants characteristic of these regions to prove poisonous to stock. But the more important result of the investigation is the recognition of the wide distribution of barium throughout the soils of the United States, and the probability that it may be encountered in plants grown in any part of the country.

FRANK K. CAMERON,
In Charge Physical and Chemical Investigations.

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