

# THE MACTLAC PHYSICAL CHEMISTRY MANUAL

A Cooperative Project of the Midwestern Association  
of Chemistry Teachers in Liberal Arts Colleges

W. C. OELKE, EDITOR

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# REPORT 1962

To all MACTLAC members and associates, but with special reference to those chemistry departments which have become contributing members of this project, appreciation and thanks for your aid and cooperation which have helped to make possible the progress noted in this report. The Editorial Board.

## GENERAL STATEMENT

The purpose of this project is to develop, test, and eventually publish a collection of better experiments for physical chemistry. In 1957 a small group of interested physical chemistry teachers met for a few minutes following the meeting of MACTLAC at Park College. Discussion at Beloit resulted in the election of a steering committee and the formulation of tentative goals. The plans and organization of the project have been developed more fully during a series of open discussions at the Valparaiso, St. Paul, and Mount Vernon meetings. Many details have been worked out by correspondence and especially at meetings of the Editorial Board Dec. 21, 1961 and Sept. 3, 1962.

## THE PLAN

The present plan is to develop a MACTLAC Cooperative Physical Chemistry Laboratory Manual to consist of two parts: 1. Experiment Section and 2. Reference Section.

The experiment section will contain a variety of experiments, some of brief, routine nature, but the majority of the open ended variety with the purpose of stimulating the student to independent effort and research type of experience. A few will probably consist of untried suggestions for the development of apparatus, methods, or short research projects. It must be recognized that this presents something of a dilemma. If experiments are tested and revised until they become relatively free from defects the research angle is in danger of being lost. When does an experiment become routine? Our only answer to this is that many carefully written and tested experiments are needed as starting points for undergraduate class work. Nearly every experiment, however, offers possibilities for variations in apparatus and methods of working, and for extension into unexplored territory. It is hoped that the "suggestions for further work" which will accompany most of the experiments will serve to develop the research approach even to the extent of bypassing much of the original experiment.

Suggestions for experiments embodying completely untried ideas will be clearly labeled as such.

Dr. Zuehlke has recently suggested that several experiments be grouped about a core idea so that each illuminates a different but related aspect of a problem. This appears to be an excellent idea to be explored further.

The reference section will be quite extensive and will follow the outline attached in abbreviated form to this report. Its purpose is to serve as a first source of information in the various areas of methodology, instrumentation, apparatus construction and data handling. Much of this material is of a general nature applicable to a number of experiments or needed as background for exploratory work. It is intended to be broad rather than exhaustive in coverage, although in the more needed areas it should serve as a complete handbook.

### ORGANIZATION

The Cooperative Physical Chemistry Laboratory Manual Project started out as an informal "off the record" effort. The 1960 business meeting of MACTLAC recognized the Project as an official MACTLAC activity.

In 1961 by, action of the group, the position of Editor was established. "The editor (is) to be the Chairman of the Committee and have power to carry out the usual functions as editor and to appoint members to a group known as the Board of Associate Editors".\* Also in 1961 the Editorial Board was authorized to solicit \$10.00 from each of the MACTLAC colleges, having a course in physical chemistry, for the purpose of furthering the project and financing the collection, duplication, and distribution of experiments. The Editorial Board agreed that schools making such contributions became Contributing Members of the project to receive copies of all experiments as they were prepared and released for testing, as well as other mailings. Only these Contributing Members have the right to duplicate experiments for local use. Non-contributors may obtain experiments by paying the per copy cost of duplication and mailing.

The response to this solicitation was most generous and to date 71 of the 105 schools solicited have joined the project. The solicitation was kept within the 7 state MACTLAC area with a few exceptions for cases where previous interest in the project had been shown. Several colleges outside our area have asked to join the project. Others eligible for associate membership in MACTLAC are welcome. The funds of the project are in the charge of the secretary treasurer of MACTLAC.

Regarding publication rights, the policy has been established that organization, writing, and publication rights to the laboratory section shall reside with the Editorial Board and that royalties resulting from its publication shall be paid to the treasurer of MACTLAC. Dr. W. C. Oelke has been authorized to write the reference part of the manual with the collaboration of such co-authors as he can arrange. This group is to retain publication rights to the reference section of the manual and will receive any royalties resulting from this section.

### PRESENT STATUS

The funds made available through the solicitation have been extremely helpful in advancing the project. A better quality of reproduction has been made possible. Limited secretarial help has been obtained. The two, between-meeting, conferences of the Editorial Board mentioned earlier have served to

\*Minutes of 1961 meeting.

coordinate the various phases of the project more closely and to settle many of the problems which have arisen.

In all, fifteen original experiments have been written and distributed, or are in process of distribution. Ten of these have been completed during 1962. At least an equal number are in various stages of development at the present time, either based on ideas as submitted by members or upon "leads" found in the chemical literature. New ideas are constantly needed. If this is to remain a truly cooperative effort, as the Editorial Board hopes, more members must submit experiments, ideas, literature references, etc., for consideration. It is expected that the questionnaire recently sent to the contributing members will uncover new sources of help and cooperation.

The Board of Editors is pleased to announce that contracts have been signed with the D. Van Nostrand Company, Inc. for the publication of both the Laboratory Section and the Reference Section of the manual. No deadline has been set for final submission of manuscripts as both parties realize that a project such as this will be slow in development. Nevertheless, the Board believes that the backing of a major publisher together with the aid, advice, and editorial services which such a company can render should be a tremendous help in bringing this project to successful fruition.

As a secondary result of our negotiations with this company the Board has received the right to revise and use, free of charge, experiments from the two editions of Laboratory Manual of Physical Chemistry by Mack & France, now out of print. At first it would seem that use of some of these experiments would run counter to the aims of the project. Early results from the questionnaire have shown considerable interest among our members in reviving a number of these excellent and in many cases unique experiments. The Board believes that proper revision with modernization and the imparting of a research slant will add valuable resources to our manual. This is not in conflict with our original aim of producing better experiments. Around 30,000 words, or about one-third of the Reference Section was written during Dr. Oelke's Sabbatical leave last semester. Dr. Hakala, is writing Chapter II on Treatment of Data and has about two-thirds of this completed at present. He expects to have it finished by January 1. Persons competent in the areas and interested in collaborating<sup>on</sup> the writing of any one or more of Chapters III, IV, IX, XII, XIV, XVI, XVII (see outline at the end of this report) should contact Dr. Oelke.

No definite plans have yet been made regarding the format in which the two sections of the manual will be published. It is possible that the Reference and Experiment sections will come out in separate bindings allowing frequent revision of the latter as new experiments become available.

In general the project appears to be moving ahead slowly, but with gathering momentum. With continued interest and cooperation from our many members there is strong expectation that a successful publication will result.

Copy of Financial Statement of the MACTLAC Cooperative Physical Chemistry Laboratory Manual Fund as of October 3, 1962.

Fund established at the fall meeting of MACTLAC held at Cornell College on October 27-28, 1961.

Receipts ----- \$720.00

Expenses:

Meeting at Wheaton 12/21/61 -----	61.77
Distribution of experiments	
Hanson, St. Olaf -----	61.56
Distribution of experiments	
Huselton, William Jewell -----	72.78
Miscellaneous expenses	
letter heads, envelopes, stamps ----	38.69
Meeting at Grinnell 9/3/62 -----	<u>102.78</u>

\$343.78

Balance on hand ----- \$376.22

Submitted by

(Signed)

William A. Deskin  
Secretary-Treasurer  
MACTLAC