

COLORIMETRIC ESTIMATION OF IRON IN PHARMACEUTICAL PREPARATIONS.*

BY JOSEPH L. MAYER.

The National Formulary, in addition to giving a formula for beef, iron and wine, solution of iron peptonate, solution iron albuminate, etc., has a note appended to the process stating the approximate quantity of iron contained in the finished product. In view of the fact that the National Formulary is a legal standard, it is necessary to analyze this class of preparations to ascertain whether they are of the proper strength, and as there is no method of assay official, I have for a considerable time employed the following colorimetric method with excellent results:

Ten Cc. beef, iron and wine are diluted with distilled water to 500 Cc.; 5 Cc. of this solution are evaporated and ignited in a platinum dish, 5 Cc. HCl (1-1) added, the material boiled an instant, poured into a 100 Cc. Nessler tube, water added q. s. 100 Cc., 3 drops of KMnO_4 solution (5-1000) added to oxidize the iron, and after a few minutes 10 Cc. of KSCN solution (20-1000) added, the color produced being immediately compared with the iron standards.

The iron standards are made up according to the method of D. D. Jackson, by mixing definite quantities of two solutions, one containing potassium platonic chloride and the other cobaltous chloride (Tech. Quar., vol. xiii, No. 4, Dec., 1900, p. 320). Mr. Jackson suggested these for the analysis of water, for which purpose I have employed them for a number of years. The first edition of the "Standard Methods for the Examination of Water and Sewage" of the American Public Health Association contained them, but for some reason, unknown to me, the present second edition of that work has omitted the method. The standards are prepared so that when 100 Cc. of water are taken for analysis, the reading on the tubes indicates at once parts per million (mg. per L.). To determine the accuracy of the method, the following experiments were conducted, the sample employed being beef, iron and wine, the results recorded being the mean of several analyses, all of which yielded extremely close checks:

(A) Ten Cc. beef, iron and wine were diluted to 500 Cc., and 5 Cc. of this dilution were evaporated, ignited and treated as above in the colorimetric method. The material matched standard tube 1.75; then since 5 Cc. = tube 1.75 \times 100 = the entire 500 Cc. dilution = 175. As the 500 Cc. contained 10 Cc. beef, iron and wine, this, multiplied by 10, equals 1750 for 100 Cc. beef, iron and wine. As the standards are so constructed that the reading gives immediately parts per million when 100 Cc. water is taken for analysis, then 100 Cc. beef, iron and wine would equal 1750 parts per million, or 1750 mg. per 1000 Cc. beef, iron and wine, or 175.0 mg. per 100 Cc. beef, iron and wine. Or, what is simpler, multiply the reading on the standard tube by 100, and when the above quantities of sample are employed, the result will be milligrammes of iron per 100 Cc. of sample. The sample indicated the presence of 0.175 Gm. iron per 100 Cc.

(B) Ten Cc. beef, iron and wine were taken, evaporated in a platinum dish on a water-bath, ignited by placing one Bunsen burner under the dish and playing another Bunsen flame, held in the hand, on top of the residue, thus easily ashing the material without any loss through foaming, etc. The dish containing the ash was then placed on the water-bath, 10 Cc. strong hydrochloric acid and 15 Cc. water added, and heated until completely dissolved. This was then filtered through a 9 cm., ashless filter paper into a 400 Cc. nonsol beaker, and the filter washed

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until free from iron, the solution in the beaker then oxidized by boiling with HNO_3 , precipitated with filtered NH_4OH , filtered through a Gooch crucible, washed, dried, ignited and weighed as Fe_2O_3 . The weight of $\text{Fe}_2\text{O}_3 \times .70 \times 10 =$ weight of iron as metallic iron per 100 Cc. The analysis indicated the presence of 0.2765 Gm. iron per 100 Cc. The difference between these figures and those obtained by the colorimetric method being so great, another gravimetric determination was made as follows:

(C) Ten Cc. beef, iron and wine were treated as under (B), the thoroughly washed precipitate of $\text{Fe}_2(\text{OH})_6$ dissolved in hot HCl , the paper thoroughly washed, and the iron again precipitated from the solution, and the analysis completed as under (B).

The analysis indicated the presence of 0.2743 Gm. of iron per 100 Cc.

