A Century of the U. S. P. 1820-1920

Pulvis Glycyrrhizae Compositus

by

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(Pulvis Glycyrrhizae Compositus)

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(Liquor Carbonis Detergens and Unguentum Picis Carbonis)

General History

Under the name of Pulvis pectoralis (Brutpulver) there appeared for the first time in the Pharmacopoea Borussica of 1799, the formula of a mild laxative powder attributed to Dr. Kurella,(1) who also used an electuary made up of similar ingredients.(2) While it received its original name from licorice (pectoral) another ingredient, senna, made it a mild laxative. For a hundred years and more it remained a popular remedy.(3) What is more it soon found its way into the pharmacopoeias of most countries.

1.) Ernst Gottfried Kurella, born Mch. 17th, 1725 in Neidenberg. East Prussia, studied medicine in Koenigsberg, graduating as Doctor of Medicine in 1746. Later he practiced medicine in Berlin where he died July 28th, 1799, the year in which his powder became official in the 1'st edition of the state Pharmacopoeia. While practicing his profession in the Prussian capital, he was a member of the Obermedizinal-kollegium, corresponding to our State Board of Medicine. (Biographisches Lexikon hervorragender Aerzte, zweite Aufl. (1931), p. 635.)

2.) Pharmacopoea Borussica 1799, was not in the University Library and could not be examined but the Pharmacopoea Borussica, 1808, contained the following electuary:

Electuarium e Senna
(Electuarium lenitivum)
Rx. Caricarum Uncias sex
Radicis Liquiritiae Uncias duas
Coque ex
Aquae Libris quatuor
ad dimidium, exprime,cola, et decoctum evapora
ad Uncias duodecim- In quibus dissolve
Sacchari albi Uncias sedecim.

Huic Syrups immisce
Pulpae Tamarindorum
Prunorum, singularum Uncias quinque et postremo
Pulveris Foliorum Sennae Unicas quatuor cum
dimidia
Seminis Anisi Unciam dimidiam
Serva

3.) In 1890 the Pharmazeutische Zeitung of Berlin (p. 201) sent out a questionnaire concerning the most popular "Handverkaufsartikel", i.e. medicaments sold over the counter other than physicians prescriptions. According to the replies received Pulvis Liquiritiae Compositus was the second, sodium bicarbonate being the most popular sales article. (H. Schelenz, Gesch. d. Pharm., p. 765.)

Synonyms

The adoption of this powder by not less than twenty-~~five~~ of the national pharmacopoeias of the nineteenth century has resulted in numerous synonyms in many languages. An alphabetical list is herewith compiled.

The following is an alphabetical list of the pharmacopoeias which contain these synonyms.

Arg.	=	Ph.	Nacional Argentina
Austr.	=	"	Austriaca
Belg.	=	"	Belgica
Brit.	=	"	Britannica
Croat. Slav.	=	"	Croatico-Slavonica
Dan.	=	"	Danica
Fenn.	=	"	Fennica
Gall.	=	"	Gallica
Germ.	=	"	Germanica
Grac.	=	"	Graca
Helv.	=	"	Helvetica
Hisp.	=	"	Hispana
Hung.	=	"	Hungarica
Jap.	=	"	Japonica
Mex.	=	"	Mexicana
Nederl.	=	"	Nederlandica
Norveg.	=	"	Norvegica
Portug.	=	"	Portugueza
Rom.	=	"	Romana
Ross.	=	"	Rossica
Serb.	=	"	Serbica

Suec. = Ph. Suecica

It. = " Italiana

U. S. = " United States

Venez. = " Venezolana

The alphabetical list of synonyms and national pharmacopoeias in which these are included is as follows:

afforende Lakridsrodpulver	Dan. VII.
afforende Lakritsrodpulver	Dan. VI.
afforende lakrisrodpulver	Norveg. III.
avforende lakrisrotpulver	Norveg. IV.
Breast Pulver (Index)	Dan. I.
Brustpulver	Grac. I, Rom. IV, Germ. I, III, IV, V, VI. Helv. I, III, IV.
Brust-Pulver	Dan. III. (Index)
Compound Licorice Powder	U.S.P. IX, X.
Compound Powder of Glycyrrhiza	U.S.P. VI, VII, VIII, IX, X.
Compound Powder of Liquorice	Brit. II(74), III, IV, V, Vi.
Laxeerpoeder	Nederl. III(94), IV, VI, VII.
Liquiritiae Pulvis Compositus	Belg. III
Polvere di liquirizia composta	Helv. III, IV. It. III, IV, V.
Polvere di liquirizia composto	Helv. I
Polvo de Orozuz Compuesto	Mex. IV.
Polvo de Régaliz Compuesto	Arg. III.
Polvo pectoral	Mex. IV.
Poudre de reglisse compose (Franc)	Mex. IV.
Poudre de reglisse composée(Fr)	Rom. IV, Belg. I, II, III, Gall. V, VI, Helv. I, III, IV.

Poudre pectorale de Kurelli	Belg. I (French Ed.)
Pulvere de liquiritie compusa	Rom. IV.
Pulvis Liquiritiae Compositus	Austr. VII, VIII, Belg. I, II, Fenn. V, Gall. V, VI, Germ. I, II, III, IV, V, VI, Graca I, III, Helv. I, II, III, IV, Hung. (Lat. & Hung. Editions) III, Jap. III, IV, Arg. III, Nederl. III, (94) IV, VI, VII, Rom. IV, It. III, IV, V, Ross. V(06), VI, VII, VIII.
Pulvis Glycirrhyzae Compositum.	Mex. IV.
Pulvis Glycyrrhizae Compositus	Brit. II(74), III, IV, V, VI, Dan. VI, VII, Norveg. III, IV, Ross. V(06), VI, VII, VIII, Suec. VIII, IX, X. U.S. VI, VII, VIII, IX, X, Germ. I
Pulvis Glycyrrhizae Compositus cum Sulphure	Brit. III.
Pulvis Liquiritiae cum Senna	Hung. III (Lat. Ed.)
Pulvis Pectoralis	Dan. I, III.
Pulvis pectoralis	Helv. I, II, III, IV.
Pulvis pectoralis Kurellae	Germ. I, Belg. I, (Lat. Ed.)
Sammensatt Lakritspulver	Fenn. V, Suec. VIII, IX, X.
Sekoitettu lakritsipulveri	Fenn. V.
Slojnai lakricinaiporosok	Ross. V(06), VI, VII, VIII, Rom. IV.
Szennas edesgyoker-por	Rom. IV, Hung. III (Hung. Ed.)
Zusammengesetztes Suessholzpulver	Austr. VII.

A better-oversight over these polyglot terms is afforded by a tabulation of the equivalent ones. Thus a polyglot table of these comparative synonyms is as follows:

Lat.[x] Pulvis Liquiritiae Compositus, Liquiritiae Pulvis Compositus

Lat.[xx] Pulvis Glycyrrhiza Compositus

Eng. Compound Powder of Liquorice or Compound Licorice Powder

Eng. Compound Powder of Glycyrrhiza

Germ. Zusammengesetztes Suesshälzpulver

Fr. Poudre de reglisse Composee

Dan. Sammensatt Lakritspulver

Sp. Polvo de Regaliz Compuesto

Sp. Polvo de Orozug Compuesto

Rom. Pulvere de liquiritie Compusa

It. Polvere di liquirizia composta (O)

Russ. Slojnai lakricinaiporosok

Lat.[xxx] Pulvis Pectoralis

Eng.

Germ.[xxxx] Brust-pulver

Fr. Poudre pectorale de (Kurelli)

Dan.

Sp. Polvo pectoral

Rom.

It.

Russ.

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x Pulvis Liquiritiae cum Senna. Hung. III (Lat. Ed.)
xx Pulvis Glycirrhyzae Compositum Mex. IV, Pulvis

Glycyrrhizae Compositus cum sulphure Brit. III

xxx Pulvis pectoralis, Helv. I, II, III, IV
Pulvis pectoralis Kurellae, Germ. I, Belg. I (Lat. Ed.)

xxxx Brust-pulver. Dan. III

Lat.

Eng.

Germ.

Dan. afforende Lakritsrodpulver, Afforende lakrisrodpulver
or
Lakridsrodpulver, avforende lakrisrotpulver

Sp.

Rom.

It.

Russ.

Dutch-Laxeerpoeder

Lat.

Eng.

Germ.

Dan.

Sp.

Rom.

It.

Dutch

Hung. Szennás edesgyöker-por

Pharmacopoeial History

As already ppointed out, Kurella's Pectoral Powder was first made official in the Prussian Pharmacopoeia of 1799. Omitting for the present its adoption by other state pharmacopoeias, its popularity is more readily expressed by its adoption in the various national pharmacopoeias. Following the chronological order of adoption, they are:-

1837.	Pharmacopoea	Graeca
1840.	"	Danica
1854.	"	Belgica
1865.	"	Helvetica
1872.	"	Germanica
1874.	(addit to) "	Britannica
1889.	Pharmacopoea	Austriaca
1889.	"	Nederlandica
1895.	"	Norvegica
1901.	"	Suecica
1904.	"	Rossica
1907.	"	Japonica
1908.	"	Gallica
1909.	"	Italiana
1909.	"	Hungarica
1914.	"	Fennica
1926.	"	Romana
1928.	"	Argentina

As previously intimated, the above list reveals only in part the pharmacopoeial spread of this preparation. Having first been made official in the Prussian Pharmacopoeia of 1799,

it continued to appear in that state pharmacopoeia (editions of 1801 (1804), 1813, 1827, 1829, 1847 and 1862) until replaced by the national pharmacopoeia, the Pharmacopoea Germanica I of 1872. Even before the pharmacopoeias of Greece and Denmark adopted Kurella's formula (or modification thereof), other German state pharmacopoeias made the Powder official. Thus it made its appearence in the following state pharmacopoeias, other than the Prussian, and remained official in subsequent editions (as listed) until those also were replaced by the national standard in 1872. These state pharmacopoeias in the university library are here enumerated in the order in which the Powder became official therein, viz.

Pharmacopoea Batava 1812
" Hannoverana 1819, 1833, 1861
" Augustin 1822
" Hassiae Electoralis 1827
" Slesvice Holsatica 1831
" Hamburgica 1834, 1845, 1852(?)
" Saxonica 1837, 1820(?)
" Wirtembergica 1845
" Bavarica 1859, 1822 (?) 1856(?)

(?) refers to editions not in the library and hence could not be examined.

The following is a list of German state pharmacopoeias edited after 1799 (First appearance of pulvis pectoralis in Pharmacopoea Borussica).

Pharm. Palatina 1802
" ~~Badensis~~ Bavarica 1822, 1856, 1859
" Borussica 1799, 1801(1804), 1813, 1827, 1829
Badensis. 1841

Neue Pharmakopoe Erfurt 1808, 1811

" Germaniae (Magdebourg) 1865

Codex Medicamentarius Hamburgensis 1835, 1845, 1852

Pharm. Hannoverana, 1706 (Dispensatorium) 1819, 1833, 1861

Dispensatorium Westphalicum 1808

Pharm. Oldenburgica 1801

" Nationalis (Cassel) 1806

" Hassiae Electoralis 1806, 1816, 1827, 1860

" Saxonica 1820, 1837

Distensatorium fuer die Konige Sachs Lande 1807

Pharm. Slesvico-Holsatica 1831

" Wirtembergica 1845

" nosocomiorum civilium Argentinensium Strasbourg 1830, 1840

Pulvis glycyrrhizae compositus was possibly included in all state pharmacopoeias (examination was incomplete as editions were not in the library) when Germany stood not for a political entity but merely for a geographic conception, it therefore followed inevitibly that it should appear in the non-official Pharmacopoea Germaniae of 1865 which represented the aspiration of German apothecaries when their country should once more be united.

In the following compilation of pharmacopoeial data the arrangement is alphabetical with reference to the Latin titles of the respective state or national standards.

(Roman numerals represent the editions of various state pharmacopoeias - Pharmacopoeias examined but not containing the official title, vernacular title or synonym are represented by —. Edition numbers of pharmacopoeias not in the library are left blank.

Farmacopea Nacional Argentina

	Off. Title	Vern. Title	Synonym
I.1898	-	-	-
x II. ?			
III.1928	Pulvis Liquiritiae Compositus	Polvo De Regaliz Compuesto	-

The Spanish Pharmacopoea was used before Argentina attained her independence - This was later supplemented by the French Codex and the U. S. P.

The first national pharmacopoeia was published in 1898. It did not include Pulvis Liquiritiae Compositus - The second Farmacopoea Nacional Argentina may have introduced the powder, but it was not in the library and hence could not be examined. It was included in the Farmacopoea of 1928, as Pulvis Liquiritiae Compositus with the synonym Polvo De Regaliz Compuesto.

x not in library.

Pharmacopoea Austriaca

	Off. Title	Vern. Title	Synonym
I. 1812			
II. 1814	-	-	-
III. 1820			
IV. 1834	-	-	-
V. 1855	-	-	-
VI. 1869	-	-	-
1884			
VII. 1889	Pulvis Liquiritiae Compositus	Zusammengesetztes Suessholzpulver	-
1890	-	-	-
VIII. 1906	Pulvis Liquiritiae Compositus	-	-

The national pharmacopoea Austriaca was first published in 1812 - Before this time, the local pharmacopoeia, the Pharmacopoeia Austriaco-provincialis, 1774, 1775, 1778, 1789, 1794 was used. Pulvis Liquiritiae Compositus was included in Pharmacopoea of 1889 and also in the Pharmacopoea of 1906, although the synonym "Zusammengesetztes suessholzpulver" was dropped.

