

more clearly than would actual photomicrographs of the fibers themselves; the only criticism that can be offered is that such drawings are apt to be more or less idealized, or rather conventionalized, with the result that unless a person is thoroughly familiar with just what features are to be observed under the microscope, he would experience difficulty in many cases in identifying some of the fibers drawn by Höhnel. Another criticism to be offered is that though Höhnel's book is eminently scientific and must always occupy a high place in the literature of the subject, the technical or practical side of the matter is rather badly neglected, which is rather disappointing in a book purporting to deal with the "technically applied" fibers. To the scientist or advanced student interested in the subject the present volume is what may be termed a valued "classic," but to the purely technical student and the one to whom the volume should make the greatest appeal and be of the greatest utility, Höhnel's book, we fear will be too highly theoretical for practical use.

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A SYSTEMATIC COURSE OF PRACTICAL ORGANIC CHEMISTRY. By LIONEL GUY RADCLIFFE and FRANK STURDY SINNATT. London: Longmans, Green & Co. 1905. xi+264 pp. Price, \$1.40.

The systematic course (96 pages) begins with methods for the detection of the various elements present in organic compounds; the determination of melting-point, boiling-point, and specific gravity; the purification of organic substances (crystallization and sublimation); and the determination of molecular and equivalent weights. This introductory portion (22 pages) is followed by detailed descriptions of the preparation of various typical organic compounds, accompanied by numerous experiments illustrating their characteristic reactions. These preparations and experiments are so arranged as to follow along with the lectures on the theoretical side of the subject, and can all be completed by a student "working five hours per week" (presumably during one academic year).

Following the systematic course, comes a special part for advanced students (140 pages), 50 pages of which are devoted to "Qualitative Organic Analysis Required for the Board of Education Examination, Stage II." This portion is inserted for the benefit of students preparing for these particular examinations,

and the authors themselves are not very enthusiastic about it, for they explain that they "are quite sensible of the fact that the analysis of such mixtures cannot be regarded as useful practical organic chemistry." Then come a number of additional preparations, methods for determining vapor density, the ebullioscopic and cryoscopic methods of establishing molecular weights, ultimate analyses, alkaloidal reagents, and so forth.

All illustrations are purposely omitted. The students design their own apparatus, or a model of the apparatus is set up by the instructor. It is no doubt a good plan to encourage beginners to design their own apparatus, but there seems to be no good reason (aside possibly from the slight additional expense) why the apparatus which the assistant is supposed to set up as a model should not be figured.

Reaction equations are likewise left out, the student being expected to look them up for himself.

Too many of the tests appended to the various preparations apply only to the individual compound, and are not in any sense group reactions. In those cases where the chemistry of the change is but imperfectly understood, as with many of the color and pyrogenetic reactions, the educational value of the test is but slight. Such tests are all well enough for analytical purposes, but are rarely of much assistance in understanding the theoretical side of the subject. The fundamental theoretical considerations upon which the preparations and reactions are based should be brought out much more clearly, including fuller explanations of the origin of the various by-products and the way in which they are removed. Greater stress should be laid upon the purification of the crude products. Failure to emphasize this point is apt to encourage careless and slovenly work.

Errors of various kinds are numerous. Incorrect statements are few, mistakes due to careless proof-reading are frequent. In the former category would fall the statement (on page 142) that the action of bromine water upon salicylic acid gives a precipitate of *tribromsalicylic acid*, whereas the product is really tribromphenol bromide. Among the errors due to careless proof-reading are many which are confusing and misleading. There is space here to mention but few of these. On page 32, a solution containing *ethyl* alcohol is oxidized and the oxidation product tested for *formic* acid. On page 182, in the preparation of ethyl nitrate, a

misplaced comma is responsible for the statement that "when nitric acid alone is used, the acid oxidizes, some of the alcohol being itself reduced to nitrous acid." On page 184, *evolution* appears instead of *solution*. On page 194, in describing the preparation of quinoline, the student is told that, after the first stage of the reaction has been induced by gentle warming, "the flame must then be *renewed*." Such a misprint may lead to serious results, as this reaction is one which often proceeds with explosive violence even when the flame is *removed*. On page 196, in describing the synthesis of succinic acid, a wandering semicolon causes it to appear that "ethylene dibromide is boiled with potassium cyanide, and ethylene dicyanide is formed on hydrolysis." On page 218, line 5 from the top, the omission of "not" completely reverses what the authors intended to say. In other cases, the language is anything but clear. Take, for example, the following test for albumin (page 204): "Strong nitric acid yields a white precipitate, which on boiling becomes yellow, and after cooling the addition of ammonia becomes darker (orange)."

The selection of preparations is also open to criticism. The preparation and handling of hydrogen cyanide, for example, is too dangerous for any but experienced hands. A disproportionate amount of space is allotted to the alkaloids.

The book is evidently prepared mainly for the chemical students in the Manchester Municipal School of Technology, to be used only under the supervision of the demonstrator, to whom the student is constantly referred for further information and advice, and without whose assistance the book would be of but little service.

It is printed on one side of the paper only, so that the actual number of pages of text is but half that given. The blank side of the page is for the student to record reactions, observations, and so forth; but, as he is supposed to keep a note-book also, the need of the blank pages is not obvious. The size of the volume is further increased by the inclusion of a 48-page list of books for sale by the publishers.

The book contains many good features and, with the changes above suggested, should prove useful.

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