Another determination was made as follows:

(D) Ten Cc. beef, iron and wine were diluted with about 100 Cc. distilled water, ammonium chloride, and an excess of NH_4OH added and H_2S passed to saturation. About 10 Cc. ether were added, the material thoroughly stirred while heating on a water-bath, and filtered through a 9 cm. filter (the addition of ether and thorough stirring make the precipitate settle quickly and cause a very rapid filtration), washed thoroughly. The precipitate was then dissolved in HCl , catching the solution in a 400 Cc. nonsol beaker, the paper washed thoroughly and the solution boiled to get rid of H_2S , after which it was oxidized with HNO_3 , the iron precipitated and the analysis conducted as under (B). The analysis indicated the presence of 0.175 Gm. iron per 100 Cc. of solution.

Another analysis was then made as follows:

(E) Ten Cc. beef, iron and wine were ignited and dissolved as under (B). This solution was then poured into a porcelain evaporating dish, HNO_3 added to oxidize, boiled and evaporated to dryness on a water-bath. Water was added and the material was again evaporated to dryness. This treatment was repeated until all HNO_3 was expelled, after which the residue was dissolved in HCl , transferred to a 100 Cc. glass-stoppered flask and the assay completed by the U.S.P. Iodometric Method. The analysis indicated the presence of 0.1787 Gm. iron per 100 Cc.

Another analysis was made as follows:

(F) Ten Cc. beef, iron and wine were ignited as under (B), and the ash carefully moistened with a few drops of HNO_3 , evaporated, ignited, and the material dissolved by heating with diluted HCl (10–15), and the determination finished by the U.S.P. Iodometric Method. The analysis indicated the presence of 0.1789 Gm. iron per 100 Cc.

Another determination was made as follows:

(G) Ten Cc. beef, iron and wine were ignited and dissolved in HCl as under (B). This solution transferred to a 250 Cc. Erlenmeyer flask almost filled with distilled water, heated to almost boiling, H_2S gas passed to saturation, boiled on a gauze (gently at first to avoid loss) until the solution was reduced to about one-half its volume, cooled and titrated with $\text{N}/10 \text{ KMnO}_4$ V.S. until the appearance of a permanent pink tint (Conn. Agr. Exp. Sta., 1907–08, page 685). The analysis indicated the presence of 0.1839 Gm. of iron per 100 Cc.

Another determination was made as follows:

(H) Ten Cc. of beef, iron and wine were ignited and dissolved in HCl as under (B), the solution reduced with stannous chloride and titrated with $\text{N}/10 \text{ K}_2\text{Cr}_2\text{O}_7$ as directed in the methods of the U. S. Steel Corporation for the analysis of iron ores (*Journ. Ind. Eng. Chem.*, Feb., 1909, page 107). The analysis indicated the presence of 0.1831 Gm. of iron per 100 Cc. Another determination was made as follows:

(I) Ten Cc. beef, iron and wine were ignited and dissolved as under (B),

the solution reduced with stannous chloride and titrated with N/10 KMnO_4 , as directed in the methods of the U. S. Steel Corporation for the analysis of iron ores (Journ. Ind. Eng. Chem., Feb., 1909, page 107). The analysis indicated the presence of 0.1776 Gm. iron per 100 Cc.

Another determination was made as follows:

(J) Ten Cc. beef, iron and wine were ignited and dissolved as under (B), the solution transferred to a 250 Cc. Erlenmeyer flask fitted with a rubber stopper and Bunsen valve, a few crystals of KClO_3 added, placed on the hot plate, boiled gently a few minutes, about 2 Gm. of iron-free zinc added (.002 percent Fe), a little sodium carbonate added to expel the air, heated nearly to boiling until the color of the solution was green and entirely free from the slightest tint of yellow. The stopper was then removed and a mixture of 10 Cc. H_2SO_4 and 20 Cc. H_2O added, and, after adding a small amount of sodium carbonate to expel the air, the stopper was replaced and the solution again heated until no undissolved particles of zinc remained. After allowing the solution to cool, it was diluted with cold, recently-boiled, distilled water and titrated with N/10 KMnO_4 until the appearance of a pink tint. The analysis indicated the presence of 0.1776 Gm. iron per 100 Cc.

