of organic life—or at least of plant life—in the polymerization of the carbohydrates."

Lieutenant Bernadou seems to misconceive the meaning and value of graphic formulæ, for while chemists hold that they are simply convenient conventional methods for expressing the ascertained facts of chemistry, and true only to the extent that they express those facts, Lieutenant Bernadou appears to regard them as original sources of information.

The useful portions of this book are the translations of the papers of Vieille and of Bruley on the Nitration of Cotton, and that of Mendeléef on Pyrocollodion Smokeless Powder, though the value of the last is lessened by the omission of all reference to the source from which it is drawn, especially as the author states in the preface that these are only 'translations of certain portions of their works on explosives.' It should be understood that while translations are a convenience, one who differs from an author should not rely upon a translation, but should first consult the original publication before expressing this difference, and the translator should be willing to have this comparison of his translation readily made by giving his sources.

The record of the results of a few experiments on the solubility of cellulose nitrates at low temperatures in continuation of the work of McNab is interesting. If Lieutenant Bernadou had but multiplied these experiments and reported them in a simple manner he would have produced something more useful to mankind than the speculative essay he has chosen to present. CHARLES E. MUNROE.

Select Methods of Food Analysis. By HENRY LEFFMANN and WM. BEAM. Philadelphia, Pa., Blakiston's Son & Co.

It is stated by the authors that "this book is intended to be a concise summary of analytic methods adapted to the needs of both practicing analysts and advanced students in applied chemistry."

The first part of the work, pages up to 68, is occupied with a brief description of the principal analytic methods employed, including spectroscopy, microscopy, polarimetry, methods of determining melting and boiling points and other general operations.

In the part given to applied analyses, comprising the rest of the book, are articles devoted to general methods for the examination of poisonous metals, colors and preservatives, while under special methods are treated the processes for determining carbohydrates, fats and oils, milk and milk products, tea, coffee and cocoa, condiments and spices, alcoholic beverages and flesh foods.

An appendix contains tables of specific gravities of water, conversion tables for thermometric degrees, tables of elements, symbols, and atomic weights, and plates showing the structure of tea leaves and starches.

In regard to the analytical methods the authors say: "The bulletins of the United States Department of Agriculture (Bureau of Chemistry) and of the Association of Official Agricultural Chemists are now nearly all out of print and scarce. The present work contains a large amount of the data and processes given in those publications, together with data from reports of some of the State agricultural experiment stations."

In addition to this general acknowledgment, the articles copied directly from the above publications are credited in the text in most cases. The authors have reproduced the plates of tea leaves and starch granules of the Bureau of Chemistry, of the Department of Agriculture, stating that the originals in many cases have been retouched by Dr. Beam.

The work is illustrated with 53 figures in addition to the plates of leaves.

This work will prove of great help to analysts who do not have access to the literature of the subject or who have not the time to make their own investigations thereof. The matter is well arranged and classified and in convenient form for reference. H. W. WILEY.

The History of Medicine in the United States, etc., to the Year 1800. By FRANCIS RANDOLPH PACKARD, M.D. J. B. Lippincott Co., Philadelphia. 1901. 8vo. Pp. 542. Illustrated.

The difficulties to be encountered in writing a history of early medicine in America have hitherto deterred authors from attempting this really herculean task, and it is not surprising, therefore, that we find Dr. Packard, in this hitherto untrodden field, claiming for his work

rather the rôle of a series of essays and compilations than of a continuous historical work. The thirteen original colonies were so scattered, so remote from and so independent of each other, that each formed a community to itself, and any attempt at a general history must deal largely and directly with these separate centers. A vast amount of research must therefore be made into records, many still in manuscript, from New Hampshire to Georgia, and this would take more time and means than medical historians—whose work must always be largely, as Dr. Packard says, a labor of love—can give. It is an encouraging circumstance that these records are gradually being made known through individual research, as evidenced by papers appearing from time to time in the journals and even by more pretentious works; and the time is probably not far distant when sufficient material will be at hand for a comprehensive historical work. But even now we can hardly feel that Dr. Packard has exhausted all readily available sources of information. In the writer's own community for example he has entirely overlooked such sources that are at his very elbow in the library of the College of Physicians and Surgeons of Philadelphia. And it is in no invidious spirit that we are led to remark that whilst Philadelphia was the chief medical metropolis of the colonies, there were other medical centers even then, and even in rural sections there were physicians of wide repute and influence whose names and records cannot be omitted from such a work. The South particularly furnished many such men educated abroad and endowed with all the learning of their day. An item of page 156 of Dr. Pepper's work would seem indeed to indicate that the physicians of the Middle and Southern States had better training than those of New England. It is there stated that of the 63 Americans who graduated in medicine at the University of Edinburgh between the years 1758 and 1788, *but one* came from the New England colonies. When we recall that Edinburgh was the chief place of resort for medical students going abroad, and that a large proportion of the 63 came from Southern States, it seems strange that this section should be comparatively so ignored by Dr. Packard. Take the state of Maryland, for example, one of the oldest and most important of the thirteen colonies. I find in the list of authorities 'chiefly consulted' by Dr. P., 67 in number, but *one* from Maryland, viz., 'McSherry's History of Maryland.' And in the 16 pages of index there are *but 13* references bearing in any way upon this state and its doctors. It would be easy to show that Maryland does not deserve this slight.

