

# SECTION ON HISTORICAL PHARMACY, AMERICAN PHARMACEUTICAL ASSOCIATION

## OPIUM IN THE PHARMACOPŒIA.\*

A REVIEW OF THE RECOGNITION ACCORDED TO OPIUM, ITS PREPARATIONS, ALKALOIDS  
AND DERIVATIVES IN THE SEVERAL EDITIONS OF THE PHARMACOPŒIA  
OF THE UNITED STATES OF AMERICA.

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From a medical or pharmaceutical point of view few excursions into the realms of the past would offer more in the way of practical or romantic suggestion than would a comprehensive review of the recognition that has been accorded to drugs or their preparations in the official standards for recognized medicines.

The following review of the recognition that has been given to opium, its alkaloids and preparations in the Pharmacopœia of the United States is offered rather as a suggestion of the possibilities than as a complete representation of the history and romance evidenced by even this fragmentary portion of the official *materia medica*.

At this time it will, of course, not be possible to recapitulate, even briefly, the origin and evolution of the Pharmacopœia itself and it must necessarily suffice to state that taking the Pharmacopœia of 1820 as the origin, the several Philadelphia revisions of that book are generally recognized as its lineal descendants.

Of the 34 titles under which opium with its alkaloids and preparations have appeared in the several editions of the Pharmacopœia, no less than 25 are included in the present edition. Ten of the titles were included in the first edition of the U.S.P. published in 1820 and of this number no less than eight are continued at the present time and are alone worthy of a much more comprehensive review than can be accorded them in a short paper of this type.

The first, in alphabetical rotation, of the official preparations of opium, *acetum opii*, or vinegar of opium, has been variously known as "black drop," "Lancaster drop," "Quakers' drop" and "Foulke's drop." As originally included in the Pharmacopœia it was a complex preparation of variable composition, depending for its efficiency on the concentration secured by exposure in the fermentation by yeast of a mixture of an aqueous extract of opium with sugar. It appears that the preparation originated with one Edward Runstall, of Bishop Auckland in Durham, about 1720, as a secret remedy. It was long esteemed as being superior to other preparations of opium and on the death of Runstall the formula for making it was published and thus became public property. The formula was subsequently included in several of the British dispensatories and became quite popular in Philadelphia. Because of the uncertainty of its composition efforts were made from time to time to improve it, and Dr. Joseph Hartshorn (1779-1850) induced one of the local pharmacists to prepare for him an acetated tincture of opium which replaced the vinegar of opium in the 1830 Philadelphia edition of the Pharmacopœia of the United States. This preparation, however, was not generally accepted, even in Philadelphia, and Charles Ellis (1800-1874), one of the

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early presidents of the American Pharmaceutical Association, in 1839 outlined a method for making a vinegar of opium as a substitute for the old time "black drop." This preparation was subsequently introduced into the 1840 Pharmacopœia with the synonym "black drop," practically in the form in which it now appears. The acetated tincture of opium was also retained practically unchanged, to and including the revision of the U.S.P. in 1870.

By far the greater number of the drugs and preparations which appear in the Pharmacopœia of the United States of 1820 were previously recognized in the Edinburgh Pharmacopœia, which, directly or indirectly, was the accepted standard in the greater portion of what was then the United States.

The tincture of opium or laudanum of the first Pharmacopœia of the United States was similar in composition to that of the Edinburgh Pharmacopœia. This preparation is said to have originated with Paracelsus (1493-1541) who was among the first to introduce the use of opium into European countries and who, it is said, owed much of his success in the practice of medicine to the liberal way in which he administered the several preparations of opium used by him.

The one time "Elixir of Paregorick," the present camphorated tincture of opium, is thought to have originated with Le Mort, at one time professor of chemistry at the University at Leyden, early in the eighteenth century. It was introduced into the London Pharmacopœia, in 1721, as "Elixir Asthmaticum."

Wine of opium, still popularly known as Sydenham's laudanum, originated with the father of medicine in England and is even now popular in all European countries despite the fact that in this country and even in England the preparation used and sold as Sydenham's laudanum does not fully reflect the original formula promulgated by Sydenham (1624-1689) himself.