The results by all methods were as follows:

- A. 0.175 Gm. iron per 100 Cc. beef, iron and wine.
- B. 0.2765 Gm. iron per 100 Cc. beef, iron and wine.
- C. 0.2743 Gm. iron per 100 Cc. beef, iron and wine.
- D. 0.1750 Gm. iron per 100 Cc. beef, iron and wine.
- E. 0.1787 Gm. iron per 100 Cc. beef, iron and wine.
- F. 0.1789 Gm. iron per 100 Cc. beef, iron and wine.
- G. 0.1839 Gm. iron per 100 Cc. beef, iron and wine.
- H. 0.1831 Gm. iron per 100 Cc. beef, iron and wine.
- I. 0.1776 Gm. iron per 100 Cc. beef, iron and wine.
- J. 0.1776 Gm. iron per 100 Cc. beef, iron and wine.

A glance at the above table will show that all methods excepting (B) and (C)—both practically identical—yielded the same results, the mean (excluding (B) and (C)) being 0.1787.

I am at a loss to account for the high results under (B) and (C), for, if it is assumed that the wine employed in making the beef, iron and wine contained aluminum, or that the precipitate was contaminated with silica dissolved by the alkali from the glass, this same condition should hold for (D), where the iron was precipitated with NH_4OH and H_2S , dissolved and reprecipitated with NH_4OH , which, of course, would precipitate aluminum and silica. The precipitations were made in nonsol beakers, the solutions being filtered very rapidly to avoid contamination with the silica of the glass.

The fact that the results by method (D) closely check the colorimetric and volumetric methods makes it difficult to explain these high results.

It is clearly proven by these results that the determination of iron in this class of preparations by precipitation, as hydroxide, ignition and weighing, as oxide, is apt to lead to high results and is therefore not a suitable method.

In laboratories equipped with the iron standards, the colorimetric method for the quantitative estimation of iron is extremely accurate, easy to apply and rapid. Should, however, another method be desired, any of the volumetric methods embodied in this paper will give accurate results.

PHARMACOPŒIAL BOTANIC DRUGS OF THE TWENTIETH CENTURY.*

By E. N. GATHERCOAL.

Latin plant names	English names	Austrian	Belgian	British	Croatian	Danish	French	German	Hungarian	Italian	Japanese	Mexican	Netherlands	Norwegian	Russian	Serbian	Spanish	Swedish	Swiss	U. S. P. VIII	U. S. P. IX
(9) <i>Pinus montana</i>.....	.....																			
(10) <i>Pinus Australis</i>.....	.....																			
(11) <i>Pinus maritima</i>.....	.....																			
(12) <i>Abies Sibirica</i>.....	.....																			
389. <i>Piper angustifolium</i> , lv.	Matico.....																				
390. <i>Piper Betle</i> , lv.....	Betel.....																				
391. <i>Piper Cubeba</i> , unr. ft.	Cubeb.....																				
392. <i>Piper Cubeba</i> , v. o.....	Oil of Cubeb.....																				
393. <i>Piper officinarum</i> , ft.	Long Pepper.....																				
394. <i>Piper methysticum</i> , rh.	Kava-Kava.....																				
395. <i>Piper nigrum</i>	Black Pepper.....																				
396. <i>Pistacia Lentiscus</i> , res.	Mastic.....																				
397. <i>Pistacia terebinthus</i> , balsamic, res.	Chios Turpentine.....																				
398. <i>Plantago major</i> , lv.	Plantain.....																				
399. <i>Plantago ovata</i> , s.....	.....																			
400. <i>Plantago psyllium</i> , s.....	Fleeseed.....																				
401. <i>Podophyllum Emodi</i> , rh. & rt.	Indian Podophyllum.....																				
402. <i>Podophyllum peltatum</i> , rh. & rt.	Mandrake.....																				
403. <i>Polygala amara</i> , plant.....	Bitter Polygala.....																				
404. <i>Polygala Senega</i> , root.....	Senega.....																				
405. <i>Polygonum aviculare</i> , fl. herb.	Knottgrass.....																				
406. <i>Polygonum Bistorta</i> , rh.	Bistort.....																				
407. <i>Polyporus fomentarius</i> , fungus.	Surgeon's Agaric.....																				
408. <i>Polyporus officinalis</i> , fungus.	White Agaric.....																				
409. <i>Populus nigra</i> , buds.....	Black Poplar.....																				
410. <i>Potentilla Tormentilla</i> , rh.	Tormentilla.....																				
411. <i>Prunus Amygdalus</i> , var. amara, s.	Bitter Almond.....																				
412. <i>Prunus Amygdalus</i> , v. o.....	Oil of Bit. Almond.....																				
413. <i>Prunus Amygdalus</i> , var. dulcis, s.	Sweet Almond.....																				
414. <i>Prunus Amygdalus</i> , both varieties, fo.	Sweet Almond Oil.....																				
415. <i>Prunus armeniaca</i> , s.....	Apricot Seed.....																				
416. <i>Prunus domestica</i> , fr.	Prunes.....																				
417. <i>Prunus Laurocerasus</i> , lv.	Cherry Laurel.....																				
418. <i>Prunus Laurocerasus</i> , v. o.....	Oil of Cherry Laurel.....																				
419. <i>Prunus macrophylla</i> , lv.	.....																			
420. <i>Prunus serotina</i> , bk.	Wild Cherry Bark.....																				
421. <i>Psidium Guaiava</i> , lv.	.....																			
422. <i>Pterocarpus Morsupium</i> , ext. wd.	.....																			
423. <i>Pterocarpus santalinus</i> , ht. wd.	.....																			
424. <i>Pueraria Thunbergiana</i> , rt. stch.	.....																			