There are several errors and omissions to be noted, but we have only space for the following: At pages 11 and 12 Mr. Pratt is appointed surgeon to the plantation in 1682 and perishes in a shipwreck in 1645 (!). At page 90 vaccination is said to have been announced by Jenner in 1779. At page 432 inoculation is said to have been 'introduced' in 1712. In the copy of Dr. John Archer's diploma, the first conferred in America, page 161, there are several inexcusable errors, in one place nearly a whole line being omitted. At page 62 it is stated that the first recorded autopsy in America occurred in 1674, whereas several recorded in Maryland preceded this by about thirty years. We also know of at least two medical societies not included in the 17 stated to have existed prior to 1800. These facts could have easily been ascertained by Dr. Packard. At page 36, it is said the degree of M.D. was conferred at the University of Aberdeen in 1650, which we feel sure is a mistake. The omissions, as we have noted, are many, but surely the author should have referred to Drs. Henry Stevenson, James Smith and Gustavus Brown, of Maryland, the first maintaining for many years the only inoculating hospital in America, the second doing more perhaps for the introduction of vaccination over the United States than any other person whomsoever, the third, besides eminence in other respects, having the distinction of being called in consultation in the last illness of George Washington.

Dr. Packard has given full and graphic descriptions of the yellow fever epidemics in Philadelphia and has thrown much light on the medical development of the continental army during the Revolution. In an interesting account of the introduction of anæsthesia, he gives due credit for the discovery to Dr. Craw-

ford Long, of Georgia, who first used sulphuric ether to produce unconsciousness in surgical operations in 1842, four years before its use at the Massachusetts General Hospital.

In conclusion, if in our rôle as critic and reviewer we have said anything to make the reader think ill of Dr. Packard's book, we desire now to take it all back and to assure him that it is a most interesting and valuable contribution to American history and literature.

E. F. C.

SCIENTIFIC JOURNALS AND ARTICLES.

THE *Botanical Gazette* for October contains the following papers: F. L. Stevens publishes the third and last part of his paper entitled, 'Gametogenesis and Fertilization in *Albugo*.' A multiple fertilization was unknown before its discovery by the author in *Albugo Bliti*, the only species of *Albugo* previously investigated exhibiting simple fertilization. The present paper includes *A. Portulacæ*, *A. Tragopogonis* and a reinvestigation of *A. candida*, and shows that these species, together with *A. Bliti*, form a series differing in the prominence of the 'receptive papilla,' the development of the cœnocentrum, and in the functional egg nuclei. The conclusion is reached that the primitive forms were multinucleate, and that the uninucleate condition is a derived one. It its ontogeny *A. Tragopogonis* indicates this, its oosphere in early stages being multinucleate, and later becoming uninucleate by degeneration of supernumerary nuclei. The cœnocentrum, an organ of hitherto unknown function, is shown to serve in the nutrition of the surviving female nucleus. Many conditions are noted which tend to confirm Strasburger's theory regarding kinoplasm and its relation to sexual differentiation.

W. L. Bray completes his paper on 'The Ecological Relations of the Vegetation of Western Texas.' It is a general discussion and analysis of this interesting field, and is designed primarily to form the basis of a detailed botanical survey of the State. The author considers at some length the relation of the vegetation to the climatic factors of temperature, moisture, winds and sunlight; and to the so-called edaphic factors of physiography, soil structure and other geological phenomena. The greater part of the paper, however, is given to a discussion of the plant formations of the region under the following general heads: (1) Grass formations; (2) woody formations, including numerous types of arborescent and chaparral formations; (3) water storage formations; (4) formations of cryptogamous xerophytes; and (5) halophytic plants. The following propositions summarize the main features of the discussion: (1) The climatic conditions conspire to make the west Texas region a typical 'grass plains country'; (2) in its temperature relations the vegetation ranges from the tropical to the transition zones; (3) the region is marked by several climatic types which are enumerated; (4) the original formations are undergoing profound changes due to human agencies, the tendency being to break up the grass formations and to permit the encroachment of woody vegetation; but areas of arborescent vegetation are being denuded of valuable timber, thus forcing the question of water supply and control of floods.

Mr. James B. Dandeno points out the confused usage of physiologists in designating the solutions with which they have worked. The term 'normal solution' has been used by some for solutions containing a gram equivalent per liter of solution, by others for those containing a gram equivalent per liter of water, and by still others for gram molecule per liter solution. After defining these three carefully and calling attention to the usage of chemists, he cites examples of confused usage by physiologists, and urges that care be taken to distinguish between different sorts of solutions and to avoid misuse of the term 'normal.'

Mr. Burton E. Livingston adds to his previous contribution on the same subject an account of several lines of experimentation, which extend his previous results and confirm his conclusions already expressed. In the new experiments upon *Stigeoclonium tenue* he has used solutions of non-electrolytes (in this case sugars), and also solutions containing both sugar and mineral salts; further, he has cultivated these plants on porous plates, in gelatin, in darkness, and under conditions where evaporation would concentrate solutions. He finds in all cases that osmotic pressure is the deter-