Pharmacopoea Belgica

		Off. Title	Vern. Title	Synonym
I.	1854	Pulvis Liquiritiae Compositus (Latin and French Ed.)	Poudre De Régliss Composée (French Ed.)	Poudre pectorale de (Kurrellii) (French) Pulvis pectoralis Kurrellae (Latin)
II.	1885	Pulvis Liquiritiae Compositus (Latin Ed.)(French Ed.)	Poudre De Réglisse Composée (French Ed.)	-
	1892	-	-	-
	1896	-	-	-
III.	1906	Liquiritiae Pulvis Compositus	Poudre De Reglisse Composee	-
	1912			

The pharmacopoeial history of Belgium begins at an early date, 1560, - with the edition of the Pharmacopoeia of Antwerp. Numerous other pharmacopoeias have appeared since that time.

1795-1814- Belgium was under French control, hence French pharmacy books were used - Later, 1814, Belgium became a part of the Netherlands and French books were replaced by those of the Netherlands. Belgium obtained its independence in 1830 and in 1854 the first pharmacopoeia was issued. Pulvis Liquiritiae Compositus has been included in all the three

editions of Pharmacopoea Belgica, 1854, 1885, and 1906.

Pharmacopoeia Britannica

	Off. Title	Vern. Title	Synonym
I. 1864	-	-	-
II. 1867	-	-	-
1874	Pulv. Glyc. Compositus	Comp. Powd. of Liquorice	-
III. 1885	Pulv. Glyc. Compositus	Comp. Powd. of Liq.	Pulvis Glyc. Compositus cum Sulphure
IV. 1898	" " "	" " "	-
V. 1914	" " "	" " "	-
VI. 1932	" " "	" " "	-

The publication of a pharmacopoeia came under consideration of the College of Physicians of London as early as 1585 - Committees were appointed and the matter was brought up again in 1617 - Finally, in 1618 the first London Pharmacopoeia appeared.

The first Edinburgh Pharmacopoeia was published in 1699 - The first Dublin Pharmacopoeia was published in 1807, although in 1794 a "Specimen Pharmacopoeia" had been circulated among members of the College and was last issued in 1850.

Pharmacopoeia Britannica first appeared in 1864, and was the result of a combination of City pharmacopoeias of Edinburgh, London and Dublin.

Pulvis Glycyrrhizae Compositus was included in the additions to Pharmacopoeia of 1867 and has been retained in succeeding editions, 1885, 1898, 1914 and 1932.

Pharmacopoea Croatico-Slavonica

	Off. Title	Vern. Title	Synonym
I. 1888			
II. 1901			

Croatia has possessed since 1888 a pharmacopoeia written in the language of the country. These pharmacopoeias are not in the University library.

Pharmacopoea Danica

	Off. Title	Vern. Title	Synonym
I. 1772	Pulvis Pectoralis	-	Brust Pulver (In index)
II. 1805	-	-	-
III. 1840	Pulvis Pectoralis	(Brust-Pulver)	-
IV. 1850			
1857			
V. 1868	-	-	-
1874			
1876			
VI. 1893	Pulvis Glycyrrhizae Compositus	afforende Lakrits-rod pulver	-
1898			
VII. 1907	Pulvis Glycyrrhizae Compositus	Afforende Lakrids-rod pulver	-

Denmark published a pharmacopoeia at an early date, 1772. The title of this pharmacopoeia was Pharmacopoea Danica regia autoritate a collegio medico Havniensi conscripta - All editions of the Pharmacopoea Danica were not available - Pulvis Pectoralis was included in 1772, 1840 editions. Pulvis Glycyrrhizae Compositus is in the 1893 and 1907 editions.

Pharmacopoea Fennica

	Off. Title	Vern. Title	Synonym
I. 1819			
II. 1850			
III. 1863			
IV. 1885	-	-	-
V. 1914	Pulvis Liquiritiae Compositus	Sammansatt Lakrits-pulver	Sekoitettu Lakritsi pulveri

The first national pharmacopoeia of Finland was published in 1819. Bulvis Liquiritiae Compositus was not included in Pharmacopoea Fennica on 1885, and although preceding pharmacopoeas w were not available it is probably possible to say it was first introduced in the Vth edition of the Pharmacopoea, 1914.

Pharmacopoea Gallica

	Off. Title	Vern. Title	Synonym
I. 1818	-	-	-
II. 1837	-	-	-
III. 1866	-	-	-
IV. 1884	-	-	-
V. 1908	Pulvis Liquiritiae Comp.	Poudre de Réglisse Composée	-
VI. 1920	Pulvis Liquiritiae Comp.	Poudre de Réglisse Composée	-

As early as 1353 an ordonnance was sent out by King John the Good that each apothecary in the City of Paris should own the Antidotaire de Nicolas.

The first Parisian Codex was published in 1639 in compliance with a new order from Louis XIII.

In 1818, after restoration of the Bourbons, the first

national pharmacopoeia was published.

Although the first national pharmacopoeia was published in 1818, Pulvis Liquiritiae Compositus was not adopted by the French Codex until 1908 , but has been retained and included in the pharmacopoeia of 1920 with the same synonym, viz., Poudre de Reglisse Composee.

Pharmacopoea Germanica

	Off. Title	Verm. Title	Synonym
I. 1872	Pulv. Liquiritiae Compositus	Brustpulver	Pulvis Glycyrrhizae Compositus Pulvis pectoralis Kurellae
II. 1882	" "	-	-
III. 1890	" "	Brustpulver	-
IV. 1900	" "	"	-
V. 1910	" "	"	-
VI. 1926	" "	"	-

Nuernberg Dispensatory of Cordus 1546 was the first offical pharmaceutical book. It was the forerunner of the national pharmacopoeias which began publication a few years later. Various state, city and local pharmacopoeias were published, as Nuernberg, printed in 1601, etc. Later larger political units as Hessia, Hannover, Brandbenburg printed pharmacopoeias. In 1865 there appeared the Pharmacopoeia Germaniae of North and East Germany - In 1872 the first German Pharmacopoeia appeared.

Pulvis Liquiritiae Compositus was included in the first Pharmacopoeia of 1872 with the following synonyms: Brustpulver,

Pulvis Glycyrrhizae Compositus, Pulvis pectoralis Kurellae. Since then, Pulvis Liquirtiae Compositus has been in all German Pharmacopoeias, 1882, 1890, 1900, 1910, 1926.

Pharmacopee Graca

		Off. Title	Vern. Title	Synonym
I.	1837	Pulvis Liquiritiae Compositus	Pulvis pectoralis Grk(German trans)	Brustpulver
	1868			
II.	1899			
III.	1909	Pulvis Liquiritiae Compositus	(Grk)	(Grk)

The first pharmacopoeia appeared in 1837 and was said to be similar to Pharmacopoeia of Bavaria because that pharmacopoeia had been used by pharmacists.

Pulvis Liquiritiae Compositus appeared in the first Pharmacopoea, 1837, was probably included in 1899, and was in 1909.

Pharmacopoea Helvetica

		Off. Title	Vern. Title	Synonym
I.	Date unknown			
II.	1872	Pulvis Liquiritiae Compositus	-	Pulvis pectoralis
III.	1876	-	-	-
III.	1893	Pulvis Liquiritiae Compositus	Brustpulver, Poudre de réglisse Composée, Polvere di liquirizia Composta	Pulvis pectoralis
IV.	1907	" "	Brustpulver, Poudre de réglisse composée, Polvere di liquirizia C Composta	Pulvis pectoralis

The Pharmacopoeia Regia, Galenica et Chimica was published in 1684 - Pharmacopoeia Helvetica in 1771 and that of Geneva in 1780.

The first national pharmacopoeia of Switzerland was published in 1865. Pulvis Liquiritiae was included in this edition and in succeeding editions, 1872, 1893, 1907.

Pharmacopoea Hispana

	Off. Title	Vern. Title	Synonym
I. 1794			
II. 1797	-	-	-
III. 1803	-	-	-
IV. 1817	-	-	-
V. 1865			
VI. 1884	-	-	-
VII. 1905	-	-	-

The first pharmacopoeia was printed in Valencia in 1651. The Pharmacopoeia Catalana in 1686 - but the Pharmacopoeia of Madrid which came into general use, was not published until 1729.

The first national pharmacopoeia of Spain was edited in 1794. Pulvis Liquiritiae Compositus does not appear in editions 1797, 1803, 1817, 1844 or 1905, possibly not in any editions.

Pharmacopoea Hungarica

	Off. Title	Vern. Title	Synonym
I. 1871	-	-	-
II. 1888	-	-	-

III. 1909	Pulvis Liquiritiae Compositus (Lat. and Hungar)	Szennas edeszyoker -por(Hungar)	Pulvis Liquiritiae cum Senna (Lat.)	

Hungary had its first national pharmacopoeia in 1871. Before this date the Pharmacopoeia of Austria was generally used.

In th Pharmacopoea Hungarica of 1909, Pulvis Liquiritiae Compositus was first introduced with the Latin and Hungarican synonyms, Pulvis Liquiritiae cum senna and Szennas edesgyoker por.

Pharmacopoea Japonica

	Off. Title	Vern. Title	Synonym
I. 1886			
II. 1891			
III. 1907	Pulvis Liquiritiae Compositus		
IV. 1920	" " "		

First published in 1886 and presented a number of points similar to that of China - Pulvis Liquiritiae Compositus was introduced into the Pharmacopoea Japonica of 1907 and was retained in that of 1920.

Farmacopea Mexicana

	Off. Title	Vern. Title	Synonym
I. 1874	-	-	-
II. 1884	-	-	-
1890			
III. 1896			
IV. 1904	Pulvis Glycirrhyzae Compositum	Polvo de Orozuz Compuesto	Polvo pectoral Poudre de réglisse compose Franc.

Farmacopea Latino-Americana

I. 1921 - - -

Before the edition of Mexicana pharmacopoea, the French Codex was in general use.

Pulvis Glycirrhyzae Compositum appeared in the Mexican Pharmacopoea of 1904. Both French and Spanish synonyms were given for the powder.

Pharmacopea Nederlandica

		Off. Title	Vern. Title	Synonym
I.	1851	-	-	-
II.	1871	-	-	-
III.	1889	Pulvis Liquiritiae Compositus	-	-
	1894	Pulvis Liquiritiae Compositus	Comp-Laxeerpoeder	-
IV.	1905	" "	" "	-
V.	1910			
VI.	1914	Pulvis Liquiritiae Compostius	Laxeerpoeder	-
VII.	1926	" " "	"	-

A pharmacopoeia was published in Amsterdam as early as 1636 and passed through five editions before 1800.

In 1805 - Netherlands was organized under the name of the Republic of Batava and it had a pharmacopoeia. The pharmacopoeia of Belgium, 1823 was also in use. These two resulted in the formation of a national pharmacopoeia which was entitled Pharmacopoea Neerlandica, 1851, 1871, and Pharmacopoea Nederlandica, 1889, 1905, 1910, 1914, 1926.

Pulvis Liquiritiae Compositus appears in the 1889, 1894, 1905 (1910) ?, 1914 and 1926 editions of the Pharmacopoea

Nederlandica.

Pharmacopoea Norvegica

	Off. Title	Vern. Title	Synonym
I. 1854	-	-	-
II. 1870	-	-	-
III. 1895	Pulvis Glycyrrhizae Compositus	Afforende lakrisrod pulver	-
1901			
IV. 1913	Pulvis Glycyrrhizae Compositus	avforende lakrisrot-pulver	-

On the 7th of April 1842, a commission of physicians and pharmacists was named to formulate the first Norwegian Pharmacopoeia, which was edited in 1854. The 1895 and 1913 editions of Pharmacopoea Norvegica contains Pulvis Glycyrrhizae Compositus.

Pharmacopea Portugueza

	Off. Title	Vern. Title	Synonym
I. 1794			
II. 1836			
III. 1876	-	-	-

In 1711 "Pharmacopoeia Lusitana" was published. The first national pharmacopoeia was published in 1794. Pharmacopoea, 1876, does not contain Pulvis Glycyrrhizae Compositus.

Pharmacopea Romana

	Off. Title	Vern. Title	Synonym
I. 1862			
II. 1874	-	-	-

III. 1893			
IV. 1926	Pulvis Liquiritiae Compositus	Pulvere de Liquiritie Compusa	Powdre de réglisse Composee (Fr.) Brustpulver (Ger.) Szennás édesgyoké-por (Hngg.) Slojnai lakric-inaiporosok (Rus.)

Pharmacopea Romana, although first published in 1862 does not include Pulvis Liquiritiae Compositus until the edition of 1926.

Farmakopeya Rossica

	Off. Title	Vern. Title	Synonym
I. 18666			
II. 1871			
III. 1880			
IV. 1891			
V. 1902			
1906	Pulvis Glycyrrhizae Compositus	Slojnai lakricinai-porosak	-
VI. 1910	" " "	" "	-
VII. 1925	Pulvis Glycyrrhizae Compositus	" "	Pulvis Liquiritiae Compositus
VIII. 1929	" " "	" "	" " "

Before 1866, the publication of the first national pharmacopoea in Russia, there had been the following: Pharmacopoea Rossica, Petrograd, 1778, 1782, 1798, 1803, Pharmacopoeia regni Poloniae Varsovie, 1817.

Farmakopeya Rossica first included Pulvis Glycyrrhizae Compositus in the 1906 editmon and has retained it in 1910, 1925, 1926 editions.

Pharmacopoea Serbica

	Off. Title	Vern. Title	Synonym
I. 1880			
II. 1908			

Before 1880 Pharmacopoea Austriaca was used in Serbia.

Pharmacopoea Suecica

	Off. Title	Vern. Title	Synonym
I. 1775			
II. 1779	-	-	-
III. 1784	-	-	-
IV. 1790			
V. 1817			
1826			
VI. 1846	-	-	-
VII. 1869	-	-	-
1871	-	-	-
1879	-	-	-
1888	-	-	-
VIII. 1901	Pulvis Glycyrrhizae Compositus	Sammansatt lakrits-pulver	-
IX. 1908	" " "	" "	-
1909			
1912			
X. 1925	Pulvis Glycyrrhizae Compositus	Sammansatt lakrits-pulver	-

The Pharmacopoeia Holmiensis was published in Stockholm in 1686, but the first national work was not issued until 1775. It was similar to works of Denmark and Norway. Pharmacopoea Suecica first introduced Pulvis Glycyrrhizae Compositus in 1901 edition, also retained it in 1925 edition.