The present official pills of opium are also of English origin and were formerly known as Mathews' or Starkey's pills. They are said to have originated with Starkey and were made and sold by Mathews. At an early period they were introduced into the Edinburgh Pharmacopœia and appear as now a mixture of opium and soap in the first edition of the Pharmacopœia of the United States.

The delay in the introduction of some of the present widely used preparations is rather interesting. Extract of opium, for instance, despite the fact that it was recommended and used at a very early period, was not included in the Pharmacopœia of the United States until 1850, and the deodorized tincture of opium which was recommended by Robiquet (1780-1840) early in the nineteenth century and a formula for which was published by Dr. Robert Hare (1781-1858), Professor of Chemistry in the University of Pennsylvania, in 1827, was not included in the Pharmacopœia of the United States until 1860, despite the fact that practically the same methods were employed in making a number of proprietary preparations of opium that had a very wide sale, notably Battley's liquor opii sedativus and McMunn's elixir of opium, both of which were said to be made according to secret formulas and were subsequently shown to be made in accordance with the method outlined by Hare many years before.

In this connection it may not be generally known to the present day generation of pharmacists that the now official process for making deodorized opium and the tincture of deodorized opium by means of petroleum benzine was first suggested by Albert E. Ebert (1840-1906) in a paper published in the *American Journal of Pharmacy* in 1877 (vol. xxxix, pp. 193-196). The process did not, however, receive official recognition until 1905, when it was included in the U.S.P. VIII.

Morphine was discovered by Friedr. W. Sertürner (1783–1841) early in the nineteenth century, and was described at some length in a paper published by Sertürner in 1816. It was included with the acetate, the sulphates and a solution of the sulphate of morphia in the Pharmacopœia of the United States for 1830, though codeine, which was discovered by Robiquet in 1832, was not included in our Pharmacopœia until more than fifty years later, 1883, in the Pharmacopœia of 1880.

This solution of morphine sulphate, official recognition of which was continued to and including the Pharmacopœia of 1870, was for many years a source of trouble and annoyance. A preparation 16 times the strength of the so-called "United States solution of morphine" was included in the British Pharmacopœias and came to be widely used in this country as "Magendie's solution of morphine." A formula for this British preparation was included in the first edition of the National Formulary with the caution not to confound the two. This caution, however, largely perhaps because of the limited circulation of the first edition of the National Formulary, was not always observed.

One of the distinctly American preparations of the Pharmacopœia and the one containing the least amount of opium has rather an interesting history and one that deserves to be recorded at some length in the future. This preparation, the compound mixture of glycyrrhiza of the U.S.P. VIII, originated with Dr. Benjamin Smith Barton, of Philadelphia (1767–1815), a noted author and botanist, who about 1814 prepared the formula, in the form of a prescription for a cough remedy. This prescription was originally filled at the store of Charles Marshall, Sr., which was subsequently presided over by Elizabeth Marshall, the first woman pharmacist in Philadelphia, a daughter of the elder Charles Marshall. The resulting mixture proved to be so efficient that Dr. Barton ordered its renewal for a number of other patients. To avoid rewriting the prescription at length he gave to the preparation the name "brown mixture," because of its color, and under this name it was long known to the apothecaries of Philadelphia, particularly to the one-time apprentices of Elizabeth Marshall, who, during many decades, were recognized to be the representative, progressive pharmacists of Philadelphia.

Another American preparation, the compound powder of morphine of the U.S.P. VIII, originated with Dr. William Tully (1785–1859) at one time professor of materia medica at Yale and the author of an early American text-book on "Materia Medica or Pharmacology and Therapeutics." The compound powder of morphine or Tully's powder became official in the U.S.P. of 1880 in practically the form in which it appears now, though with the large number of other synonyms, the name Tully's powder is found only in the index of the U.S.P. VIII.

The following brief review of the titles for opium, its preparations and alkaloids, which have appeared in the several editions of the Pharmacopœia of the United States will serve to suggest many additional incidents of pharmaceutical interest. Collectively the list tends to reflect, in rather an impressive manner, the popularity of really efficient preparations and their persistence from decade to decade.

