

# **THE ANALYSIS OF NON-FERROUS ALLOYS**

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The analysis of non-ferrous alloys by Fred Ibbotson & Leslie Aitchison

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**FRED IBBOTSON & LESLIE AITCHISON**

**THE ANALYSIS OF  
NON-FERROUS  
ALLOYS**



**THE CHEMICAL ANALYSIS OF  
STEEL-WORKS MATERIALS**

By **FRED IBBOTSON**, D.Met., B.Sc., F.R.C.Sc.I., F.I.C.

With Diagrams. 8vo.

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AND

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*WITH DIAGRAMS*

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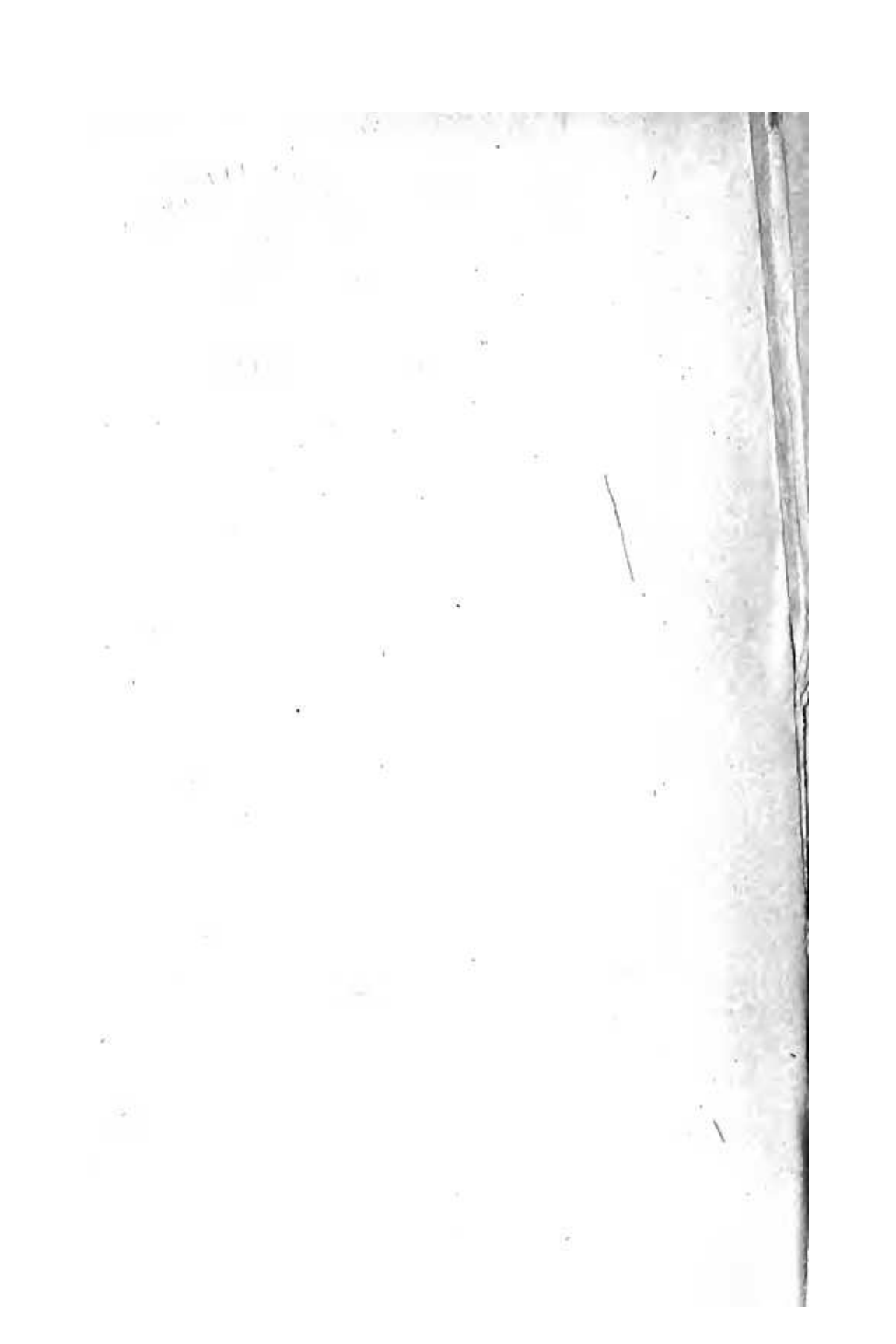
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## PREFACE TO THE SECOND EDITION