Farmacopea Italiana

	Off. Title	Vern. Title	Synonym
I. 1892	-	-	-
II. 1902	-	-	-
III. 1909	Pulvis Liquiritiae Compositus	Polvere Di Liquirizia Composta	-
IV. 1920	" " "	"	-
V. 1929	" " "	"	-

The earliest Pharmacopoeias published in Italy were Antidotarium de Quiricus Augustis de Tortona, Turin, 1492, others at Mantoue 1559, Venice, 1766, 1783, 1800, Bolobne, 1574, 1606, 1615, 1641, Rome 1583, 1585, 1590, 1638.

However, a national pharmacopoeia was not published until 1892. Pulvis Liquiritiae Compositus is included in 1909, 1920, 1929 editions.

United States Pharmacopoeia

	Off. Title	vern. Title	Synonym
1820	-	-	-
1830	-	-	-
1840	-	-	-
1850	-	-	-
1860	-	"	-
1870	-	-	-
1880, VI	Pulvis Glycyrrhizae Compositus	Compound Powder of Glycyrrhiza	-
1890, VII	" " "	" " " "	-
1900, VIII	" " "	" " " "	-
1910, IX	" " "	" " " "	Compound Licorice Powder

1920, X	Pulvis Glycyrrhizae Compositus	Compound Powder of Glycyrrhiza	Compound Licorice Powder

Pulvis Glycyrrhizae Compositus was adopted by the U. S. in the Pharmacopoeia of 1880 and is included in all succeeding pharmacopoeias.

Farmacopoea Venezolana

	Off. Title	Vern. Title	Synonym
I. 1898			
II. 1910	-	-	-

Farmacopoea Venezolana has not adopted Pulvis Glycyrrhizae Compositus.

State Pharmacopoeias

Pharmacopoea Bavarica

	Off. Title	Vern. Title	Synonym
1822	-	-	-
1823	-	-	-
1859	Pulvis Glycyrrhizae Compositus	Zusammengesetzes Suessholz Pulver	Pulvis Liquiritiae Compositus Pulvis Kurellae

Pulvis Glycyrrhizae Compositus was not introduced into the Pharmacopoea Bavarica until 1859.

Pharmacopoea Borussica

	Off. Title	Vern. Title	Synonym
1805	Pulvis Liquiritiae Compositus	Pulvis pectoralis	-
1808	Pulvis Liquiritiae Compositus	Zusammengesetztes Suessholzpulver	Brustpulver Pulvis pectoralis
1813	" "	" Pulvis pectoralis	-

1817	Pulvis Liquiritiae Compositus	Zusammengesetztes Suessholzpulver	Brustpulver Pulvis pectoralis
1827	Pulvis Glycyrrhizae seu Liquiritiae Compositus	Pulvis pectoralis	-
1830	Pulvis Glycyrrhizae seu Liquiritiae Compositus	Zusammengesetzes Sueszholzpulver	Pulvis pectoralis Brustpulver
1847	Pulvis Glycyrrhizae Compositus	Zusammengesetztes Suesholzpulver	Zusammengesetzes Lakrizenpulver Kurella's Brustpulver
1862	Pulvis Glycyrrhizae Compositus Pulvis Liquiritiae Compositus	Pulvis pectoralis Kurellae	

Pulvis Liquiritiae Compositus was included in all Pharmacopoeas Borussicas which were examined, 1805-1862.

Pharmacopoea Edinburgensis

	Off. Title	Vern. Title	Synonym
1803	-	-	-
1817	-	-	-
1821	-	-	-
1828			

Pharmacopoeia Edinburgensis of 1803, 1821 did not contain Pulvis Glycyrrhizae Compositus. Since it was not placed in the first Pharmacopoeia Britannica, 1864, it probably was not includedin any Pharmacopoeia Edinburgensis.

Pharmacopoea Hamburgica

	Off. Title	Vern. Title	Synonym
1835	Pulvis Liquiritiae Compositus	P. pectoralis	Poudre pectorale
1845	" " " " "		Brustpulver Poudre pectorale

1852 Pulvis Liquiritiae Com-positus P. pectoralis -

Pharmacopoea Hamburgica included Pulvis liquiritiae Compositus in editions 1835, 1845 and 1852.

Pharm. Hannovera

	Off. Title	Vern. Title	Synonym
1819	Pulvis Liquiritiae Compositus	Pulvis pectoralis	-
1831	" " "	" "	Brustpulver
1861	" " "	" "	-

It is only natural that Pulvis Liquiritiae Compositus would be included in Pharmacopoea Hannovera (or any state German Pharm.), 1819, 1831, 1861 as it was introduced by the Prussian Pharmacopoea.

Pharmacopoea Hassiae Electoralis

	Off. Title	Vern. Title	Synonym
1860	Pulvis Pectoralis	Zusammengesetzes Suessholzpulver Brustpulver	Pulvis Glycyrrhizae Compositus Pulvis Liquiritiae Compositus

Pulvis Pectoralis was quite a common name for Pulvis Glycyrrhizae Compositus and as such it was included in the Pharmacopoea Hassiae Electoralis of 1860.

Pharmacopoea Saxonica

	Off. Title	Vern. Title	Synonym
1837	Pulvis pectoralis	Brustpulver	Pulvis Liquiritiae Compositus

Pulvis pectoralis was included in Pharmacopoea Saxonica of 1837.

Pharmacopoea Slesvico Holsatica

	Off. Title	Vern. Title	Synonym
1831	Pulvis Liquiritiae Compositus	Zusammengesetztes Suessholzpulver	-

Pulvis Liquiritiae Compositus was included in Pharmacopoea Slesvico Holsatica, 1831.

Formulas

The following includes the formula of Pulvis Glycyrrhizae Compositus. The names of the ingredients are not translated but all of the material is a replica of the original. The constituents, senna, glycyrrhiza, fennel, sulphur and sugar, with varying descriptions as to roots, leaves, powder number, etc., are fairly uniform. The amount of each constituent varies to some extent but the proportion remains approximately the same. Grams, parts by weight (Expressed or implied) ounces, pounds, drachms, drops (oil of fennel) are used in designating the amount of each constituent.

Farmacopea Nacional Argentina

	I 1898	II ?	III 1928	
Azúcar, en polvo, No. 45	-		50	gramos
Régliz, en polvo			15	"
Hojas de sen, en polvo No. 45			15	"
Frutos de hinojo, en polvo No. 26			10	"
Azufre sublimado, lavado			10	"

Pharmacopoea Austriaca

	I 1812	II 1814	III 1820	IV 1834	V 1855	VI 1869	1884	VII 1889	
Sacchari		-		-	-	-		30	gram-mata
Folium Sennae								10	"
Radicis Liquiritiae Mundatae								10	"
Fructus Foeniculi								5	"
Sulfuris depurati								5	"
Olei Foeniculi									

	1890	VIII 1906	
Sacchari	-	partes	49
Folium Sennae		"	20
Radicis Liquiritiae Mundatae		"	20
Fructus Foeniculi		"	10
Sulfuris depurati		1 partem	
Olei Foeniculi		1 partem	

Pharmacopoea Belgica

	I 1854	II 1885	1892	1896	III 1906	1912
Foliorum Sennae	part. 160	160	-	-		
Radicis Liquiritiae	" 160	160				
Semimum Foeniculi	" 80					
Sulphuris depurati	80	80				
Sacchari	" 520	520				
Fructum foeniculi		80				

or Pharmacopee Belge

Feuilles de séné	160	160
Racine de réglisse	160	160
Fruits de Fenouil		80
Soufre purifié	80	80
Sucre	520	520
Semences de Fennuil	80	

Feuille de sene en poudre No. 40	150
Racine de réglisse en poudre n°40	150
Fruit de fenouil en poudre n°20	100
Soufre	100
Sucre en poudre n°30	500

Pharmacopoea Belgica cont.

	I 1854	II 1885	1892	1896	III 1906	1912
Sennae folii pulvis n°40					150	
Liquiritiae radicis pulveris n°40					150	
Foeniculi fructus pulveris n°20					100	
Sulphuris					100	
Saccahari pulveris n°30					500	

Pharmacopoeia Britannica

	I 1864	II 1867	1874	III 1885	IV 1898
Senna in (a) fine powder			2 ounces	2 ounces or 2 parts	Imperial 2 ounces metric 50 gramme
Liquorice root, in (a)' fine powder			2 "	"	2 ounces 50 grammes
Refined sugar, in powder			6 "	6 ounces or 6 parts	6 ounces 150 grammes
Fennel Fruit in fine powder				1 ounce or 1 part	1 ounce 25 grammes
Sublimed sulphur				"	1 ounce 25 grammes
Senna leaves, in powder					
Senna leaf, finely powdered					
Liquorice, peeled, finely powdered					
Fennel, finely powdered					
Sucrose, finely powdered					

	V 1914	VI 1932
Senna in (a)' fine powder		
Liquorice root, in (a)' fine powder	16 grammes	
Refined sugar, in powder	52 "	
Fennel Fruit in fine powder	8 "	
Sublimed sulphur	8 "	80 grammes
Senna leaves, in powder	16 "	
Senna leaf, finely powdered		160 "
Liquorice, peeled, finely powdered		160 "
Fennel, finely powdered		80 "
Sucrose, finely powdered		520 "

' (a) omitted in 1898, 1914

Pharmacopoea Danica

	I 1772	II 1805	III 1840	IV 1850	1857	V 1868	1874	1876
Radicis Iridis Florentinae	(sex) 6 drachmas	—				—		
Liquiritae	6 drachmas							
Florum Sulphuris semuciam	(unam.) 1 drachm.							
Benzoes	(unam.) 1 "							
Sacchari cendi albi	(duas) 2 uncias							
Olei stillatitii Foeniculi	guttas decem.							
Anisi	guttas decem.							

	VI 1893	1898	VII 1907
Fructus Foeniculi pulverati partes			75
Sulfuris sublimati partes			75
Foliorum Sennae pulveratorum partes			175
Radicis Glycyrrhizae pulveratae partes			175
Saccharu pulverati partes			500
pulveriseret Fennikelfro	75		
Svovlblomme	75		
pulveriserede Sennesblade	175		

Pharmacopoea Danica cont.

	I 1772	II 1805	III 1840	IV 1850	1857	V 1868	1874	1876	VI 1893
pulveriseret Lakritsrod		-				-			175
pulveriseret hvidt Sukker									500
Deutschhe Bearbeitung									
pulv. rad. Irid florent			6 drachms						
pulv. rad. Glycyrrhiz.			"						
flor. Sulphur. lot.			½ unze						
flor. Benzoës			1 drachme						
Sacch. albi			2 unzen						
Ol. Aeth. Foeniculi			10 tropfen						
Ol. Aeth Anisc			"						

1898	VII 1907

Pharmacopoea Fennica.

	I 1819	II 1850	III 1863	IV 1885	V 1914
Fructus foeniculi				-	1 del.
Sulfur lotum					1 del.
Radix liquiritiae					2 del.
Folium sennae					2 del.
Saccharum					4 del.

Pharmacopoea Gallica

	I 1818	II 1837	III 1866	IV 1884	V 1908	VI 1920
Sucre blanc, pulvérisé	-	-	-	-	50 Gm.	50 Gm.
Racine de reglisse pulvériseé					15 "	15 "
Folioles de séné pulvérisée					15 "	15 "
Fruits de fenouil pulvérisés					10 "	10 "
Soufre sublimé lavé					10 "	10 "

Pharmacopoea Germanica

	I 1872	II 1882	III 1890	IV 1900
Foliorum Sennae	2 parts	2 parts		
Radicis Liquiritiae	2 "	2 "		
Fructum Foeniculi pulveratorum	1 "			
Suffuris depurati	1 "	1 "		
Sacchari optimi pulverati	6 "			
Fructum Foeniculi		1 "		
Sacchari		6 "		
Mittelfein gepulverter Zucker			6 Theile	50 Theile
fein gepulverte Sennesblätter			2 "	15 "
fein gepulvertes Sueskolz			2 "	15 "
Mittelfein gepulverter Fenchel			1 "	10 "
Gereingter Schwefel			1 "	10 "

	V 1910	VI 1926
fein gepulverten Sennesblattern	3 Teilen	3 Teilen
Fein gepulvertem Sueszholz	3 "	3 "
Mittelfein gepulvertem Fenchel	2 "	2 "
Gereinigtem Schwefel	2 "	2 "
Mittelfein gepulvertem Zucker	10 "	10 "

Pharmacopee Graca

	1837	1868	1899	1909 Greek
German Trans.				
Sennesblatter	3 Th.			
Sueszholz	3 "			
Zucker	1½ "			
Anis	1 "			
Schwefel	2 "			

Pharmacopoea Helvetica

	I 1865	II 1872	1876	III 1893	IV 1907
Fructus Foenioculi	1 partes	1 partes	-		-
Sulfuris loti, utriusque partem	1 "	1 "			
Radicis Liquiritiae	2 "	2 "			
Foliorum Sennae Alexandrinorum, Utriusque partes sex	2 "	2 "			
Saccharu partes sex	6 "	6 "			

German trans.) ein, Teil, 1
Fenchel

	III 1893	IV 1907
Gewaschener Schwefel	ein Teil, 1	
Sennesblatt	zwei Teile, 2	
Suessholz	" " , 2	
Zucker	vier " , 4	
Sulfur lotum (VI)'		1
Folium Sennae (VII)'		2
Radix Liquiritiae (VI)'		2
Saccharum (VI)'		4
Fructus Foeniculi (VI)'		1

' - no. of powder to be used.

