

4. Laboratory tests on albino rats, guinea pigs and chicks show that levulinic acid is nontoxic to these animals when fed to the extent of 5% of the food intake.

5. These preliminary studies suggest that levulinic acid in small amounts may be used safely to acidulate foods or beverages.

We wish to express our appreciation to G. E. Gage, Head of the Department of Physiology of the Massachusetts State College, for aid in interpreting the data and to C. W. Truehart, Medical Technologist of the Northampton State Hospital, for performing the clinical laboratory tests.

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Nomenclature Confusion in the Case of the Balsam Poplar or Tacamahac*†

By Kenneth Redman‡

Populus balsamifera Linné was the binomial invariably applied to the Balsam Poplar or Tacamahac until Farwell (1) took exception to the name in 1919, and said that "the binomial. . . belongs to the Carolina Poplar, as usually understood. . . ." The confusion in the literature regarding the taxonomical status of these poplars following Farwell's article seems to be due in part, at least, to Linné's error in botanical synonyms for *P. balsamifera* in his "Species Plantarum" (2). In this connection, Farwell (3) has pointed out that the technical description of Linné is from the "Hortus Cliffortianus" (4), and that ". . . reference to the latter publication shows that species No. 4, *Populus foliis cordatis crenatis*, is the one referred to. This is founded solely on *Populus nigra, folio maximo, gemmis balsamum odoratissimum fundentibus* Catesby (5), . . . a Carolina species. There is therefore no question . . . that the binomial

Populus balsamifera belongs to the Carolina Poplar, as usually understood, since in the last analysis the Linnæan species is founded upon that of Catesby."

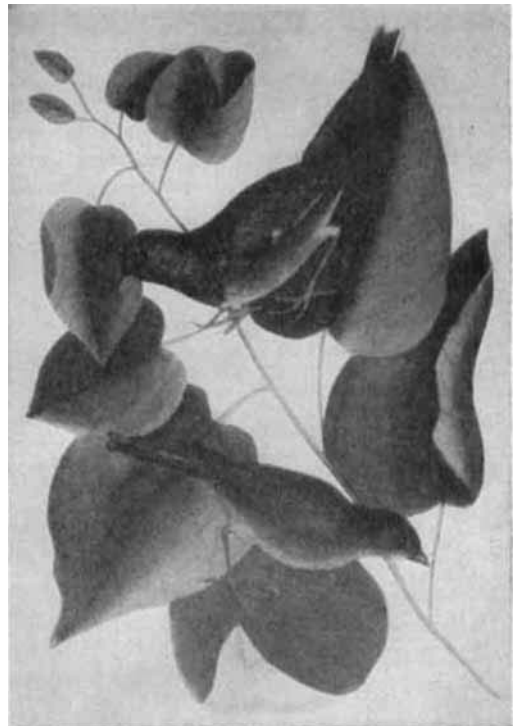


Fig. 1.—Catesby, M., "The Natural History of Carolina, Florida and the Bahama Islands," 1731, t. 34.

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Sargent (6) accepted Farwell's view after examining a photograph of Catesby's specimen (Fig. 1) from which his figure was made. Wiegand and Eames (7) and Stout (8) also accept this view.

House (9) comments on Catesby's citation as follows: "The reference of Catesby which Sargent picks as the type of *Populus balsamifera* Linné is the third citation given by Linnæus. . . . The first citation from the 'Hortus Cliffortianus' is positively referable to our northern poplar, it is the tree known to Linnæus. . . ." House (10), however, considered that Linné erred in referring Catesby's plate to *P. balsamifera*, but does not think this is sufficient reason "to reject the Linnean name for the northern poplar or to connect the name 'balsamifera' with a tree of such doubtful specific value as possessed by *P. angulata* Michx. f. (considered as a botanical synonym for the Northern Balsam Poplar by Sargent (11))." It is true, as House claims, that Catesby's reference (12) which Sargent (13) and Farwell (14) pick as the type of *P. balsamifera* Linné is the third citation given by Linné in his "Species Plantarum" (15), but it has already been shown that Farwell pointed out that the technical description of Linné is referable to Catesby's description. This is also shown by the fact that the citation in the "Species Plantarum" (16) to Royen (17) refers to "POPULUS foliis cordatis crenatis" in the "Hortus Cliffortianus" (18). Also, Royen (19) gives the citation of Catesby (20), *Populus nigra, folio maximo, gemmis Balsamum odoratissimum fundentibus*, as a botanical synonym.