A LIST OF TITLES OF OPIUM, ITS PREPARATION AND ALKALOIDS RECOGNIZED IN THE PHARMACOPŒIA OF THE UNITED STATES FROM 1820 TO 1900.

*Opium*.—Opium, U.S.P. VIII. The concrete juice of *Papaver somniferum* was included in the primary list of materia medica in the U.S.P. 1820 and continued unchanged to 1850. The alkaloid requirement of at least 7 percent of morphine by the official process was included in 1860. This was increased to 10 percent in 1870, modified to 9 percent for opium:

in the moist condition in 1880 and in 1890 made to read not less than 9 percent of crystallized morphine as now.

*Opium Deodoratum*.—Deodorized Opium, U.S.P. VIII. Opium treated with ether was recognized in 1880 as Opium Denarcotisatum, denarcotized opium, with the requirement that it yield 14 percent of morphine. The title was changed in 1890 and the assay requirement in 1900 was made to read from 12 to 12.5 percent of morphine. The U.S.P. VIII also directs the use of purified petroleum benzine in place of ether.

*Opium Granulatum*.—Granulated Opium, U.S.P. VIII. The granulated form of opium was included in 1900 with the requirement that it yield from 12 to 12.5 percent of morphine.

*Opium Pulvis*.—Powdered Opium, U.S.P. VIII. Opium, dried and powdered, was officially recognized in 1880 with the requirement that it contain not less than 12 nor more than 16 percent of morphine. This requirement was changed in 1890 to not less than 13 nor more than 15 percent of crystallized morphine and in the U.S.P. VIII to from 12 to 12.5 percent of morphine.

#### PREPARATIONS OF OPIUM AND ITS ALKALOIDS.

*Acetum Opii*.—Vinegar of Opium, U.S.P. VIII. This title appears in the Pharmacopœia of 1820 with the synonym black drop and the directions to ferment an aqueous extract of opium and spices with yeast, after the addition of sugar. This preparation was continued in the 1830 New York edition but omitted from the 1830 Philadelphia edition, which latter contains a formula for acetated tincture of opium. A modified formula for vinegar of opium (2:13) with the synonym black drop was included in the U.S.P. for 1840. The formula was changed in 1880 to 10 percent of powdered opium.

*Collyrium Plumbi Acetatis et Opii*.—Collyrium of Opium and Acetate of Lead, U.S.P. 1820. This preparation, somewhat similar to the lead and opium wash of the National Formulary, appears but once.

*Confectio Opii*.—Confection of Opium, U.S.P. 1870. This one time popular confection was made official in 1830 and continued through the several editions of the U.S.P. to 1870.

*Emplastrum Opii*.—Opium Plaster, U.S.P. VIII. The plaster of opium was made official in 1840. The formula was changed in 1880 to the use of extract of opium as now.

*Extractum Opii*.—Extract of Opium, U.S.P. VIII. The aqueous extract of opium became official in 1850. An alkaloid requirement of 18 percent of morphine was included in 1890 and changed in 1900 to 20 percent of morphine.

*Linimentum Saponis et Opii*.—Liniment of Soap and Opium, U.S.P. 1830. This preparation was official in 1820 and continued in the Pharmacopœia of 1830.

*Liquor Morphine Sulphatis*.—Solution of Sulphate of Morphine, U.S.P. 1870. A solution of 1 grain of morphine sulphate in a fluidounce of water was made official in 1830 and continued unchanged up to and including the Pharmacopœia of 1870.

*Mistura Glycyrrhizæ Composita*.—Compound Mixture of Glycyrrhiza, U.S.P. VIII. The well-known brown mixture became official in 1850. In 1880 the formula was changed to require the pure extract of glycyrrhiza and in 1900 the synonym was omitted from the text but still appears in the index.

*Pilule Opii*.—Pills of Opium, U.S.P. VIII. This mixture of soap and opium appears in the Pharmacopœia of 1820 and has been continued practically unchanged to the present time.