Pharmacopoea Hungarica

	1871	1888	1909
Illó édeskömény-olajat egy grammot	-	-	1
Dorzold el apránként Cukar-porral negyvenkilenc grammal			49
azután tégy a keverékhez Mosott ként tiz grammot			10
edesgyoker-port húsz grammot			20
Szennalevél-port húszgrammot			20
Olei Anisi aetherei gramma unum			1
carptim Conterito Pulveris saccahari grammatibus undequinquagenta			49
Sulfuris Loti grammata decem			10
Pulveris Liquiritiae grammata viginti			20
et Pulveris foliorum Sennae grammata viginti			20

Pharmacopoea Japonica

	I 1886	II 1891	III 1907	IV 1920
Licorice root, in fine powder			15 pts.	3 pts.
Senna, in fine powder			15 "	
Fennel, in medium powder			10 "	
Purified sulphur			10 "	2 "
Sugar, in medium powder			50 "	
Senna leaves, in fine powder				3 "
Fennel Fruit, in medium powder				2 "
White Sugar, in medium powder				10 "

Farmacopoea Mexicana

	I 1874	II 1884	1890	III 1896	IV 1904
Polvo de Orozuz	-	-			60
Idem de sen					60
Azufre lavado					30
Polvo de fructos de hinojo					30
Idem de azucar					180

Pharmacopoea Nederlandica

	I 1851	II 1871	III 1889	III 1894	IV 1905	V 1910	VI 1914	VIII 1926
Pulvis Foliorum Sennae	-	-	16 parts					
Pulveris Radicis Liquiritiae, utruisque partes Sedecim			16 "					
Pulveris Fructum Foeniculi			8 "					
Sulfuris depurati utriusque partes octa			8 "					
Pulveris Sacchari partes quinquagintadus			52 "					
Poeder van Sennebladen				16	15		15	15
Poeder van Zoethoutwortel, van elk zestien deelen				16	15		15	15
Poeder van Venkelvruchten				8	10		10	10
Gezuiverde Zwavel, van elk acht deelan				8	10		10	10
Poeder van Suiker twee en vijftig deelen				52	50		50	50
Pulveris Foliorum Sennae partes quindecim						15		
Pulveris Radices Liquiritiae partes quindecim						15		
Pulveris Fructum Foeniculi partes decem						10		
Sulfuris depurati, partes decem						10		
Pulveris Sacchari partes quinquaginta						50		

Pharmacopoea Norvegica

	I 1854	II 1870	III 1895	1901	IV 1913
Fructus Foeniculi pulverati	-	-	8		
Sulfuris sublimati singulorum partes octo			8		
Folii Sennae pulverati			16		
Radicis Glycyrrhizae pulveratae singulorum partes sedecim			16		
Sacchari albi pulverati partes qvinqvaginta duae			52		
Radix Glycyrrhizae pulverata					16
Folium Sennae pulveratum					16
Fructus Foeniculi pulveratus					8
Sulfur sublimatum					8
Saccharum album pulveratum					52

Pharmacopea Romana

	I 1862	II 1874	III 1893	IV 1926
Fructus Foeniculi pulv. (VI)'		-		10
Sulfur depuratum (VI)'				10
Folia Sennae pulv. (VII)'				15
Radix Liquiritae pulv. (VI)'				15

	1862	1874	1893	1926
Saccharum pulv. (VI)'				50

') Number of powder to be used

Pharmacopoea Rossica

Foliorum Sennae

	I 1866	II 1871	III 1880	IV 1891	V 1902	1906	VI 1910	VII 1925'	VIII 1929'
Foliorum Sennae pulveratorum						2	2	20	20
Radicis Glycyrrhizae pulveratae						2	2	20	20
Fructum Feniculi pulveratorum						1	1	10	10
Sulfuris depurati						1	1	10	10
Sacchari pulverati						6	6	40	40

'
Note - 1925 and 1929 Formula in Russian

Pharmacopoea Suecica

I 1775	II 1779	III 1784	IV 1790	V 1817	1826	VI 1846	VII 1869	1871	1879
	-	-				-	-	-	-

	1888	VIII 1901	IX 1908	1909	1912	X 1925
Sulfur Sublimatum elotum		en del, 1	1			10 delar
Fructus Foenieuli		" "	1 1			" "
Radix Glycyrrhizae		tva delar,	2 2			20 "
Folium Sennae		" "	2 2			" "
Saccharum		frya "	, 4			
Saccharum lactis		" "	4 4			40 "

Pharmacopoe Italiana

	I 1892	II 1902	III 1909	IV 1920	V 1929
Faghi di senna, s.p.	-	-	p. 100	p.2	
Radici di liquirizia s.p.			" 100	" 2	
Frutti di finocchio s.p.			" 50	" 1	
Solfo sublimato e lavato			" 50	" 1	Gm. 80
Zucchero, s.p.			" 100	" 6	
sena polvere (40)'					Gm.180
Liquirizia radice polvere (40)'					" 236
Olio essenziale di finocchio					" 4
Zucchero polvere (40)'					" 500

' No. of powder to be used

State Pharmacopoeias

Pharmacopoea Bavarica

	1822	1823	1859
Sennesblatter	—	—	je zwei Unzen
Suessholz-Wurzel			je zwei Unzen
Fenchel, gereinigter Schwefel			je eine Unze
Weisser Zucker			sechs Unzen

Pharmacopoea Borussica

	1805	1808	1813	1817	1830	1847	1862
Pulv, rad liquir	℥ ii	-		-			
folior. sennae	℥ ii						
Sem. foenic.	℥ i						
Sulph. dep.	℥ i						
Sacch. alb.	℥ vi						
Pulveris Radicis Liquiritiae			Pulvis Radicis Liquiritiae				
Foliorum Sennae			Foliorum Sennae Singulorum uncias duas		uncias sex		
Seminis Foeniculi			Seminis Foeniculi				Seminis Foeniculi
Sulphuris depurati			Sulphuris depurati Sihgulorum Unciam Unam		Uncias quatuor	Uncias tres	Sulphuris depurati Singulorum partem unam
Sacchari albi			Uncias sex				
Radicis Glycyrrhizae echinatae aut glabrae decorticatae singulorum pulveratorum					Uncias sex		
Sacchari albi pulverati					libras tres		
Seminis anisi vulgaris pulverati					uncias duas		
Foliorum Sennae						Uncias sex	2

Pharmacopoea Borussica cont.

	1805	1808	1813	1817	1830	1847	1862
Radicis Glycyrrhizae echinatae, singulorum pulveratorum						Uncias sex	
Seminis Foeniculi, pulverati						Uncias tres	
Sacchari albissimi pulverati						Uncias octodecim	Partes sex 6
Radicis Glycyrrhizae Singulorum pulveratorum							Partes duas 2
Fructum Foeniculi pulveratorum							1

Pharmacopoea Hamburgica

	1835	1845	1852
Radicis Liquiritiae pulveratae			
Foliorum Sennae pulveratorum	Singulorum Uncias duas		Singulorum Uncias duas
Seminis Foeniculi pulverati Sulphuris depurati	Singulorum Uncias		Singulorum Unciam
Sacchari pulverati	Libram dimidiam		Libram dimidiam

(Deutsche Bearbeitung)

Sueszholz	2 Unz
Sennesblatter	2 "
Fenchel	1 Unze
Schwefelblumen	1 "
Zucker	½ Pfd.

Pharmacopoea Hannoverana

	1819	1833	1861
Pulveris Radicis Liquiritiae Foliorum Sennae	Singulorum Uncias Duas		
Seminis Foeniculi	Singulorum		
Sulphuris depurati	Unciam Unam		
Sacchari Albi	Uncias sex		
Pulveris Radicis Liquiritiae Foliorum Sennae		Singulorum Uncias Duas	
Sulphuris depurati loti		Singulorum Uncias Unam	
Pulvis Sacchari albi		Uncias sex	
Radix Liquiritiae			
Folia Sennae			je zwei Unze
Semen Foeniculi			
Sulphur depuratum lotum			je, eine unze
Saccharum album			sechs unzen

Pharmacopoea Hassias Electoralis

Rp.	1860
Pulveris Radicis Liquiritiae	Singulorum Partes duas
" Foliorum Sennae	
" Seminis Foeniculi	Singulorum Partem Unam
Sulphuris depurati	
Pulveris Sacchari Albi	Partes sex

Pharmacopoea Saxonica

1837

Deutsche Bearbeitung	
anis	2 drachmen
Gewaschener, sublimirter Schwefel	½ unze
Süszholz	6 drachmen
Sennesblätter	" "
Zucker	4½ unze

Pharmacopoea Slesvico Holsatica

1831

Deutsches Bearbeitung	
rad. Glycyrrhiza	2 unz.
Sennesblatter	1 unz.
Fenchelsamen	1 unz.
Schwefblumen	1 unz.
Weiszer Zucker	6 unzen

Pulvis Glycyrrhizae Compositus was introduced into the United States Pharmacopoeia of 1880 and has appeared in the successive editions, 1890, 1900, 1910 and 1920. The United States Pharmacopoeial Text is herewith tabulated.

PULVIS GLYCYRRHIZAE COMPOSITUS.[1]

Compound Powder of Glycyrrhiza.[2]

Senna,[6] in No. 60 powder, eighteen parts 18

Glycyrrhiza,[7] in No. 60 powder, sixteen parts 16

Fennel,[8] in No. 60 powder, eight parts 8

Washed Sulphur,[9] eight parts 8

Sugar,[10] in fine powder, fifty parts 50

To make one hundred parts 100

Rub them together until they are thoroughly mixed.[11]

U. S. P. 1880, p. 273.

PULVIS GLYCYRRHIZAE COMPOSITUS.[1]

Compound Powder of Glycyrrhiza.[2]

Senna,[6] in No. 80 powder, one hundred and eighty grammes .. 180 Gm

Glycyrrhiza,[7] in No. 80 powder, two hundred and thirty-six grammes .... 236 Gm

Washed Sulphur,[9] eighty grammes ..... 80 Gm

Oil of Fennel,[8] four grammes ..... 4 Gm.

Sugar,[10] in fine powder, five hundred grammes ..... 500 Gm

To make one thousand grammes 1000 Gm.

Mix the Oil of Fennel thoroughly with about one-half of the Sugar, then add the remainder of the Sugar and the other ingredients, and mix thoroughly.[11] Finally pass the powder through a No. 60 Sieve, and keep it in well closed vessels.[12]

U. S. P. 1890, p. 327.

PULVIS GLYCYRRHIZAE COMPOSITUS.[1]

Compound Powder of Glycyrrhiza.[2]

Senna,[6] in No. 80 powder, one hundred and eighty grammes ..	180 Gm
Glycyrrhiza,[7] in No. 80 powder, two hundred and thirty-six grammes	236 Gm.
Washed Sulphur,[9] eighty grammes	80 Gm.
Oil of Fennel,[8] four grammes	4 Gm.
Sugar,[10] in fine powder, five hundred grammes	500 Gm.
To make one thousand grammes	1000 Gm.

Mix the Oil of Fennel thoroughly with about one-half of the Sugar, then add the remainder of the Sugar and the other ingredients, and mix thoroughly. Finally, pass the powder through a No. 80 sieve, pulverize the residue if any should be left on the sieve, add to the sifted powder, and mix thoroughly.[11] Keep it in well closed vessels.[12]

Average dose. - 4 Gm. (60 grains).[13]

U. S. P. 1900, p. 369.

PULVIS GLYCYRRHIZAE COMPOSITUS.[1]

Compound Powder of Glycyrrhiza.[2]

Pulv. Glycyrrh. Co. - Compound[4]

Licorice Powder.[3]

Senna,[6] in No. 80 powder, one hundred and eighty grammes	180 Gm.
Glycyrrhiza,[7] in No. 80 powder, two hundred and thirty-six grammes	236 Gm.
Washed Sulphur,[9] eighty grammes	80 Gm.
Oil of Fennel,[8] four grammes	4 Gm.
Sugar,[10] in fine powder, five hundred grammes	500 Gm.
To make one thousand grammes	1000 Gm.

Mix the oil of fennel thoroughly with about one-half of the sugar, then add the remainder of the sugar and the other ingredients, and mix thoroughly. Finally, pass the powder through a No. 80 sieve, pulverize the residue if any should be left on the sieve, add it to the sifted powder, and mix thoroughly.[11] Keep it in well closed containers.[12]

Greenish yellow to yellowish brown with a fennel-like odor; when mounted in water or hydrated chloral T.S. and examined under the microscope, Compound Powder of Glycyrrhiza shows fragments of glycyrrhiza with their characteristic yellow fibers associated with crystal fibers, large tracheae with elliptical, bordered pores and cells containing numerous, spherical starch grains varying from 0.002 to 0.02 mm. in diameter, also fragments of senna as shown by their characteristic, more or less bent, unicellular, non-glandular hairs, from 0.1 to 0.35 mm. in length; fragments of epidermis with elliptical stomata and their 2 neighboring cells and fragments with crystal fibers; upon the addition of potassium hydroxide T. S. to aqueous mounts of the powder, some of the fragments are immediately colored a yellowish-red, changing to a reddish-brown.

Introduce 0.1 Gm. of Compound Powder of Glycyrrhiza into a test tube, moisten it with 2 mils of alcohol, then add 10

mils of water, boil the mixture, allow it to cool and then filter; the filtrate is of a pale yellowish-brown color, which changes immediately to a yellowish-red on the addition of a drop of potassium hydroxide T. S.

Compound Powder of Glycyrrhiza is free from an odor of hydrogen sulphide.[14] [13]

Average dose - Metric, 4 Gm. - Apothecaries, 1 drachm.

U. S. P. 1910, p. 345.

PULVIS GLYCYRRHIZAE COMPOSITUS [1]

Compound Powder of Glycyrrhiza [2]

Pulv. Glycyrrh. Co. [4] - Compound Licorice Powder. [3]

Senna, [6] in very fine powder	180 Gm.
Glycyrrhiza, [7] in very fine powder	236 Gm.
Washed Sulphur, [9]	80 Gm.
Oil of Fennel [8]	4 Gm.
Sucrose, [10] in fine powder	500 Gm.
To make	1000 Gm.

