SCIENTIFIC BOOKS

Introduction to Contemporary Civilization; an Orientation Course for College Students. By WALTER LIBBY. pp. xiii, xix + 272 pp. New York and London, A. A. Knopf.

CHARLES BEARD says that the history of civilization if intelligently conceived may be an instrument of civilization. The book which is before us for review attempts to amplify this statement of Beard's. The book is called "Introduction to Contemporary Civilization" with a sub-title, "An Orientation Course for College Students," and is the first of its kind and therefore a pioneer in a new field of education.

In his preface the author says:

> After having presented the materials of this orientation course to a class of some six hundred freshmen at an institution of higher learning in the United States as well as to a more select group of students in one of the Canadian universities, I am convinced that, through an educational experience roughly comparable to that of a mountain climber, the aspiring youth of the twentieth century (when mechanical devices are doing so much to overcome the obstacles of space and time) should be enabled to transcend the limitations of their special studies and to reach a point of vantage from which to survey, not merely one phase of contemporary life, but a wide range of its interrelated phases. I have, therefore, written this work for college students to give them a synopsis or bird's-eye view of present conditions, to help them find their bearings in the diversified studies of the academic curriculum, to provoke their cooperation in the educational process, and to introduce them to the responsibilities of our complex social life.

Dr. Walter Libby, the author of this timely book, has been a lifelong student of the historical background of modern science and is therefore eminently qualified to present the subject of contemporary civilization, as his experience dictates.

This task of orientating the student is one which colleges and universities have set themselves only recently. Many students come to the universities with their minds clearly made up as to what they wish to prepare for, but have their views considerably modified in the course of a year or so when they discover that they are unable to adapt themselves to the work they have planned to take up as a life profession or that they are more interested in doing something else. Others go to college with the frank statement that they do not know exactly what they wish or to what career they are most suited. It is for the purpose of helping both types of students that orientation lectures are now being given in many of our larger educational institutions. Unlike European systems of education which as a rule offer a very limited field of opportunity to prepare for a life work, our American universities offer such a variety of possibilities that it is a difficult problem to orientate the student according to his abilities and aspiration. An orientation course, to serve a practical purpose, must omit extreme specialization on the one side and too great an overspreading on the other.

Dr. Libby's book is composed of a series of thirty chapters with different subject headings, all treated, however, with the synthetic philosophy with which Dr. Libby surveys the accomplishments of our civilization. Each chapter, to the reviewer, seems too short for a formal history of the particular subject treated, yet each is concisely and forcibly set forth, written with much thought, and is in reality a historical essay. And should one care to carry the investigation further, the extensive and authoritative references at the end of each chapter will assist in the task of amplification. The references in themselves make a valuable bibliography on contemporary thought and in the public or university library are accepted as standard titles on history and culture.

A study of the chapters reveals an immense amount of erudition. The first chapter treats of the idea of concept of progress and shows that civilization and culture develop gradually with the slow growth of human knowledge. The following chapter, "The Development and Occupation," tells how women became the first inventors by necessity. Chapter three relates to the selection of plants and animals and emphasizes the great basic occupation of agriculture (raising of crops and rearing of live stock). The remaining chapters discuss social, economic, educational and international moral problems. The vast subject of scientific progress and the development of scientific associations, as well as technology, is treated critically and in a commendable manner. The author shows that the subjects of fine art, modern drama and religion have an integral part in our human culture. Probably the most practical and suggestive chapters are the two having to do with the psychology of research. Here Dr. Libby shows his mastery of psychology. Scientific students would do well to examine these chapters critically with a view to profiting by the lessons of psychology. A study of the minds of scientific men and their method of arriving at results, expected and unexpected, constitutes one of the interesting phases and romances of the history of science. What are the mental processes involved in scientific discovery? Are they those of creative visual imagination or of stimulation by sympathetic cooperation? At any rate, there is certainly one thing to be understood—a scientist is born and not made.

To the reviewer, the last chapter was of particular interest. Many systems of classification of the

sciences have been set forth, based more or less upon a philosophical concept of the theory of knowledge. The attempt here is to define knowledge in two broad categories—theoretical and practical. Space does not permit a critical discussion of this study of the science of sciences, important as it is from the standpoints of the methodology and history of science.