* Continued from p. 421, April issue.

Latin plant names	English names	Austrian	Belgian	British	Croatian	Danish	French	German	Hungarian	Italian	Japanese	Mexican	Netherlands	Norwegian	Russian	Serbian	Spanish	Swedish	Swiss	U. S. P. VIII	U. S. P. IX
522. <i>Triticum vulgare</i> , flour fm. s.	Wheat Flour	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
523. <i>Triticum vulgare</i> , stch. fm. s.	Wheat Starch																				
524. <i>Tussilago Farfara</i> , fl.	Coltsfoot Flowers						X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
525. <i>Tussilago Farfara</i> , lv.	Coltsfoot Leaves						X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
526. <i>Ulmus fulva</i> , in. bk.	Slippery Elm Bark										X										
527. <i>Umbilicus pendulinus</i> , lv.	Ipecac, Rio	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
528. <i>Uragoga Ipecacuanha</i> , rt.	Squill	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
529. <i>Urginea maritima</i> , bulb scales.	Indian Squill	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
530. <i>Urginea Indica</i> , bulb scales	Blueberries	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
531. <i>Vaccinium myrtillus</i> , fr.	Valerian	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
532. <i>Valeriana officinalis</i> , rh. & rt.	Oil of Valerian	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
533. <i>Valeriana officinalis</i> , v. o.	Indian Valerian	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
534. <i>Valeriana Walkhchi</i> , rh. & rt.	Vanilla	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
535. <i>Vanilla planifolia</i> , fr.	White Hellebore	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
536. <i>Veratrum album</i> , rh. & rt.	Mullein Flowers	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
537. <i>Verbascum</i> species, fl., without calyx.		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
<i>V. phlomidoides</i>																					
<i>V. thapsiforme</i>																					
<i>V. Thapsus</i>																					
538. <i>Veronica officinalis</i> , hb.	Speedwell																				
539. <i>Veronica Virginia</i> , rh. & rt.	Leptandra																				
540. <i>Viburnum prunifolium</i> , rt. bk.	Black Haw Bark																				
541. <i>Viburnum Opulus</i> , bk.	Cramp Bark																				
542. <i>Vinca minor</i> , lv.	Periwinkle																				
543. <i>Viola odorata</i> , fl.	Violet Flowers																				
544. <i>Viola tricolor</i> , fl. hb.	Pansy																				
545. <i>Xanthoxylon Americanum</i> , bk.	N. Prickly Ash																				
546. <i>Xanthoxylon Clava-Herculis</i> , bk.	S. Prickly Ash																				
547. <i>Zea mays</i> , styles & stigmas.	Corn Silk																				
548. <i>Zea mays</i> , stch. of s.	Corn Starch																				
549. <i>Zingiber officinale</i> , rh.	Ginger																				
550. <i>Zizyphus vulgaris</i> , fr.	Jujube Berries																				

523. French and German—*T. sativum*.

528. Italian and U. S. P. VIII and IX—*Cephaelis Ipecacuanha*; U. S. P. VIII and IX—also from *Cephaelis acuminata* (*Cartbagena Ipecac*); British—*Psychotria Ipecacuanha*.