*Pulvis Ipecacuanhæ et Opii*.—Powder of Ipecac and Opium, U.S.P. VIII. The Latin title of this preparation appears in the Pharmacopœia of 1820 as now, though the English title, for a number of decades, was given as powder of ipecacuanha and opium with the synonym Dover's powder. The diluent used up to and including the Pharmacopœia of 1870 was potassium sulphate. In 1860 the title of the preparation was changed to *Pulvis Ipecacuanhæ Compositus*, compound powder of ipecacuanha, with the other two titles as synonyms. In 1880, with the use of sugar of milk as a diluent, the title was again changed to *Pulvis Ipecacuanhæ et Opii* but the English title appears as now, powder of ipecac and opium.

*Pulvis Morphine Compositus*.—Compound Powder of Morphine, U.S.P. VIII. This

preparation appears first in the U.S.P. 1880 with the synonym Tully's powder. In the U.S.P. VIII the synonym was omitted from the text but still appears in the index.

*Suppositoria Morphia*.—Suppositories of Morphia, U.S.P. 1870. Cacao butter suppositories, each containing  $\frac{1}{2}$  grain of sulphate of morphia.

*Suppositoria Opii*.—Suppositories of Opium, U.S.P. 1870. Cacao butter suppositories, each containing 1 grain of opium.

*Suppositoria Plumbi et Opii*.—Suppositories of Lead and Opium, U.S.P. 1870. Cacao butter suppositories, each containing  $\frac{1}{2}$  grain of opium and 3 grains of lead acetate.

*Tinctura Ipecacuanhæ et Opii*.—Tincture of Ipecac and Opium, U.S.P. VIII. This preparation was included in the Pharmacopœia of 1880 practically as it appears at the present time, a mixture of deodorized tincture of opium and fluid extract of ipecac.

*Tinctura Opii*.—Tincture of Opium, Laudanum, U.S.P. VIII. This widely used tincture, as it appears in the Pharmacopœia of 1820, represents 1 ounce of opium in 16 fluidounces of the completed preparation. The strength of the preparation was changed from time to time until 1880, when it was practically put on a 10 percent basis, though the morphine requirement in the several revisions since that time has been changed slightly.

*Tinctura Opii Acetata*.—Acetated Tincture of Opium, U.S.P. 1870. This tincture (1:10) was introduced in the Pharmacopœia of 1830 as a substitute for the then widely used vinegar of opium. It was continued practically unchanged up to and including the Pharmacopœia of 1870.

*Tinctura Opii Camphorata*.—Camphorated Tincture of Opium, Paregoric, U.S.P. VIII. This old time mixture was made official in 1820 as *Tinctura Camphoræ Opiata*, opiated tincture of camphor, "formerly paregoric elixir." The formula, at that time, included among other ingredients extract of glycyrrhiza and clarified honey. The title was changed in 1830 to the present one and the formula in the Pharmacopœia of 1840 omitted the extract of glycyrrhiza. The formula in the Pharmacopœia of 1880 substituted glycerin in place of honey.

*Tinctura Opii Deodorati*.—Tincture of Deodorized Opium, U.S.P. VIII. This preparation became official in the Pharmacopœia of 1860 as *Tinctura Opii Deodorata*, deodorized tincture of opium, an aqueous extract deodorized with ether and preserved by the addition of 25 percent of alcohol. The strength of the preparation was the same as tincture of opium, 1:13. With tincture of opium it was changed to 1:10 in the Pharmacopœia of 1880 and the morphine content requirement for the preparation has been similar to that for tincture of opium since that time.

*Trochisci Glycyrrhizæ et Opii*.—Troches of Glycyrrhiza and Opium, U.S.P. VIII. These troches were first included in the Pharmacopœia of 1820 as *Trochisci Glycyrrhizæ cum Opio*, troches of liquorice and opium, and were originally flavored with tolu. The Latin title in the Pharmacopœia of 1830 was changed to that in use at the present time and the formula was changed in 1850 by substituting the use of oil of anise for tolu as a flavor. The English title was changed, in 1880, to the form used at the present time.

*Trochisci Morphiæ et Ipecacuanhæ*.—Troches of Morphia and Ipecacuanha, U.S.P. 1890. These troches were included in the Pharmacopœia of 1870 and the title in 1880 was changed to *Trochisci Morphiæ et Ipecacuanhæ*, troches of morphine and ipecac.

