THEORY OF ERRORS AND LEAST SQUARES. A TEXTBOOK FOR COLLEGE STUDENTS AND RESEARCH WORKERS

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Theory of errors and least squares. A textbook for college students and research workers by LeRoy D. Weld

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BY

LEROY D. WELD, M.S.

PROFESSOR OF PHYSICS IN COE COLLEGE

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PREFACE

THERE are few branches of mathematics which have wider applicability to general scientific work than the Theory of Errors, and few mathematical implements which are capable of greater usefulness to the research worker than the Method of Least Squares. Yet, for some reason, students are rarely given opportunity to acquire facility in these lines, the result being that too many of our scientists and engineers go about their work without such equipment. It would be almost impossible to enumerate the variety of ways in which the ideas relating to these subjects adapt themselves to even such simple bits of quantitative work as the chemist or the surveyor is daily called upon to do. And it is difficult for the writer to imagine how an elaborate research in any of the exact sciences can be carried on at all, without the constant application of these principles throughout both the preliminary and the final stages of the work. The satisfaction to be gained from the application of the theory of *precision* alone is well worth all the time necessary to acquire these subjects. Add to this the fact that the

theory of error distribution has direct theoretical bearing upon certain very important laws and problems of physics, chemistry, astronomy, and even of biology, and the reasons for students' having opportunity to attain the elements of the subject become still more emphatic.

This small volume embodies the material used by the writer as lecture notes during the past twelve years. It is intended as a presentation of the Theory of Errors and Least Squares in such a simple and concise form as to be useful, not only as a textbook for undergraduates, but as a handy reference which any research worker can read through in an evening or so and then put into immediate practice.

It will be noticed that the illustrative examples and problems are drawn from various branches of science, suggesting the wide range of possible application. No attempt is made, of course, at an exhaustive treatment in such small compass. Some of the special methods employed by expert computers, often included in larger works, have been purposely omitted. For the convenience of the student, and in order not to interrupt the thread of the subject, a few of the more complicated mathematical discussions have been set apart in the Appendix and referred to at the appropriate places. It is not intended that they shall be omitted from the course when using the book as a text, though the casual reader may get along very well without them.

The writer wishes to express his appreciation to the numerous friends who have kindly given aid by way

of furnishing data for the illustrative examples, or otherwise. Where material has been taken from other works, due credit has been given for the same.

L. D. W.

CEDAR RAPIDS, IOWA,
December, 1915.