Dr. Libby evidently recognizes the fact that a good index greatly increases the practical efficiency of a text-book, for his book contains a much larger analytical index than is usually found in books of this size, and its content is as carefully worked out as that of the rest of the volume.

Dr. Libby's book will be also a most inspiring and useful one in the field of adult education and a good guide and source book for purposes of self-education. Therefore college students, laymen and librarians will do well to keep this volume on their shelves.

FREDERICK E. BRASCH
LIBRARY OF CONGRESS

SCIENTIFIC APPARATUS AND LABORATORY METHODS

PRESERVING CERTAIN GREEN ALGAE IN NATURAL COLORS

PERMANENT slide mounts of the green alga Chara made as described below were very instructive. The natural colors of orange, brown and green were preserved as well as a fine sharpness of detail. The preservation of the sexual organs and thallus was better than in material preserved by usual methods. Two species of Chara were used, both heavily encrusted with lime.

The process is a modification of a method published in 1897[1] and in 1921[2] by Dr. A. F. Woods. Deviations from the schedule might be made to suit different materials. Preparations made as described were not injured by long exposure to the brightest sunlight. Thirty per cent. nitric acid did not change the colors for a remarkably long time.

Copper is employed to fix the chlorophyll, forming a light-fast compound very similar in color and shading to natural chlorophyll. Acetic acid removes the lime. A salt of copper is mixed with the acid so that the two processes go on simultaneously. Of several schedules the following was most successful for lime-encrusted Chara.

(1) Soak plants in cool tap water two days to partly remove lime.

(2) Remove air by soaking in cool boiled water or in an aspirator.

(3) Fix about four hours in a solution containing 4 per cent. acetic acid and ½ per cent. C. P. copper acetate (sulphate may be used). Use 50 volumes of solution to one of material. Agitate material occasionally to remove CO_2 bubbles.

(4) Pour off the blue solution and add to it just enough concentrated ammonia to give it a marked purple tint. The purple is due to the formation of complex copper-ammonia ions. Pour the basic solution back on the material and let stand for an hour or until the thallus shows a marked blue-green color.

(5) Wash in tap-water ten minutes. Soak in 50 volumes distilled water for five minutes. Material should now show thallus bluish green, antheridia orange and oogonia brown and green. Transfer to a 5 per cent. glycerine solution in distilled water. If 5 per cent. glycerine causes plasmolysis omit wash in tap water using 5 per cent. glycerine instead.

(6) In order to preserve the orange and brown pigments the following schedule must be rigorously observed. Pieces of smooth glass should be cleaned and the material placed on them in lots of the size desired in the permanent glycerine jelly mounts. Cover each bunch of material with thin glasses. Start artificial evaporation at once. If available use hot sunlight and air. The following was used with success. Slides were placed on an asbestos board and heat projected upon them from a regular electric heater. Adjust so water evaporates steadily but not suddenly from under the cover-glasses; add 5 per cent. or 10 per cent. glycerine as needed. Toward the end more concentrated solutions may be used to advantage. Occasional examination should be made to guard against plasmolysis or swelling. Practice is necessary. Not more than ten or twelve hours should be employed in evaporation if the orange and brown are to be preserved.

(7) When nearly the consistency of pure glycerine, remove the glasses and mount on clean new slides in Kaiser's gelatin. Allow to harden for at least a week before sealing two or three times with balsam. The formula for Kaiser's gelatin may be obtained from Lee's "Microtomist's Vade-Mecum" or other text of histology.

The method outlined above is difficult but it is possible to make some beautiful preparations. It is a modification of an old process employing well-known principles. Such a procedure has been applied to plants other than the algae with success.

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[1] A. F. Woods, "Method of Preserving the Green Color of Plants for Exhibition Purposes," *Bot. Gaz.*, 24: 206, 1897.

[2] A. F. Woods, "Preserving the Green Color of Algae, Protonema, etc.," *Quar. Jour. Mic. Science*, 14: 225–228, 1921.