Mix the oil of fennel thoroughly with about one-half of the sucrose, then add the remainder of the sucrose and the other ingredients and mix thoroughly. Finally, pass the powder through a No. 80 sieve, pulverize the residue if any should be left on the sieve, add to it the sifted powder, and mix thoroughly. [11] Keep it in well closed containers. [12]

Description and physical properties - Greenish-yellow to greenish-brown, with a fennel-like odor. The elements of identification are the tissues of glycyrrhiza and senna.

Tests for identity and purity - Place 0.1 Gm. of Compound Powder of Glycyrrhiza in a test tube, moisten it with 2 cc. of alcohol, add 10 cc. of water, boil the mixture, cool and filter. The filtrate is of a pale yellowish-brown color, which changes immediately to a yellowish-red on the addition of a drop of potassium hydroxide T.S.

Compound Powder of Glycyrrhiza should be free from an odor of hydrogen sulphide. 14) 13)
Average dose - Metric, 4Gm. - Apothecaries, 1 drachm.

U. S. P. 1920, p. 307-8.

Comments concerning the U. S. P. Text are discussed under the following divisions:

1.) Official Latin Title. The official Latin title remained unchanged since the introduction of the preparation into the 1880 pharmacopoeia.

2.) Official English Title. The same statement holds true for the official English title.

3.) Synonym. The more common vernacular, involving the substitution of Licorice for Glycyrrhiza, was introduced as synonym in 1910 and retained in 1920.

4.) Official Abbreviation. In accordance with the editorial practice adopted in 1910, an abbreviation for the official Latin title was introduced at that time.

5.) Formula. The ingredients remain essentially the same, but in 1890 Oil of Fennel was substituted for Fennel, also the quantities were changed as indicated in the accompanying table. Moreover, whereas the "parts" by weight of the 1880 Pharmacopoeia indicate the transition change from the apothecaries' system of weights and measures to the decimal system, from 1890 on the French system was the only one used.

	1880	1890	1900	1910	1920
Senna	18 pts.	180 Gm.	180 Gm.	180 Gm.	180 Gm.
Glycyrrhiza	16 "	236 "	236 "	236 "	236 "
Fennel	8 "	-	-	-	-

Oil of Fennel -		4 Gm.	4Gm.	4 Gm.	4 Gm.
Washed Sulphur	8 pts.	80 "	80 "	80 "	80 "
Sugar	50 "	500 "	500 "	500 "	500 "
	100 "	1000 "	1000 "	1000 "	1000 "

6.) Senna. Senna is an important constituent of Pulvis Glycyrrhizae Compositus. The proportion of senna in the powder has remained the same, 18 parts to 100 parts in the U. S. P. 1880, and 180 Gm. to 1000 Gm. in the U. S. P. , 1890, 1900, 1910 and 1920. The nmuber of the powder was no. 60 in the U. S. P. of 1880, no. 80 in the U. S. P. of 1890, 1900 and 1910 and a very fine powder, 1920

7.) Glycyrrhiza. Glycyrrhiza is the constituent which gives Pulvis Glycyrrhizae Compositus its title. The proportion of glycyrrhiza in the powder changed after the U. S. P. of 1880. Thus, Pulvis Glycyrrhizae Compositus of the U. S. P. 1880 contained glycyrrhiza, 16 parts to 100 parts, but in the U. S. P. 1890, 1900, 1910, 1920 it contained 236 Gm. to 1000 Gm. or almost one and one half times asmmuch. The number of the powder, no. 60 in the U. S. P. 1880 changed in an identical manner with that of senna.

8.) Fennel. In the U. S. P. 1880, fennel in no. 60 powder, 8 parts to 100 parts was used. In the U. S. P. 1890, 1900, 1910 and 1920, oil of fennel, 4 Gm. to 1000 parts of powder were used. Thus there was a decided decrease due to the fact that the oil replaced the fruit.

9.) Sulphur. The sulphur used in Pulvis Glycyrrhizae Compositus is Sulphur Lotum or washed sulphur which is made

by digesting sublimed sulphur with ammonia water (sublimed sulphur is made from crude sulphur by melting, purifying by distillation and collecting the vapor and condensing into a fine powder). In the U. S. P. 1880, 8 parts of sulphur to 100 parts of the powder were used. This proportion remained the same in succeeding editions of the U. S. P. 1890, 1900, 1910 and 1920, viz., 180 Gm. to 1000 Gm. of the powder.

10.) Sugar. Sugar in a fine Powder, 50 parts to 100 parts or 50% of the powder is sugar in the U. S. P. of 1880. This proportion remains the same, sugar in a fine powder, 500 Gm. to 1000 Gm. of the powder in the U. S. P., 1890, 1900, 1910, 1920 (the sugar is listed as sucrose in the U. S. P. 1920)

11. Directions for preparation. The directions for the preparation of Pulvis Glycyrrhizae Compositus were very brief in the U. S. P. 1880. Rub them (referring to powders) together until they are thoroughly mixed.

In the U. S. P. 1890 Oil of fennel was used instead of fennel, thus making it necessary to mix the oil with ½ of the sugar, then adding the remainder of the sugar and other ingredients and mixing thoroughly, finally passing the powder through a no. 60 sieve.

In the U. S. P.1900, the mesh of the sieve used was changed to no. 80, resulting in a finer powder.

The directions remained the same in the U. S. P. 1910, 1920 to those of the U.S.P. 1900.

Powders act as convenient form for the administration of medicines. Due to their minute subdivision, they are among the most rapidly absorbed of common medicinal agents.

However, they are limited in composition as deliquescent, hygroscopic, efflorescent, corrosive and bitter substances can not be administered in this form. Pulvis Glycyrrhizae Compositus consists of the two laxatives, senna and sulphur, sweetened and flavored by liquorice, sugar and fennel.

Compound Licorice Powder must be made into a paste with water before administration. Thus ordinary sulphur is difficult to mix with water as it tends to float on the surface. Compound Licorice Powder is easily made into a paste. This is presumably due to the fact that some colloidal constituents of senna pass into solution and produce a liquid with properties of a very dilute mucilage.

The fineness of powders is important. This, of course, varies with the kind of substance to be powdered. The following is a list of different grades of powders used in the U.S.P. (1) Coarse powder no. 20
(2) Moderately coarse powder no. 40
(3) Fine powder no. 60
(4) very fine powder no. 80

Thus in the U.S.P. 1880, each constituent except sulphur was in the form of a no. 60 powder and a fine powder resulted. In the U. S.P. 1890, senna and glycyrrhiza were in the form of a very fine powder, no. 80, sugar a fine powder but the powder was passed through a no. 60 sieve resulting inaa fine powder.

In the U.S.P. 1900, 1910, 1920, both senna and glycyrrhiza were in the form of a very fine powder, no. 80, sugar in fine powder and the powder was passed through a number 80 sieve resulting in a very fine powder.

Before passing a substance through a sieve various precautions must be taken. The material must first be dried and the temperature must not be too high or the materials will be

lost. Other substances must first be made into a paste, then dried and powdered.

12.) Conditions for storage. The U.S.P. 1880 does not give any directions for storing but the U.S.P. of 1890, 1900, 1910, 1920 explain that the powder should be kept in well closed containers or vessels. A powder must be protected from air, light and moisture so it will not deteriorate. The powder must be kept in tightly closed containers. Exposure to air and moisture develops an odor of hydrogen sulphide, thus making the powder unfit for use.

Licorice root and senna are always obtained in the crude condition. This is due to the fact that for some purposes they should be broken as little as possible. The average druggist pays very little attention to the preservation of crude drugs. A common method is to wrap in paper and store side by side.

(In the Druggists Circular and Chemical Gazette, vol. 46, 1902, p. 148) Fiebig finds that vegetable powders remain in an excellent condition for an indefinite period of time if the atmospheric air in the containers is displaced by dry carbon dioxide gas.

13.) Dose. No dose was given in the U.S.P. 1880, 1890. The Dose in the U.S.P. 1900 was given as 4 Gm. (60 grains). A similar dose was given in the U.S.P. 1910 and 1920, as metric, 4 Gm. and apothecaries, 1 drachm.

Many pharmacopoeias containing this powder do not give any doses; as Pharm. Borussica, 1805, 1813, 1830, 1847, 1862; Svenska, 1901, 1908, 1925. When the dose is given it is usually 1 drachm, as Pharm. Hannoverian 1819, 1833, 1861. The British Pharmacopoeia 1898, 1914, 1932 gives the dose as

60 to 120 grains, 4 to 8 Gm.

14.) Qualitative test for. No description &rtests for identity and purity of Pulvis Glycyrrhizae Compositus were included in the U.S.P. 1880, 1890 and 1900. The U.S.P. 1910 included quite a lengthy description and test for the powder. It Was described as a greenish yellow to greenish brown powder with a fennel-like odor. As description of the tissues of glycyrrhiza and senna as seen under the microscope when the powder is mounted in water or chloral hydrate test solution was given. Tests for identity and purity were also included, using potassium hydroxide test solution on the filtrate obtained by treating the powder with alcohol and water. A characteristic color change from pale yellowish brown to a yellowish red should result. Compound Powder of Glycyrrhiza is free from odor of hydrogen sulphide.

The U.S.P. 1920 includes a description of the powder and physical properties, given briefly, bringing out the fact that the elements of identification are the tissues of glycyrrhiza and senna. The tests for identity and purity are identical to those given in the U.S.P. 1910.

Qualitative tests are necessary, due to the fact that powders are often adulterated. A great many powdered drugs sold in the general market are unreliable. A great endless number of substances are used in "diluting processes".(1)

(1). Proceedings of American Pharm. Ass. 1873, Vol. 21, p. 1813. A list of adulterants was furnished to Mr. Jamieson by a person who had the opportunity to become intimately acquainted with the secrets and mysteries of drug powdering. Included in this list was licorice adulterated with corn.

Senna is very often adulterated. Thus chestnut leaves are used to adulterate senna leaves. The following test may be made to determine if chestnut leaves are present. A 5% solution of ferric chloride will not blacken senna leaves within thirty seconds but, it will blacken chestnut leaves. Pharm. Ass.
Another contamination arises from the presence of leaves of Solenostemma Argel Hayne, a plant of the order Asclepiadaceae. At Boulak near Cairo at the beginning of the 19th. century Argel used to be mixed with senna in the proportion of 1 to 4. Argel leaves have but a feeble purgative action and occasion griping. Leaves or leaflets of other plants were formerly mixed occassionally with senna.(2)

The sulphur and sulphate(3) content of Pulvis Glycyrrhizae Compositus has caused considerable question. Also at times abnormal samples of Pulvis Glycyrrhizae Compositus may be obtained which bring up a question concerning adulteration.(4)

(2). Poisonous Coriaria Myrtifolia L, Colutea Arborescens L, Egyptian Tephrosia Apollinea Delile. Reference on these three leaves to be found in Pereira's Elem. of Mat. Medica, II, part II (1853), 1866.

(3). Vol. 55, 678-1907, Journal of American Pharm. Ass. Pulvis Glycyrrhizae Compositus. Sulphur and sulphate content - The question having arisen as to how much sulphate would be ordinarily contained in the official (B.P.) prepared Co. licorice powder. F.H.Alcock has made and records the results of experiment from which may be concluded that Pulvis Glycyrrhizae Compositus does not contain appreciable amounts of sulphur or sulphate, nor much organic sulphur and that all sulphate obtained by any process of oxidation of the added sulphur may be rightly ascribed to this alone. Commercial specimens examined by author were found to be variable in quantity of sulphur, 7,1 %, 8.1 %, 9.25 %. One sample gave varying results although taken from the same bottle on different occasions. This was shown to be due to the fact that a good shake of the bottle is necessary to insure uniformity of composition. (Pharm. Jour. Nov. 3, 1906, p. 485)

(4). Vol. 44, p. 438, 1896. Proceedings of American Pharm. Ass. Causes of inferiority in a sample. George Coull

had occasion to make an examination of a sample of Compound Licorice Powder; which was characterized by a light color and a notable deficiency in sweet taste. His experiments led him to the conclusion that powdered licorice root used in the abnormal sample had been extracted with water - either wholly or in part - with a view to removing the dark coloring matter and produced a light colored Compound Licorice Powder. Chem. & Drug. Nov. 30, 1895, p. 798

The practicing druggist has as much or more to do with powdered vegetable drugs than with crude. It is certainly his duty to pass judgment on the purity and identity of drugs. This can be done by a careful micro - chemical reagents and tests.

The application of the microscope is regarded as necessary as shown in the following steps.

(1). Detection of drugs used as adulterations or substitutes.

(2). The selection of the variety, some varieties are worthless.

(3). Differentiation of closely related and very similar drugs.

(4). The detection of damaged goods.

(5). The determination of the proper season of collection

There are various problems connected with specific powders - glycyrrhiza, to distinguish between Spanish and Russian (Thus from Spanish licorice one obtains a greenish gray color, but from Russian licorice root a greenish yellow color is obtained, thus in making Pulvis Glycyrrhizae Compositus it is better to use the Russian.) Senna, to distinguish the two varieties. The microscope must be used - it is as essential as any other instrum ent used in the pharmaceutical laboratories for precision.

When a substance is powdered and sifted as in the case of licorice powder, the cells are separated in general without losing their shape, only the more delicate of the parenchymatous cells break down. The action of sifting as a general rule tends to separate from the powder merely bundles or masses of elements which have escaped the action of the crusher. The microscope should show the characteristics of the powder quite clearly, and it is not necessary to use an amplication of more than 300 diameters.

Before examining the drug under the microscope it might become necessary to overcome difficulties presented by starches, albumen and other substances, obscuring the structural elements.

Kenzel suggests the following method (Western Druggist, Vol. 20, 1898, p. 506).

Mix 5 Gm. of the powder with 200 cc. of dilute sulphuric acid, 1.5 % and heat on a steam bath for about two hours. Strain, wash magma thoroughly and digest in a similar manner with 200 cc. of 1.5 % soda solution. Strain and wash well, first with water and then with alcohol. Then cover residue with ether and after one-half an hour pour off ether and press and dry powder. If found necessary the entire procedure must be repeated, but this seldom happens.