*Vinum Opii*.—Wine of Opium, U.S.P. VIII. This wine was included in the Pharmacopœia of 1820 with the statement that it was "called Sydenham's Laudanum." Originally it represented 1 ounce of opium in 8 fluidounces of the completed preparation. The synonym was omitted from the Pharmacopœia of 1820 and the formula in 1880 was changed to 10 percent of powdered opium. In the Pharmacopœia of 1890 it was required to contain from 1.3 to 1.5 percent of morphine, but the present U.S.P. VIII omits these requirements and again includes "Sydenham's Laudanum" as a synonym in the index.

#### ALKALOIDS OF OPIUM.

*Apomorphinæ Hydrochloridum*.—Apomorphine Hydrochloride, U.S.P. VIII. This alkaloid was included in the Pharmacopœia of 1880 as *Apomorphinæ Hydrochloras*, hydrochlorate of apomorphine. The title was changed in the U.S.P. VIII to *Apomorphinæ Hydrochloridum*, Apomorphine Hydrochloride.

*Codeina*.—Codeine, U.S.P. VIII. This alkaloid of opium was included in the Pharmacopœia of 1880. The official recognition of the product prepared from morphine by methylation was added in the U.S.P. VIII.

*Codeinæ Phosphas*.—Codeine Phosphate, U.S.P. VIII. The phosphate of the alkaloid codeine appears for the first time in the U.S.P. VIII.

*Codeinæ Sulphas*.—Codeine Sulphate, U.S.P. VIII. The sulphate of the alkaloid codeine appears for the first time in the U.S.P. VIII.

*Morphina*.—Morphine, U.S.P. VIII. This alkaloid of opium was included in the Pharmacopœia of 1830 as "Morphia" with directions for making. These directions were included in the several editions of the Pharmacopœia to 1870 but were omitted from the 1880 Pharmacopœia, the title at that time being changed to Morphina, morphine, with a description of the physical and chemical properties of the alkaloid and tests for identity and purity.

*Morphinæ Acetas*.—Morphine Acetate, U.S.P. VIII. The acetate of the alkaloid morphine was included in the Pharmacopœia of 1830 as Morphinæ Acetas, acetate of morphia, with the directions for making from morphia. The monograph remained practically unchanged up to and including 1870. In the 1880 edition of the U.S.P. the method for making was substituted by a comprehensive description and tests and the title changed to Morphinæ Acetas, morphine acetate.

*Morphinæ Hydrochloridum*.—Morphine Hydrochloride, U.S.P. VIII. The hydrochloride of the alkaloid morphine became official in 1840 as Morphinæ Murias, muriate of morphia, with directions for making from morphia. The title was changed in 1880 to Morphinæ Hydrochloras, hydrochlorate of morphine, and the formula for making substituted by a comprehensive description with tests. The title, in the present Pharmacopœia, was changed to Morphinæ Hydrochloridum, morphine hydrochloride.

*Morphinæ Sulphas*.—Morphine Sulphate, U.S.P. VIII. The sulphate of the alkaloid morphine became official in 1830 as Morphinæ Sulphas, sulphate of morphia, with directions for making from morphia. The title was changed in 1880 to Morphinæ Sulphas, sulphate of morphine, and in common with the other salts of morphine the formula was omitted, being substituted by a rather comprehensive description and a number of tests.

## AUTOBIOGRAPHIES OF AMERICAN PHARMACISTS.\*

BY WILHELM BODEMANN.

TO THE HISTORICAL SECTION OF THE AMERICAN PHARMACEUTICAL ASSOCIATION:

As the name of this Section implies, history of American pharmacy is your chief object.

In my humble opinion a true history of American pharmacy is next to impossible if the leading members of our profession do not file with the properly instituted central headquarters their autobiographies.

The Chicago Veteran Association has undertaken to write the history of Chicago pharmacy, and to that end the members of this Association must file their autobiographies with the historian. On several occasions I have recommended to the American Pharmaceutical Association the establishment of similar Veteran Associations throughout this country. Not until at the Detroit meeting did my suggestion meet with support and there it was acted on favorably. May I ask with what result? The different Branches would form the natural nucleus for such an undertaking, taking it for granted that pharmacists who have been

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