It is not entirely clear what House (21) meant by the words ". . . the first citation from the 'Hortus Cliffortianus' is positively referable to our northern poplar. . . ." If we place a comma after *citation*, the "Species Plantarum" (22) is referred to, which fits in nicely with reference to the "third citation" (23), but if we interpret the wording literally, the "first citation" could either refer to the primary citation under species No. 4, or to species No. 1 of the "Hortus Cliffortianus" (24). Since the last two possibilities have already been dis-

cussed, species No. 1 of the "Hortus Cliffortianus" (25) remains for consideration. "1. POPULUS foliis subrotundis dentato-angulatis: subtus tomentosus (;) *Populus alba*. Dod. Dalech. hist. 87. (;) *Populus alba* Leuce. Bauh. hist. (;) *Populus alba* vulgo Albarus. Caes. Syst. 120. (;) *Populus alba*, majoribus foliis. Bauhin pin. 429. Boerh. (;) *Populus alba*, minoribus foliis. C. B. 42 lugdb. 2, p. 211."

Here it may readily be seen that Linné's descriptive name in the first citation clearly describes the leaf of *Populus alba*. In addition, all of the remaining citations have *alba* for what we now recognize as the specific name. Further, the fifth citation, *Populus alba, majoribus foliis* Bauhin (26), is referred by Miller (27) to the White Poplar or *Abele-tree*. Thus it appears that House's exception to Sargent's (and Farwell's) view that the binomial *Populus balsamifera* Linné belongs to the Carolina Poplar is not valid.

The first botanical synonym for *Populus balsamifera* in the "Species Plantarum" (28) "Populus foliis cordatis crenatis basi nudis: petiolis teretibus," Wachendorff (29), has not been commented on in the literature consulted, but reference to this citation (Fig. 2) shows that "POPULUS foliis cordatis, crenatis" in the "Hortus Cliffortianus" (30) is given as a botanical synonym, which has already been discussed.

The fourth citation under *Populus balsamifera* Linné in the "Species Plantarum" (31), "Populus foliis ovatis acutis serratis," Gmelin (32), is taken as the type for *P. balsamifera* by Sudworth (33) when he says "Gmelin's plate 33, cited by Linnæus, clearly represents the foliage of our balsam poplar and in no way the deltoid foliage of our eastern cotton-wood. The writer is, therefore, here retaining *Populus balsamifera* Linné for the balsam poplar."

Upon inspecting Gmelin's "Flora Siberica" (34), we find he refers his "Populus foliis ovatis, acutis serratis" to "Populus foliis cordatis crenatis" Linné (35), and "Populo simili arbori resinosa, altera" Bauhin (36). Again referring to the "Hortus Cliffortianus" (37), "POPULUS foliis cordatis crenatis" is the one referred to.

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826. *POPULUS*. Linn. gen. 909.

1. *POPULUS* foliis subrotundis, dentato-angulatis, utrinque glabris. LINN. HORT.

A. STAMINEA.

B. PISTILLATA.

2. *POPULUS* foliis subrotundis, dentato-angulatis; subtrus tomentosis. LINN. HORT.

A. STAMINEA.

B. PISTILLATA.

3. *POPULUS* foliis deltoïdibus, acuminatis, ferratis. LINN. HORT.

A. STAMINEA.

B. PISTILLATA.

4. *POPULUS* foliis cordatis, crenatis: basi nudis: petiolis teretibus.

POPULUS foliis cordatis, crenatis. LINN. HORT.

5. *POPULUS* foliis cordatis, obsolete ferratis, infimis ferraturis glandulosis: petiolis lateraliter utrinque planis.

827. *JUNIPERUS*. Linn. gen. 917.

1. *JUNIPERUS* foliis sessilibus, patentibus. ROY. LEXO.

A. STAMINEA.

B. PISTILLATA.

Fig. 2.—Van Wachendorff, E. I., "Horti Ultraiectin Index," 1747, p. 294.