529. Belgian, French, Mexican, Netherlands, Russian and Spanish—*Urginea Scilla*.

536. U. S. P. VIII—also from *V. viride* (Am. Hellebore) and U. S. P. IX from *V. viride* only.

540. U. S. P. VIII and IX—also from *V. Lentago*.

546. U. S. P. VIII—*Pagara Ciava*—*Herculis*.

549. Belgian—*Arromatum Zingiberis*.

ABBREVIATIONS.

olr., oleoresin.	wd., wood.	j., juice.
pdf., purified.	i.j., inspissated juice.	sc., sclerotium.
p., pure.	th., thallus.	k., kernel.
v.o., volatile oil.	tp., tops.	co., corm.
s., seed.	hd., head.	sg., stigma.
lv., leaves.	f.o., fixed oil.	pl., plant.
bk., bark.	st., stem.	ster., sterile.
ext., extract.	fm., from.	stch., starch.
exud., exudation.	emp., empyreumatic.	bd., buds.
g., gum, gummy.	ht., heart.	i.m.j., inspissated milky juice.
fl., flower, flowering, florets.	lig., ligulate.	tu., tuber.
rt., root.	lf., leaflets.	mu., mucilage.
rh., rhizome.	in., inner.	h., hairs.
hb., herb.	pd., peeled.	cl., cleansed.
ft., fruit.	ri., rind.	bals., balsam.
res., resin.	unr., unripe.	spo., spores.
fr., fresh.		

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Bermuda Arrowroot.....	306	Chocolate, Bitter.....	512	Galangal.....	22
Betel.....	390	Chrysarobin.....	32	Galbanum.....	215
Bistort.....	406	Cinchona.....	106	Galeopsis.....	226
Bitter Almond.....	411	Cinnamon, Ceylon.....	112	Galls.....	428
Bitter Chocolate.....	512	Cinnamon, Chinese.....	109	Galls, Chinese.....	439
Bitter Orange Peel.....	121	Cinnamon, Saigon.....	114	Gambir.....	348
Bitter Polygala.....	403	Cloves.....	205	Gamboge.....	227
Bittersweet.....	485	Coca Leaves.....	201	Garden Thyme.....	516
Blackberries.....	450	Coconut Oil.....	137	Gentian Root.....	231
Blackberry Bark.....	452	Coffee.....	138	German Chamomile.....	309
Black Cohosh.....	105	Cohosh, Black.....	105	Ginger.....	549
Black Haw Bark.....	540	Cola.....	139	Goldenseal.....	260
Black Hellebore.....	252	Colchicum Root.....	140	Grindelia.....	242
Black Mustard.....	73	Colchicum Seed.....	141	Ground Ivy.....	236
Black Pepper.....	395	Colocynth.....	116	Guaiaic.....	244
Black Poplar Buds.....	409	Coltsfoot Flowers.....	524	Guarana.....	357
Black Sassafras.....	111	Coltsfoot Leaves.....	525	Gum Ammoniac.....	186
Blessed Thistle.....	134	Condurango.....	308	Gum Arabic.....	9
Bloodroot.....	461	Contrayerba.....	189	Gum Asafetida.....	214
Blueberries.....	531	Copaiba.....	152	Gum Balata.....	325
Bogbean Leaves.....	323	Coriander.....	156	Gum Benzoin.....	495
Boldo Leaves.....	363	Corn Silk.....	547	Gum Euphorbium.....	211
Boneset.....	210	Corn Starch.....	548	Gum Galbanum.....	215
Broom Tops.....	177	Corsican Moss.....	23	Gum Guaiac.....	244
Buchu.....	61	Costmary.....	499	Gum Gutti.....	227
Buckthorn Bark.....	434	Cotton, Absorbent.....	239		
Buckthorn Berries.....	433	Cotton Root Bark.....	241		
Burdock Root.....	43				