The microscopy of Pulvis Glycyrrhizae Compositus is as follows: It shows first in senna, its characteristic hairs, vessel terminals, stomata and fibers. Senna also contains a few conglomerated crystals of calcium oxalate. In the glycyrrhiza there are a large number of vessels of large size, ranging from 60 to 150 mikra in diameter. The wood fibers are about 25 mikra in diameter. The washed sulphur is

characterized by its tortuous shaped masses resembling ginger rhizomes. The sugar is mostly in fragments of hexagonal crystals. It turns black or blackish on the addition of strong sulphuric acid. In a general way Pulvis Glycyrrhizae Compositus can be distinguished by crystals, vessel-endings, hairs, fibers, starch and special shape of sulphur masses.

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Paggendorff, J. C. 1863.

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The Pharmaceutical Journal and Transactions, 3rd. Series, Vol.I, 1870-71.

The formula of Pulvis Glycyrrhizae Compositus as taken from the Pharm. Borussica is given.

Maisch, John 1872.

On some Pectoral Powders of European Pharmacy

Am. Jour. Pharm., July 1, 1872, p. 292.

Formulas of some European Pectoral Powders are given.

1872.

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Pulvis Glycyrrhizae Compositus

Am. Jour. of Pharm. Aug. 1, 1872, p. 381.

Pulvis Glycyrrhizae Compositus is recommended to be included in the U.S.P.

1872-73.

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Proposed addition to the British Pharmacopoeia

The Pharmaceutical Jour. and Trans., 3rd. Series, Vol. III, 1872-73, p. 948

Pulvis Glycyrrhizae Compositus when prepared with ginger instead of oil of fennel, is improved in taste.

1873.

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Adulterations of Powders

Proc. Am. Ph. Ass., vol. 21, 1873, p. 486.

Licorice is often adulterated with corn.

1873-1874.

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The Pharmaceutical Jour. and Trans. 3rd. Series, Vol. IV, 1873-1874, p. 793.

Pulvis Glycyrrhizae Compositus as adopted by the Pharmacopoeia of Great Britain differs from that contained in other pharmacopoeias.

1874.

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Pulvis Liquiritiae Compositus

The Pharmaceutical Journal and Trans. 3rd. Series, Vol. V, 1874-1875, p. 660.

The formula of Pulvis Glycyrrhizae Compositus as given in the German Pharmacopoeia.

Flueckiger and Hanbury 1874.

Pharmacographia

A history of Radix Liquiritiae is given.

- 1876.

Am Jour. Ph., March 1876, p. 138

The formula of Pulvis Glycyrrhizae Compositus as given in the Pharmacopoeia of Philadelphia.

Flueckiger and Hanbury 1879.

Pharmacographia, 1879, p. 180, 181.

The derivation of thw word licorice is explained, it being a corruption of the word glycyrrhiza; as shown in transitional form, gliquiricia.

Pharmacographia, 1879, p. 220.

Adulteration of senna- Argel leaves are frequently used to adulterate senna, also leaves of several other plants are occasionally mixed with senna.

Pharmacographia, 1879, p. 308.

A brief history of fennel - Fennel was used by the ancient Romans. The diffusion of the plant was stimulated by Charlemagne in Europe.

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Geissler, Dr. Edward, Moeller, Dr. Josef. 1890.

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Pulvis pectoralis, Brustpulver, Hustenpulver, is according the German Pharm. and many others - Saccharum, 6 parts; Folia senna, 2 parts; Radix Liquiritiae, 2 parts; Fructus Foeniouli, 1 part; Sulphur, 1 part.

Geissler, Dr. Ed.

Geissler, Dr. Edward and Moeller, Dr. Josef 1891.

Real Encyklopodie der Gesamten Pharmazie X, Wien und Leipsig, p. 461.

The various methods of forming a powder - The nature of the substance must fisrt be known. Many substances must be dried first. Temperature is also important, it must not be too high.

- 1894.

Von der Ausstellung der Hauptversammlung des Deutschen Apotheker-vereins zu Cassel.

Pharmaceutische Centrahalle, p. 489.

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1894.

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Senna

National Dispensatory, Ed. V.

Description of the Pharmacopoeial varities of Senna.

Coull, George 1896.

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Proc. A. Ph. A., Vol. 44, 1896, p. 436.

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Kraemer, Henry 1897.

Powdered vegetable drugs

Bulletin of Pharmacy, Vol. XI, 1897, p. 441.

The necessity of preserving crude drugs carefully is discussed.

Rusby, H.H. 1897.

The detection of adulteration of powdered drugs.

Pharmaceutical Review,(Drug, Cir. and Chem. Gaz., 1897, p. 185) Vol. 15.

Distinguishing features of powders are usually found in the very form. Different methods of separating drugs from each other are given. Included in this is the separation of senna leaves from chestnut leaves. 5% solution of ferric chloride

will not blacken senna leaves within 30 seconds but will blacken chestnut leaves.

\- 1898.

Examination of powdered drugs.

Western Druggist, Vol. 20, p. 506.

A method is given whereby the difficulties of adulterants ofnonsubstances as starch and albumin obscuring the structural elements in a microscopical examination of powdered drugs is overcome.

Rusby, H.H., M.D. 1898.

Powdered drugs in the Pharm of 1900.

Druggists Circular and Chem. Gaz., vol. 42, p. 205.

The application of a microscope toward the examination of powders is given.

\- 1898.

Qualitative examination of powdered and vegetable drugs.

Pharmaceutical Review, vol. 16, p. 467.

The vegetable drugs are divided into seven classes according to varying shades of color.

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Pharmaceutical Review, Vol. 17, p. 69.

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Emanuel, Louis 1900.

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American Druggist and Pharm. Record.

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\- 1900.

Adulteration of drugs.

Bulletin of Pharmacy, Vol. 14, p. 383.

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\- 1902.

Druggists Circular and Chem Gaz., Vol. 46, p. 148.

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Thomas, John K. 1902.

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\- 1902.

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National Druggist, Vol. 32, p. 221.

A microscope is necessary in the examination of drugs. Just what a microscope shows, the technique and amplications necessary on a microscope are given.

Schneider, Albert 1903.

Powdered drugs.

National Druggist, Vol. 33, 1903, p. 117.

Professor Schneider claims that a microscopical examination and micro-chemical reagents and chemical tests must be used in examining powders.

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Geschichte der Pharmazie, Berlin, 1904, p. 567.

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Pulvis Glycyrrhizae Compositus B.P. Sulphur and sulphate content.

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The magic of Herbs, p. 276.

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A brief history of various pharmacopoeias is given.

- 1931.

Biographisches Lexikon, hervoragender Aerzte, 2nd Ed., p. 635.

A brief summary of the life and works of Kurella is given.

Author Index

Liquor Carbonis Detergens

Products of destructive distillation, natural as well as artificial, have been used medicinally since antiquity. Thus asphaltum or bitumen is an ingredient of several formulas collected by Scribonius Largus[1]. The production of charcoal, used as a fuel in the brasiers of antiquity resulted in tar as a by-product[2]. Dioscorides as well as Scribonius Largus[3] record its use.

That not all wood tars were alike must have been known at a relatively early date[4]. Thus the pine tars, which early found use as naval stores, differed from those obtained from hard wood[5]. Again, a difference between beech wood tar and other hard wood tars was recorded early[6]. Of the destructive distillation products of coniferous trees, the empyreumatic oil obtained by the destructive distillation of juniper wood long played an important role in the materia medica[7]. Hence, when the coal gas industry was first developed in England during the early decades of the nineteenth century[8], it naturally followed that parallel preparations to those made from wood tar should be tried out. Finally, it should be pointed out, that the water gas industry[9] has more recently resulted in a so called coal tar that is differeht from the coal tar resulting as a by-product in the manufacture of coal gas. Mention should be made, incidentally at least, of the products of the destructive distillation of shales[10] including ichthyol[11] if not of the tars resulting in the refining and cracking of petroleum[12].

That the differences between, as well as the similarities of, these various products of destructive distillation had beenoobserved long before the development of modern chemistry has already been alluded to. However, it was only after the rapid development of organic chemistry during the second half of the nineteenth century that our knowledge of coal tar made real progress.[13] Our knowledge of wood tars did not share equally in this progress.[14] It was the enormous development of the coal gas industry after the middle of the nineteenth century that resulted in the productionnof large quantities of coal tar as a by-product. Although the coal gas industry was first developed in England, it was the chemical industry of Germany that exploited the achievements of synthetic organic chemistry not only in the production of "coal tar" dye stuffs, but also of synthetic new remedies.[15]

Yet, phenominal as was the development of new remedial agents of definite composition and known constitution from basal products obtained from coal tar, these synthetics have not replaced completely the coal tar and its simpler preparations. Inasmuch as the coal tar preparations are largely, if not entirely, parallel preparations of those made previously from wood tar, it will benecessary to review briefly the latter. For this purpose it will not be necessary to consider such special products as empyreumatic oil of juniper (and the tar obtained therefrom), neither beech wood tar with its creosote, etc. "Pine tars" being important as naval stores played an important role in commerce, hence were the ones used most in medicine. The botanical source naturally varied with each

country, but for our present purpose differences in the several pine tars may be ignored.[16]

Let us consider pine tar and its galenical preparations,[17] also coal tar and its galenical preparations[18]. These preparations vary with each country but are essentially similar. Pine tar is used as a stimulant and antiseptic in the United States in the following forms. The syrup is made from the rectified oil of tar (which is the volatile oil from pine tar rectified by steam distillation), sucrose and water. Pine tar is used externally as an ointment consisting of yellow wax, petroleum and tar. Other preparations of pine tar are Glycerole of Tar, made by mixing washed tar with alcohol triturating the mixture with magnesium carbonate and water and mixing, also Liquor Picis Alkalinus, which is a solution of pine tar in potassium hydroxide. Galenical preparations of coal tar are Liquor picis Carbonis which is a solution of coal tar in alcohol and quillaja bark which is used to facilitate the action. This is the most common preparation of coal tar although preparations similar to those of pine tar may be made by simple substitution of coal tar for pine tar.

1.) 10. Bitumen. Erdpech, ἄσφαλτος. Scribonius nennt Bitumen Saguntinum, quod est natura liquidum und ferner Bitumen Judaicum. Er wendet bitumen in der Wundbehandlung an, so in dem Cap. 208 erwaehnten, "barbara" genannten Pflaster des Chirurgen Glycon; vergl. "barbarum" bei Celsus.[1] Mit dem saguntischen Bitumen liquidum laesst Largus bei Stockschnupfen die Nase besalben. Das juedische Bitumen stammt aus dem

todtem Meere und ist von fester Consistenz. Gegen Zahnweh werden Raeucherungen mit diesem trockenen Erdharze empohlen. Vergl. diese Studien Bd. 3, p. 244. (R. Kobert, Hist. Stud. V, p. 79)

For the formulas of Scribonius Largus which call for bitumen (solid or Judaicum) and bitumen liquidum (or Sagumtinum), see G. Helmreich, Scribonii Largi Compositius (Univ. Libr. X35Y)
.R7

2.) Cap. 94. Περὶ ὑίσσης ὑγρᾶς Fluessiges Pech. Das fluessige Pech (der Theer) nun, welches Einige auch Konos nennen, wird aus den fettesten Hoelzern der Kiefer and Fichte gesammelt. Als schoen aber gilt das glaenzende, glatte und reine. Es ist wirksam gegen toedtliche Gifte, bei Schwindsucht, Lungengeschwueren, Husten, Asthma, bei schwerem Auswerfen von Schleim (Fluessigkeiten) aus der Brust, wenn es in der Gabe eines Bechers mit Honig aufgeleckt wird. Es wirkt auch als Salbe gegen Anschwellungen der Mandeln, des Zaepfchens und gegen Entzuendung der inneren Schlundmuskeln (Braeune), ferner bei eiterfluessigen Ohren mit Rosensalbe und gegen Schlangenbisse mit fein zerriebenem Salz aufgeschmirt. Mit gleichviel Wachs gemischt entfernt es schorfige Naegel, zertheilt Geschwuelste der Gebaermutter und Verhaertungen des Afters. Mit Gerstenmehl und Knabenurin gekocht zerreisst es ringsum die verhaerteten Halsdruesen. Mit Schwefel oder Fichtenrinde oder Kleien eingestrichen haelt es kriechende Geschwuere auf. Mit Manna und Wachssalbe gemischt, verklebt es die Fisteln, auch bei Schrunden an den Fuessen und

Fingern wirkt es als Salbe heilsam. Ebenso fuellt es die Geschwuere aus und reinigt sie mit Honig; mit Rosinen und Honig zertheilt es ringsum die Karbunkeln und eiternden Geschwuere. Mit Nutzen wird es auch den faeulnisswidrigen Mitteln zugemischt.

Die Bereitung des Theers gibt D. nicht an, wir erfahren sie von Plinius XVI 52. Das Holz wird in Stuecke gesaegt und in einem Ofen, der von aussen allenthalben mit Feuer umgeben ist, geschweelt. Das zuerst Uebergehende (der Holzessig) laeuft wir Wasser in einer Rinne ab, heisst Vedrium und besitzt eine solche Kraft, dass man in Aegypten menchliche Leichname damit uebergiesst und dadurch conservirt. Die nachfolgende Fluessigkeit ist schon dicker und liefert den Theer.

Aus der vielfachen Verwendung des Theers geht hervor, welchen Werth D. denselben beilegte. Auch in neuerer Zeit hat der Theer in der Therapie keine nuwichtige Rolle gespielt, es sei nur an die uebertriebenen Hoffnungen erinnert, welche man seiner Zeit an die Theerkapseln Guyot's zur Heilung der Schwindsucht knuepte. Als aeusserliches Mittel ist er noch jetzt im Gebrauch.

