the academic costume worth paying $35 to $95 for?" I would quickly answer "No." Considering it desirable to provide myself with a doctor's gown and hood, I purchased the silk and velvet trimming by the yard, and got a dressmaker to make the gown after the pattern of one owned by a friend. As a result I have a first-class gown of the best material, and the cost was about half the regular price of a similar gown ready made.

J.

SCIENTIFIC BOOKS

Michigan Bird Life, a List of the Bird Species known to Occur in the State Together With an Outline of their Classification and an Account of the Life History of Each Species, with Special Reference to its Relation to Agriculture. With seventy-five full page plates and one hundred and fifty-two text figures. By Walter Bradford Barrows, S.B., Professor of Zoology and Physiology and Curator of the General Museum. Special Bulletin of the Department of Zoology and Physiology of the Michigan Agriculture College. Published by the Michigan Agricultural College. 1912. 8vo. Pp. xiv + 822, 70 half-tone plates and 152 text figures.

The purpose and general character of the present work are stated by the author to be to provide an authoritative list of the birds of Michigan, with such additional information respecting them as would be useful and of interest not only to the nature lover and general reader, but to students and teachers. In a work originating with and published by a State Agricultural College, it is eminently proper that special attention should be given to the economic status of the species in relation to man's interests, yet it is recognized that each has "a scientific, an esthetic, a human value, which can not be estimated in dollars and cents," and which should forever protect it "from extreme persecution, and above all from final extinction."

An introduction of nearly thirty pages deals with the physiographic and climatic features of the state, the distribution of its plant and animal life, and especially its bird life with reference to the different areas characterized by special conditions of environment, as prairies, marshes and pine and hardwood forests. The subject "how to study birds" is discussed at some length, and with intelligence and fairness, the conclusion being that field-glass records of rare species by amateurs should not be relied upon as satisfactory evidences of occurrence. Where there is any improbability of a bird being at a given time and place, the record should "rest upon an actual specimen taken at that locality and either preserved for the examination of any one interested or at least examined and identified by a competent authority before being destroyed."

Nearly ten pages are given to the subject of migration, which includes not only comment on the migratory movements of birds in Michigan, but a summary of recent progress in knowledge of bird migration, remarks on the rapidity of flight in birds, and on the disasters known to overtake birds in migration, by which thousands upon thousands lose their lives through adverse weather conditions, so that large areas become nearly depopulated of certain species. Attention is also called to recent changes in the bird life of Michigan through deforestation of large portions of the state, the draining of marshes, etc., and the consequent increase or decrease of certain species.

The main text of the work treats, in systematic sequence, of the 326 species of birds known to occur in the state, with keys to the species and higher groups, a liberal amount of biographical matter, followed by diagnoses in small type. The life histories are especially full, with often somewhat extended discussion of the economic relations of the species to agriculture, for which the author is especially fitted by his twenty-five years of study of the complex relations of birds to insects and crops as a specialist in this field, first under the United States Department of Agriculture and later at Michigan Agricultural College. A "hypothetical list" of 62 species of birds that have been attributed to Michigan by previous

authors, but whose occurrence there is doubtful, is given in an appendix, where the alleged claims of each to a place in the Michigan fauna are set forth. A bibliography of some twenty-five closely printed pages, a glossary of technical terms, a list of contributors to the work, and an index round out the volume, which will take its place among the best of the state ornithological manuals.

J. A. A.

A School Chemistry. By F. R. L. WILSON, M.A., Assistant Master at Charterhouse, and G. W. HEDLEY, M.A., Head Science Master, Military and Civil Side Cheltenham College. Oxford, H. Frowde. 1912.

This work has been prepared to supply a demand for a shorter course than the author's "Elementary Chemistry." One who has completed the work in a satisfactory manner is prepared to take the matriculation examinations for a number of English universities. The directions for work are very full and the selection and arrangement of experiments are excellent. Wherever possible the experiments are carried out quantitatively and questions and problems are introduced at the end of each chapter. The use of this book by a student should develop his powers of observation and scientific method of reasoning and give him a good insight into the fundamental principles of chemistry.

J. E. G.

Practical Chemistry for Engineering Students. By A. J. HALE, B.Sc. (London), with an introductory note by Professor R. MELDOLA. London, Longmans, Green & Co. 1912. $1.00 net.

In the introductory note attention is called to the fact that while chemistry is recognized as necessary for engineering students, owing to the short time at their disposal for this subject and the lack of appreciation of its value by the students themselves, the course in this subject must be so arranged as to give as much as possible in a short time. In order to get some training in quantitative analysis they must know some general chemistry and qualitative analysis. Although this book is intended primarily for engineering students it is possible, by the selection of certain designated experiments, to use it in connection with a course in the chemistry of building materials. The experiments in general chemistry are well selected to bring out the general principles of the subject, and the experiments are arranged in such a manner as will bring out the quantitative relations whenever possible. This is followed by a short course on qualitative analysis and work in quantitative analysis, the latter being selected to give practise in the preparation of standard solutions, gravimetric and volumetric determinations and methods of analysis of materials of special importance for the engineer, such as water analysis, determinations of the value of fuel, furnace gases, analysis of cements and alloys. While the general method here used would be approved by most chemists, the necessarily limited number of quantitative methods which can be given would no doubt lead to a wide divergence of opinion as to the ones best suited for the purpose.

J. E. G.

Review Questions and Problems in Chemistry. By M. S. H. UNGER, A.M., Head Master, St. John's School, Manlius, N. Y. Ginn & Co. 50 cents.

An excellent manual for use in reviewing classes or formulating examination questions in preparatory school work, covering as it does all the material necessary for college entrance or college board examinations.

J. E. G.

SPECIAL ARTICLES

THE TEMPERATURE COEFFICIENT OF THE COAGULATION CAUSED BY ULTRAVIOLET LIGHT

IT has been pointed out in a previous paper[1] that certain proteins coagulate when exposed to ultraviolet light. In order to learn something about the nature of this reaction it seemed desirable to investigate its temperature coefficient. As photochemical reactions in general are nearly independent of tempera-

[1] SCIENCE, N. S., 37: 24–25, 1913.