But Gmelin's second synonym, "*Populo simili arboræ resinosa, alteri*" Bauhin (38), evidently refers to "*Arbor Populo similis resinosa altera.*" A free translation of Bauhin's (39) remarks concerning this tree is to the effect that "The Tacamahaca col-

lected in New Spain is from an odorous tree, as large as the poplar and whose fruit is the color of a peony." It seems then that Gmelin erred in his synonymy, in the first instance referring to the Carolina Poplar and in the second instance, to a tree that is not a poplar at all. Gmelin's illustration (40), however, could apply to the Balsam Poplar, which is the view taken by Sudworth (41).

CONCLUSION

It has been shown that Linné in all probability erred in his citations for *Populus balsamifera* in his "Species Plantarum," for while the first and second citations are referable to the third, Catesby's Carolina Poplar, it is possible that the illustration of the fourth citation is referable to our Northern Balsam Poplar, which was commonly known as *Populus balsamifera* Linné for over a century and a half, and which Sudworth selects as the type. That Linné's *Populus balsamifera* was a composite can also be seen by the fact that the primary citations in his "Species Plantarum" and "Hortus Cliffortianus" are so different that they could hardly be considered to refer to the same tree. Thus, although *Populus balsamifera* is a *nomen confusum*, the preponderance of Linné's citations are referable to *Populus nigra, folio maximo, gemmis Balsamum odoratissimum fundentibus* Catesby (42), which is the type selected by Farwell, Sargent, Stout and Rehder (43). The oldest valid name for the Balsam Poplar, or Tacamahac, is *Populus tacamahacca* Miller (44).

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Book Reviews

Textbook of Clinical Parasitology, by DAVID L. BELDING, M.D., Professor of Bacteriology and Experimental Pathology, Boston University School of Medicine, Member of staff of Evans Memorial, Massachusetts Memorial Hospitals. D. Appleton-Century Co., Inc., New York, N. Y., 1942. xxi + 888 pp., 279 figs., 44 tables and 4 colored plates. Price, \$8.50.

Knowledge of the diagnosis and treatment of parasitological infections is very important and must receive more attention in the present conflict, since many theaters of war are located in the tropical and subtropical countries. This book is intended for medical students, physicians, public health officials, medical personnel in the armed forces, laboratory workers and biologists. The book is written from the standpoint of one responsible for teaching the subject, and to accomplish this end, numerous illustrations are used throughout the text. Many of the illustrations are diagrammatic and convey a fairly complete picture of the topic under discussion, independent of the text. Numerous keys are also incorporated in the text which should prove helpful to those who have need for a ready reference book. In place of the more popular terms, the author employs a few expressions which are little used to-day, such as alexin-fixation instead of complement-fixation. Nearly every chapter is accompanied by a few selected references, which should enhance the usefulness of the book for those desiring more than an elementary knowledge of the subject. The book, as the title implies, is a textbook and in this respect it fulfills its purpose.—H. E. Morton.

Synopsis of Materia Medica, Toxicology and Pharmacology, by FORREST RAMON DAVISON, Medical Department, The Upjohn Company. Second edition. The C. V. Mosby Company, St. Louis, Mo., 1942. 695 pp., 45 figs., 12.5 x 19.5 cm. Price, \$5.75.

The writing of a synopsis in any field entails the careful selection of material to be included. Dr. Davison has not always been wise in his choice of subject matter, for at the expense of much valuable information, such drugs of secondary importance as conium, the sulfone hypnotics, and new agents which are almost untried are discussed, while many important facts are omitted. For example, there is nothing stated about the mode of destruction of epinephrine, the value of the short and intermediate acting barbiturates in cocaine poisoning, nor the more modern treatment of acute and chronic alcoholism. It is pleasing, however, to see the inclusion of such modern findings as the use of dihydrotachysterol to replace parathormone.

This synopsis is divided into two parts. Part I, comprising 95 pages, is given over to the consideration of fundamental principles of pharmacology, materia medica and prescription writing. Pharmacists will be pleased to see in this book many helpful suggestions regarding prescription writing, made available in such a way as to encourage the physician to prescribe in a simple and straightforward manner. Particularly noteworthy is the section on vehicles in which the most useful properties of coloring and flavoring agents are tabulated and the basic principles of disguising medicaments are outlined.