Cap. 95. Περὶ Πισσελαίου. Theeroel. Aus dem Theer wird auch ein Theeroel hergestellt, indem das Wasserartige abgeschieden wird; dieses steht darueber, wie Molken ueber der Milch[1] und wird nun beim Kochen des Theers erhalten, indem reine Wolle darueber ausgebreitet wird, welche, wenn sie aus dem aufsteigenden Dampfe gesaettigt ist, in ein Gefaess ausgedrueckt wird. Dieses geschieht die ganze Zeit hindurch, in welcher der Theer gekocht wird. Es leistet dasselbe wie der Theer. Mit Gerstenmehl aufgestrichen, befoerdert es den Haarwuchs bei der Fuchskrankheit (Alopekie, Haarschwund). Dieselbe Heil-

kraft besutzt auch der Theer, wenn er eingerieben wird, bei Geschwueren ubd Raeude des Viehes.

1) Eigentlich sollte es heisen "ueber dem Kaese".

Das Wasserartige ist Holzessig, welcher im Wesentlichen aus Methylalkohol und Essigsaeure besteht. D. erhaelt durch die einfache Manipulation die fluechtigen Theerbestandtheile, welche wir durch die Destillation gewinnen; es sind hauptsaechlich Kohlenwasserstoffe, Benzol, Toluol, Xylol u. s. w., Koerper von niedrigem Siedepunkt (leichtes Theeroel), vielleicht bei staerkerem Erhitzen auch Phenol und Kreosot (Schweres Theeroel).

J. Berendes, Des Pedanias Dioskurides .....
Arzneimittellehre in fuenf Buechern, p. 93.

3.) 175. Pix liquida. Holztheer von Pinus silvestris L. (Coniferae).

Largus nennt auch pix Bruttia und pix Hispana oder Spana, welche Sorten bei den Roemern im Ruf besonderer Guete standen. Theer wird als Bestandtheil zahlreicher Pflaster genannt, die hauptsaechlich bei der Wundbehandlung in Anwendung kamen. Ferner laesst Scribonius Scabies mit Schwefel und Theer behandln, wie es ja auch heute noch in Form der Wilkinson'schen Salbe geschieht. Einen Mastdarmvorfall besalbt Largus mit Cedernoel und Pix liquida und reponirt ihn darauf; wir gehen allerdings anders zu Werk, aber falls der Theer nicht zu dick aufgetragen wird, so laesst sich gegen diese Anwendung desselben nichts Ernstliches einwenden. Cap. 40 spricht Largus von einem Mittel,

welches ihn, als er von einem kranken Ohr geplagt wurde, vollkommen hergestellt hat. Das Mittel besteht aus 1 Theil und 3 Theilen Oel und wird mittelst einer Spritze dem Ohr beigebracht. Unter χιοσέλαιον oder flos picis versteht Scribonius den beim Kochen des Theers in Wolle aufgefangenen Dampf. Spaeter wird die Wolle ausgedrueckt und auf diese Weise das Praeparat gewonnen. Von χιοσέλαιον sagt Largus, es beseitige den unleidlichen Geruch des Ohrausflusse. Wir koennen uns mit diesem Praeparat und der Anwendung desselben bei Largus nicht vollkommen einverstanden erklaeren. Es handelt sich entschieden um ein terpentinhaltiges Desinficiens. Von χιοσέλαιον. handelt auch Dioscorides (I, 95).

R. Kobert, Hist. Stud. V, p. 67.

453. Qafr ul-jahud. Bitumen judaicum, Judenpech. Das beste Judenpech stammt aus Palaestina, ist schwarz und glaenzend. es ist (macht) heiss und trocken in zweiten Grade, erweicht die harten Geschwuelste und zieht die frischen Wunden zusammen.

454. Qir. Terra bituminosa, mit Naphtha getraenkte Erde. Die Wirkung dieses Mittels steht der des Judenpechs nahe; es ist (macht) kalt und wirkt verduennend.

Die pharmakologischen Grundsaetze des
Abu Mansur Muwaffak bin Ali Harawi (See p. 137)
R. Kobert, Hist. Stud. 3,p. 244.

4.) Gildemeister u Hoffmann, Aetherischen Oele III Auflage, Band 1, p. 101, 108, 130, 171

Various wood oils obtained at early date

1. Turpentine Oil (prep. recorded by Dioscorides)
2. Oil of Cypress (known as early as 1672)

Lebanon Cedar Oil (method of preparation given by Herodotus, Dioscorides and Pliny)

3. Oil of Sandalwood (known to Egyptians as early as 11 century B.C.

4. Oil of Elemii (used by Romans, based on surmise)

Definite methods of distillation were used for the wood oils.

5.) Gildemeister and Hoffmann, 2nd Edition - Translated by Edward Kremers, Vol. II, p. 97, p. 96.

American Wood Turpentine Oils

Production: As early as 1841 attempts were made to utilize the "light wood", which name owes its origin to the use made of it in torches, by subjecting it to destructive distillation. It was thought that this wood might yield as much wood spirits, acetic acid, charcoal, gas and atr as did the foliage woods("hard woods"). It did not give results as long as the principle of destructive distillation was employed. Other methods were tried, 1. to heat the wood in resin baths and inject steam, 2. comminuted wood distilled in superheated steam, 3. Use of non-superheated steam. In 1910 there were 30 factories in the United States that distilled soft woods, yellow pine, smaller amounts of Norway pine and Douglas fir.

Wood turpentine oil (obtained from soft woods) is neither a genuine turpentine oil nor a pine tar oil. It is obtained from the trunks and stumps by steam distillation and not by destructive distillation. Because of method of preparation,

those constituents produced at a high temperature and characteristic of pine tar oils, phenols, pyroligneous acid, furfurol, diacetyl, etc. are not in the wood turpentine oils. However, wood turpentine oils contain a number of oxygenated substances not found in turpentine oils. The S. G. is higher and the viscosity is greater.

Abraham, Asphalts and Allied Substances, 3rd Ed. N. Y. 1929, p. 219.

Hard woods include maple, birch, beech, oak, poplar, elm, willow, aspen, alder, ash, hickory, chestnut and eucalyptus.

Resinous or soft woods include the pine, fir, cedar, cypress, spruce, hemloch, larch or tamarack. Soft woods are distinguished from hard woods principally in that the former contain large quantities of turpentine and resin. The distillation of hard wood aims at the recovery of wood alcohol, acetates, tar and charcoal, whereas distillation of soft wood aims at recovery of turpentine, wood tar oils, tar and charcoal.

Hawley, L. F., Wood Distillation, 1923, p. 108.

The yield of methyl alcohol and acetic acid is much lower from distillation of soft woods than hardwoods. The tar obtained from soft wood is mostly resinous. It is not known if a non-resinous soft wood gives a tar just like hardwood tar but it is similar in external appearance.

Gildemeister U Hoffmann, Die Atherischen Oele, III Auflage, Band I, pp. 101-103.

The products of the pine forests of North America were used principally in ship building and as naval supplies, thus products were termed naval stores.

6.) Hager's Handbuch der Pharmaceutischen Praxis. 1 Band A -G

Fagus - Oleum Fagi silvaticae.

From the wood, by means of destructive distillation, Beechwood tar is obtained and from this, creosote is obtained.

Howley, L. F., Wood Distillation, 1923, pp. 34, 43.

Considerable acetic acid and methyl alcohol are obtained from destructive distillation of beechwood. Wood tar is the only raw material for medicinal beechwood creosote.

Most hardwoods conform to the following - amount of tar decreases with decrease of alcohol and increase of charcoal. Beechwood does not conform to this.

7.) Gildemeister U Hoffmann, Die Atherischen Oele, III auflage, Band I, p. 108, 109.

Oil of Juniper berries - As oleum de granis Juniperi, it was kept in stock in Rotheapotheke of Braunschweig in 1521. Its preparation was described by Valerius Cordus in 1546. The oil distilled from juniper wood is mentioned repeatedly in treatises on distillation. It is rarely distilled from wood of Juniperus communis but mostly from J. Oxycedrus. It was known to the R Romans. The method of preparation is described by Meuse the younger who died in 1015.

8.) Coal tar and Ammonia, Lunge, Part I, 1909, p. 6-8

Before the latter part of the 17th. century no notice seems to have been taken of the appearance of tar during

heating of coal. In 1737-38 Clayton, found that besides coke and tar combustible gases were formed by destructive distillation. About the middle of the 18th. century the use of coal became more general, and more especially the manufacture of coke for smelting purposes, instead of wood charcoal, began to be practiced on a more extensive scale. The manufacture of illuminating gas from coal seemed to have occurred, toward the end of the last century to the Frenchman, Lebon and the Englishman, William Murdock at about the same time. The former had already recommended the use of tar for preserving timber, but Murdock along with his pupil, Clegg, really laid the foundation of the gas making industry. The first private gas-works was erected in 1798, at engineering works of Bolton and Watts; The first public gas works in London in 1813, Paris 1815 and Berlin 1826.

9.) Coal Tar and Ammonia, Lunge, Part I, 1909, p. 157.

The introduction of water-gas (which is not incompatible with the production of tar) has not reduced the manufacture of coal gas.

Molinari, General and Industrial Chemistry, 1920, p. 486-489.

Water gas contains CO, H_2, together with CO_2, N, is used as a source of heat, light and motive power.

As an illuminant, water gaswas useless until the discovery of the Auer mantle, as there was always the danger of poisoning in cases of escape or incomplete combustion owing to high content of CO.

In North America water gas, has been carburetted with

light petroleum, also Auer mantle makes it possible to use it very economically.

The water gas industry has developed considerably first in the United States, where there is an abundance of anthracite which contains little bituminous matter and hence lends itself to production of water gas. In Europe, its development has taken place, especially since 1890 as result of investigations by Bunte, Quaglio, Schiele, Blass, etc.

As a rule, water gas is used without further purification especially when used for heating purposes, when however, it is employed in gas engines, it is advisable to purify it from sulphur compounds.

10.) Shale tars.

Abraham, Asphalt and Allied Substances. 1929, p. 251-262.

Scotland is the home of the "Shale oil industry". In the United States the distillation of shales is more or less in a process of development, and at present is in an experimental stage.

Crude tar is generally termed "shale oil" but this name is just as inappropriate as the expression "Oil shale" often used to designate the shale.

Shale tar is one of the products obtained on destructive distillation of shale. It usually appears in a black mass with a greenish fluorescence. It is similar in composition to lignite tar, although it contains a larger percentage of nitrogen (1.1 to 1.5 %). Members of the paraffin and

olefine series make up 80 -90 % by weight of the tar. Small quantities of cresols and phenols are present. The percentage of phenols contained in shale tar is much smaller proportionately than that present in peat and lignite tars. Shale tar contains larger percentages of nitrogen and sulphur, and smaller percentages of oxygen, paraffin and phenols.

When shale tar is distilled the following products are obtained. (1) non-condensible gases, (2) crude naphtha, (3) so called "crude distillate" or once run oil or "green oil", (4) coke.

11.) Hager's Handbuch der Pharmaceutischen Praxis, 1902, II Band, p. 646-652.

Ichthyol.

A bituminous stone is found at Seefeld, 50000 feet above sea level in the Austrian Tyrol. Ichthyol is obtained by the dry distillation of this stone. The veins are enveloped by a strata of another rock, which is called "gallenstein". This rock shows fossil impressions, especially of fish.

There are numerous preparations some of which are:

Collodium Ichthyoli

Gelatina Ichthyoli Unna

Pasta Ichthyoli

Saponimentum Ichthyoli

Suppositoria Ichthyoli, nach Ehrmann

Unguentum Ichthyoli Compositum Unna

12.) Coal Tar and Ammonia, Lunge, Part I, 1909, p. 144.

Liebermann and Burg, 1878, found that petroleum and paraffin oils when passed through red hot tubes filled with porous material, are converted into a mixture of hydrocarbons very similar to coal tar, containing about 4% benzene and t toluene and 0,9% crude anthracene. Petroleum and vulcan oil yielded much gas and benzene but hardly any anthracene.

Abraham, Asphalts and Allied Substances, 1929, p. 212, 218.

Petroleum products (e.g. "gas oils") upon being subjected to a high temperature under more or less pressure in a closed retort will result in the formation of oil-gas tar; when sprayed on incandescent anthracite coal or coke result in the production of water gas tar. The crude petroleum or "gas oil" is sprayed into the closed heated retort. This causes oil to decompose into a permanent gas and from 5 to 10 % by weight of oil gas tar. In th case of water gas tar, from 2 to 10 % of tar is produced, based on the weight of petroleum or gas oil used. The water gas tar is similar in its physical and chemical properties to the oil gas tar.

13.) Abraham, Asphalt and Allied Substances, 1929, p. 263-308.

Coal tar may be obtained as a by-product from bituminous coal in (1) Gas works, (2) Coke ovens, (3) Blast furnaces, (4) Gas producers, (5) Low temperature processes.

When coal tar is subjected to distillation one or more of the following distillates is obtained.

(1) Light oil or "crude naphtha". It constitutes the

fraction lighter than water and is distilled over below vapor temperature of 200° C. It contains crude benzol, toluol, solvent naphtha (Xylol) and heavy naphtha.

(2). Middle oil from 210°-250° C. Acid products are obtained, phenol, cresols.

(3). Heavy oils - 250 C to anthracene oil fraction, or creosote oil.

(4). Anthracene oil - Last fraction - Anthracene, used principally to produce alizarin and other coal-tar dyes.

14.) Abraham, Asphalt and Allied Substances, 1929, p. 219 - 232.

Two types of wood may used to obtain wood tar. Hard woods - or resinous, or soft woods.

The bituminous products derived from the destructive distillation od wood are known commercially as hard wood tar and pine tar, hard-wood tar pitch and pine tar pitch.

The physical and chemical properties of the tars vary according to the wood which is used, and also to the method of treatment.