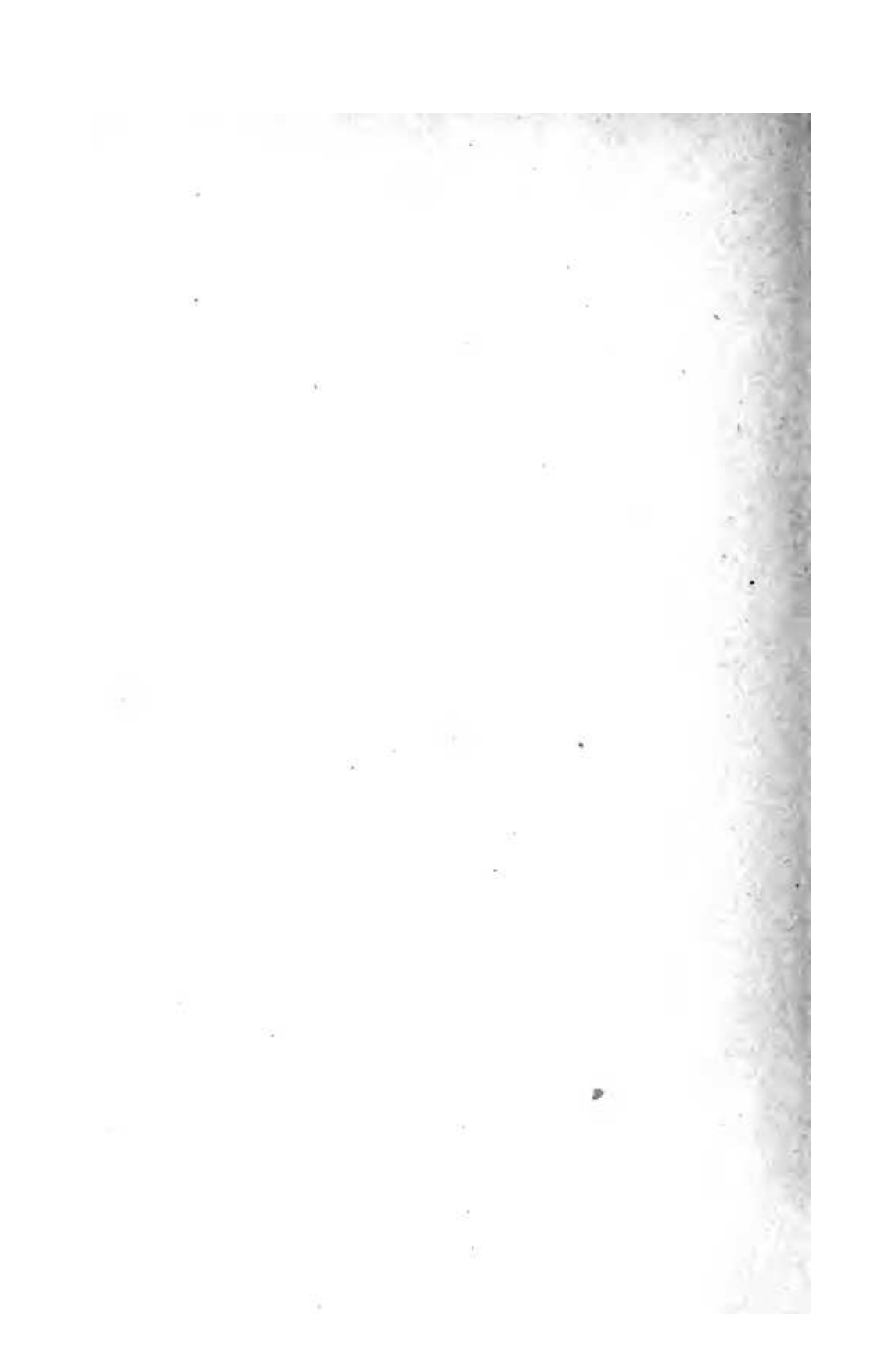
THE first edition of this book was published just as the Great War commenced. The war did a great deal to encourage the accurate control of metals by means of chemical analysis, and the non-ferrous metals and alloys experienced this stimulus to a marked extent. In addition, the war brought to the front many and various alloys which previously had been either unknown or very little used. A notable example of this effect was the greatly extended use of the light alloys of aluminium. Despite this dual development in the field occupied by the non-ferrous alloys, it cannot be said that there was any concomitant development in the methods employed in their analysis. Some methods were brought forward, but the advance was not startling.