When wood tar is shaken with water, the aqueous extract will react acid (due to acetic acid present). Both hard wood tar and pine tar are almost completely soluble in absolute alcohol, glacial acetic acid and acetic anhydride. When wood tar is subjected to distillation, the first portion shows a separation of water which will react acid. As distillation is continued, oily materials are obtained which dissolve readily in alcohol, and when treated with sulphuric acid

become water-soluble substances.

Tar is one of the products obtained by destructive distillation of wood. The pyroligneous acid (another product obtained) and tar are separated by settling. Then both pyroligneous acid and tar are distilled in order to obtain a pure product of each. The method consists of heating the tar with steam.

The dehydrated tar makes up from 3 to 10 % of the wood. It may be used as follows: (1) sold as such and used for preserving wood, (2) burned under retorts as fuel, (3) subjected to fractional distillation thus obtaining light oils, used as solvents in manufacturing varnishes, heavy oils after further refining marketed as wood creosote used as a disinfectant, wood preservative and flotation oil, and residual pitch.

15.) Four Thousand Years of Pharmacy, LaWall, p. 505.

The factor of outstanding importance in the 19th. century was the appearance of synthetic remedial agents, "the products of the tar barrel". Thus, in the unsuccessful search for synthetic quinine by Perkin in 1856, which led to the discovery of the first coal tar dye called "mauve" or Perkins purple brought about unexpected developments in the coal industry.

Die Aetherischen Oele, Von E. Gildemeister u Hoffmann, III auflage, Band I, p. 253-255.

In modern chemical industry, Germany unquestionably ranks first. Beginning about the middle of the past century,

simple apparatus took on a different shape in the factory of the volatile oil industry. This larger and more rationally constructed distilling apparatus increased the yield and produced oils of a better quality. Southern France and Germany lead as principal centers of production.

Four Thousand Years of Pharmacy, LaWall, p. 506.

The coal tar industry influenced chemistry along 1. preparation of remedial agents, 2. preparation of antiseptics, Some of the remedial agents were synthetic products identical with those that had formerly been obtained from natural sources. Others were new to science, as acetanilid, antipyrin.

16.) Handbuch der Pharmakognosie, A. Tschirch, Band II, Part II, p. 892-900.

Pine tar and source - varies with the country.

America,

Pinus australis Mich. (P. palustris Mill, longleaf pine, Southern Pitch pine)

P. heterophylla (Elliol) Sudue . (P. cubensis Greiseb, P. Elleotii)

Engelm, P. Taeda var. heterophylla, cuban - swamp or slash pine.

Pinus Taeda L (Loblolly pine, old field pines)

P. echinata Mill. (P. mitis Mich. Shoreleaf pine)

Pinus rigida Mill. (Pechkiefer)

P. glabra Wall (spruce pine)

France.

Pinus Pinaster Solandes (P. Maritina Lam.)

Spain, Algeria, Greece

Pinus halepensis

Austria.

Pinus Laricio Poiret (Schwarzhiefer)

Pinus Laricio var. Austriaca Endl.

Germany.

Picea vulgar, Lk.

P. excelsa Link

Pinus Abies L.

P. Picea Duroi

Abies excelsa Poir

Pinus silvestr. L.

Russia, Poland, Finland, Sweden

Pinus silvestris

Picea vulgar

Abies sibirica

India.

Pinus longifolia

Burma.

Pinus Khasya

P. Merkusii

Philippines.

Pinus insularis Endl.

Japan

Pinus Thunbergi

Real-Encyklopoedie der Gesamten Pharmazie, Zweite auflage.

XII, p. 109.

Portugal, same as Spain

Pinus Pinaster Solander P.

Canada.

Abies Canadensis (L) Miller

Abies balsamea Marsh

Pinus Fraseri Pursh

Hungary

Pinus Mughus Scop.

17.) Hager's Handbuch der Pharmaceutischen Praxis, 1902, II Band, p. 646-652.

Preparations from wood tars.

Dr. Berkelys antiherpetic capsules

Aqua Picis (Germ. Helv.) Eau de goudron (Gall.)

Aqua picea, Theerwasser, Tar-water

Oleum Picis, Oleum Picis liquidae, U. S.

Oleum Pini rubrum

Oleum cedriae

Theeroel

Pechoel

Resineonum Picis, Resinéone de goudron, tar oil resineon

Mistura Olei Picis (Nat. Form) Pommade de Goudron (Gall.)

Sapo Picis (Hungarica)

Sirop de Goudron (Gall.)

Siripus Picis cum Codeine (Helv.)

Unguentum Picis (Hamb.V)

Unguentum Picis Compositum (nat. form)

Unguentum Picis liquidae (Brit.)

Vinum Picus (nat. form)

Emplastrum Picis canadensis (nat. form)

18.)

Pix carbonis praeparata (Brit.) Prepared coal tar.

Teinture de Bois de Panama coaltarée (Gall.)

Stein Kohlen-asphalt

Calcaria sulphurica piceata

Extractum Lith anthracis

Liquor anthracis acetonatus

Liquor carbonis detergens

Liquor Lithanthracis acetonatus

Liquor Musci detergens

Sapo carbonis detergens liquidus

Emplastrum Picis canadensis (nat, form)

Emulsion mere

Tinctura Lithanthracis.

Coal Tar Ointment

Inasmuch as coal tar ointment, when applied, leaves much to be desired as to cleanliness, it seemed desirable to ascertain which constituents thereof were therapeutically effective as remedy for eczema and possibly other skin diseases.

For this purpose a gallon of coal tar was donated by the Milwaukee Gas Light Company from its works in which illuminating gas is manufactured by the retort process, hence uncontaminated with water gas tar. This was resolved into several fractions by treating it with selective solvents, also by the distillation, under diminished pressure, of one of the extracts.

Moisture Determination. In order first to determine its water content, a moisture determination was made by the xylene method. At the same time the amount of xylene-soluble material in the tarvwas acertained by filtering the hot xylene solution and evaporation of the solvent.

I. 24 Gm. of tar yielded 0.89 cc of H_2O = 3.7 p.c. moisture, 13.09 Gm. = 54.5 p.c. xylene soluble constituents, and 9.7 Gm. = 40.4 p.c. insoluble residue. Total 98.6 p.c.

II. 21 Gm. of tar yielded 0.75 cc of H_2O = 3.6 p.c. moisture, 11.8 Gm. = 56.4 p.c. of xylene soluble constituents, and 8 Gm. = 38.1 p.c. inmoluble residue. Total 98.1 p.c.

Extractions with Petroleum Ether, and Ether. 100 Gm. of tar were shaken for 2 hrs. with 90cc of petroleum ether and the hydrocarbon extract separated from the undissolved tar. The residue was then shaken with 80cc ether and the ethereal

solution separated. After evaporation of the solvents, the extracts were weighed. The results are herewith tabulated:

	I		II	
	Weight	Percent	Weight	Percent
Petroleum ether extract	30.11 Gm.	30.11 p.c.	33.0 Gm.	33.0 p.c.
Ether extract	18.7 "	18.7 "	20,2 "	20.2 "
Residue	42.82 "	42.82 "	40.1 "	40.1 "
Total	91.63 Gm.	91.63 p.c.	93.3 Gm.	93.3 p.c.
Loss	8.37 "	8.37 "	6.7 "	6.7 "

Extraction and Distillation of Coal Tar. In the process of distillation of coal, coal gas is a very important substance brought into existence. A final residue of coke is obtained, which is impregnated with the sulphur which has not volatilized in the form of sulphurous gases. However, gas-tar and ammoniacal liquors are also two very important products. At one time these were regarded by the gas engineers to be necessary nuisances. Now, However, they enable gas to be sold at much cheaper prices, due to the fact that they can be utilised.Tar in its primitive condition has been used, as every one is aware, for painting or tarring various objects, to protect objects from ravages of insects and worms, or to prevent corrosion when applied to metal piers. However, it can be used to much better advantage and far more interesting purposes than originally dreamed of.

The chemist has been very interested in aromatic chemistry as connected with the coal tar industry in the past fifty years. Due to the fact that certain substances can be obtained very cheaply from coal tar, extensive studies have been made to obtain commercial products. These early investig-

ators were rewarded as they obtained dyestuffs, drugs, perfumes, flavors, explosives and photographic developers.

The refining of coal tar is carried on by distillation and chemical treatment. In the process of distillation, the tar after standing in tanks for some time, in order to separate from ammoniacal liquor, is pumped into large stills and heat is applied. The more volatile products pass over and are collected. These are the first light oils, or crude coal naphtha. Next, by increasing the heat, medium oils, next the heavy oils pass over and when the last of these the "green oil" distills over - pitch alone is left. Pitch is used to a large extent in the preparation od artificial asphalt and also of a fuel known as "briquettes".

The products thus obtained are not pure but are subjected to further distillation., and a great variety of oils are obtained which retail under various names.

The following is a chart showing the products obtained from the distillation of a thousand (1000) pounds of coal tar.

1000 lbs of coal tar
distilled yields

Light oil redistilled yields approx.	Middle oil extracted with NaOH and redistilled	Heavy oil yields impure cresols and phenols	Green oil yields anthracene 5-20 lbs	Pitch 500-600 lb
16 lbs Benzene 2.5 lbs toluene 0.3 lb xylenes	Phenol and cresols together about 20 lbs	Naphthalene 40 - 60 lbs.		

Benzene or benzol is one of the best known products in the fractional distillation of crude coal naphtha. Other products of

the same light oils are toluene and xylene.

Benzene is highly inflammable, its valors ignite in the presence of a flame, and if vapor becomes mixed with air before ignition, it is a dangerous explosive. Benzene is used as a solvent (for removing grease from clothing etc.) By further distillation a light oil is given off, "artificial turpentine oil". This is used as a solvent for varnishes and lacquers.

By distillation of heavy oils, carbolic acid, anthracene and naphthalene are obtained. The pure compounds, especially carbolic acid or phenol, are used as antiseptics and disinfectants. Owing to the wide spread knowledge of the causes of disease and greater efforts made to improve hygiene, the demand for antiseptics and disinfectants has greatly increased. Many disinfectant preparations of which carbolic and cresylic acids form the basis are on the market.

Naphthalene, besides being used in chemical industry is employed as a disinfectant and preservative against attack of moths and other insects.

The use of coal tar on a large scale dates from the introduction of the pickling process by John Bethell in 1838. Coal tar creosote has been found to be superior to all other substances for preserving wood. The life of the wood is trebled or quadrupled, resulting in a great saving in the cost of upkeep of wooden wharves etc., and more important, a reduction in consumption of timber. This reduction is worth while in these days when the world's resources of timber are being rapidly depleted.

Creosote oil also possesses disinfecting properties and

is used in the preparation of cattle washes, sheep dips and general disinfectants. Creosote oil, fractionated by distillation is also used in the production of lamp black, for softening hard pitch, and as a liquid fuel for Diesel engines.

Tar is used for sprinkling roads. Hard and soft pitch find use as road binding material, manufacture of roofing felt and briquettes, and many other uses of importance.

Extraction and distillation of coal tar. 1006 Gm. of the coal tar obtained from the Milwaukee Gas Light Company were extracted with 5 liters of ether and the ethereal solution evaporated. 682 Gm. of extract, or roughly 68 p.c. were thus obtained. The ether-insoluble residue weighed 268.5 Gm., or about 27 p.c., involving a loss of 5 p.c.

The ether extract was distilled under reduced pressure with the following results:-

Fraction	Temp.	Pressure	Yield
I	-95	9 mm.	111.6 Gm.
II	95-140	4 "	79.5 "
III	140-295	33 "	178.0 "
			369.1 Gm.

The non-volatile residue obtained weighed 297 Gm. and was black. The following is a brief description of the three fractions:

Fraction I. A light yellow liquid which solidified on cooling.

Fraction II. Amber colored liquid.

Fraction III. A dark brown liquid which solidified as

it passed through the condenser.

The following is a brief description of the ether insoluble portion of the tar (residue upon ignition).

A black carbon-like mass which (on ignition) brought about by heat of bunsen burner, produced a reddish glow similar to the burning of coal.

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Just as tar, i.e. wood tar, resulted as a by-product in the production of charcoal by the destructive distillation of wood, so coal tar resulted as a by-product in the manufacture of coal gas. Inasmuch as wood tar has been used for medicinal purposes, it followed that coal tar should be tried out as a remedial agent. Only the smallest fraction of one percent could be used in this manner.

However with the resolution of coal tar - again similar to that of wood tar - into such technological products as tar oil (corresponding to wood tar oil) and pitch or asphaltum (corresponding to wood pitch and in a measure to natural asphaltum) various other products applicable to medical and sanitary uses were obtained (e.g. disinfectants for toilets, etc.). But it was with the chemical study of these technological products that new industries were developed, e.g. the dye-stuff industry, that of medical synthetics, of saccharin, a sweetening agent, etc. As intermediates, a variety of products were obtained, such as benzene, naphthalene, anthracene, phenols, etc. which were used as such (e.g. naphthalene as insecticide, the individual (carbolic acid) amd mixed (tricresol) phenols as antiseptics and disinfectants, but by far the larger bulk of these were prepared by a distinct branch of chemical industry for the manufacture of dyes and synthetic new remedies.

In this country, however, in which the dyestuff industry consumes only a fraction of the coal tar products as a by-product in the gas and coke industries (as a matter of fact in the latter the by-products were wasted, i.e. burned, for the

most part until recently) the extensive construction of "oiled" gravel roads provided an outlet for enormoun quantities of coal tar without chemical treatment.

The study of all these technological products from crude to intermediate to individual synthetic chemical has given rise to an extensive literature. While some of the treatises consider a single substance, e.g. benzol, others a distinct group of products, e.g. coal tar dyes, still others are more general,e.g. "The constituents of coal tar", yet another is devoted to processes rather than products, e.g. "Coal tar distillation". Hence, to classify the texts would seem impracticable. Without attempting to give a complete bibliography of this field, such texts as are available in the University Library are herewith listed chronologically. In addition, the subjects indicated in the titles are arranged alphabetically with reference to the texts that include them.

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