The main duty, therefore, of the authors in presenting a new edition is to provide the best analytical methods for those new alloys that have been brought into prominence. They have therefore added to the book methods for the analysis of aluminium and its light alloys, and since the separation of aluminium and zinc presents the most difficult problem in the analysis of such alloys, they have dealt with this separation at some length in a separate chapter. Other alloys which now call for adequate treatment are mainly those of nickel. The principal alloys of this metal are those with copper and those with chromium and iron. Methods for the analysis of all these alloys have been included in this new edition. The other notable additions deal with the determination of the special elements, such as iron or manganese, that are added to the copper-zinc and copper-tin alloys in order to give these alloys mechanical properties of special value.

F. I.  
L. A.

SHEFFIELD, BIRMINGHAM,  
*October 1921.*





## PREFACE

It is probable that a true estimate of the importance and degree of self-realisation of a subject (or branch of a subject) may be found in the literature to which it gives rise. Judging the analytical chemistry of the non-ferrous alloys from this point of view, it may be seen at once that its importance is of very recent growth, and that even now it is very far behind its sister-rival, the chemistry of the ferrous alloys. Fortunately there are abundant signs that the makers and users of non-ferrous alloys are determined to utilise scientific knowledge and progress to a much greater extent than formerly, and the first essential in any of these advances is accurate chemical analysis. This has resulted in the appearance of a large mass of scattered information in the technical and chemical journals. Generally these have had in view two aims—first, accuracy combined with convenience; and secondly, accuracy combined with speed. Anyone who has worked through the analysis of an alloy by the methods outlined in the standard text-books of practical chemistry will realise at once that the time-honoured processes, redolent of unlimited time and sulphuretted hydrogen, fulfil neither of these two conditions. The aim of this book is to bring within the covers of one volume the methods which in the authors' opinion and experience combine as far as possible both these qualifications in the highest degree. A further aim has been to make possible the estimation of one element without the tedious separation from every other element which so often occurs in the older text-books.

In view of the huge number of original papers that have appeared and are still appearing on this subject, this book cannot be more than a milestone on the road to greater accuracy and higher speed. At the same time it will be

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found that the methods recommended are quite fitted to the needs of the works' chemist and at the same time are eminently suitable for use in the laboratories of all institutions whose curriculum embraces the analysis of alloys. In order to meet these two classes of students more thoroughly, the work is so arranged that the metals that are to be met with in the course of the analysis are treated from the point of view of pure solutions or pure substances, and this is followed by a chapter in which all the various alloys are treated separately, when the more suitable methods applicable to these alloys are detailed.

The courtesy of the Council of the Chemical Society in allowing Figs. 14, 15, 16, 17 and 19 to be reproduced from their *Transactions* must be acknowledged gratefully. Fig. 13 is reproduced from the *Chemical News* by kind permission of the editor.

F. I.  
L. A.

METALLURGICAL DEPARTMENT,  
SHEFFIELD UNIVERSITY,  
*July 1914.*