Gum Myrrh.....	142	Lily-of-the-Valley		Oil of Dill.....	362
Gutta Percha.....	349	Herb.....	147	Oil of Eng. Chamomile...	39
Hellebore, American.....	536	Lily-of-the-Valley		Oil of Eucalyptus.....	203
Hellebore, Black.....	252	Root.....	148	Oil of Fennel.....	219
Hellebore, False.....	16	Linden Flowers.....	518	Oil of Fleabane.....	196
Hellebore, White.....	536	Linseed.....	295	Oil of Juniper.....	276
Hemp, Canadian.....	41	Linseed Oil.....	297	Oil of Laurel.....	288
Hemp, Indian.....	85	Logwood.....	246	Oil of Lavender.....	292
Hempseed.....	86	Long Pepper.....	393	Oil of Lemon.....	131
Henbane.....	262	Lovage.....	294	Oil of Lemon Balm.....	315
Henbane Seed.....	263	Lupulin.....	259	Oil of Lemon Grass.....	172
Hops.....	258	Mace.....	331	Oil of Mace.....	332
Horehound.....	307	Maidenhair.....	15	Oil of Mustard.....	74
Horseradish Root.....	135	Male Fern.....	56	Oil of Neroli.....	125
Hound's Tongue Root.....	174	Mallow Flowers.....	304	Oil of Nutmeg.....	329
Hyssop.....	265	Mallow Leaves.....	303	Oil of Orange.....	120
Iceland Moss.....	97	Malt.....	257	Oil of Parsley.....	359
Ignatia Beans.....	493	Mandrake.....	402	Oil of Pennyroyal.....	251
Indian Gum.....	33	Manna.....	224	Oil of Peppermint.....	320
Indian Hemp.....	85	Marigold.....	82	Oil of Pine Needles.....	4,387
Indian Pennywort.....	261	Marjoram.....	343	Oil of Rose.....	447
Indian Podophyllum.....	401	Marshmallow Flowers.....	27	Oil of Rosemary.....	449
Indian Squill.....	530	Marshmallow Leaves.....	25	Oil of Rue.....	455
Indian Tobacco.....	300	Marshmallow Root.....	26	Oil of Sandalwood.....	463
Indian Valerian.....	534	Mastic.....	396	Oil of Sassafras.....	469
Ipecac, Cartagena.....	529	Matico.....	389	Oil of Savin.....	283
Ipecac, Rio.....	528	Mexican Scammony.....	270	Oil of Spearmint.....	322
Irish Moss.....	235,102	Mexican Tea.....	98	Oil of Sweet Birch.....	67
Jaborandi.....	371	Mezereum.....	178	Oil of Tar.....	385
Jalap.....	212	Milfoil.....	10	Oil of Thyme.....	517
Jambul Bark.....	207	Motherwort.....	293	Oil of Turpentine.....	380
Jambul Seed.....	208	Mugwort.....	52	Oil of Valerian.....	533
Japanese Gentian.....	232	Mulberries.....	326	Oil of Wintergreen.....	228
Japanese Mustard.....	482	Mullein Flowers.....	537	Oleum Rusci.....	66
Japanese Peppermint.....	316	Mustard, Black.....	73	Olibanum.....	72
Japanese Pokeroot.....	367	Mustard, Japanese.....	482	Olive Oil.....	339
Java Plum.....	208	Mustard, White.....	481	Opium.....	351
Jequirity Leaves.....	6	Myrobalans, Chebulic.....	505	Orange, Sweet.....	118
Jequirity Seed.....	5	Myrrh.....	142	Orange Berries.....	123
Jujube Berries.....	550	Myrtle Fruit.....	333	Orange Blossoms.....	124
Juniper Berries.....	275	Myrtle Leaves.....	334	Orange Leaves.....	126
Kamala.....	302	Northern Prickly Ash		Orange Peel, Bitter.....	121
Kava Kava.....	394	Bark.....	545	Orange Peel, Sweet.....	119
Kefir.....	456	Nutmeg.....	328	Oregon Grape.....	62
Kino.....	422	Nutmeg Butter.....	330	Orris.....	272
Kino, Bengal.....	77	Nux Vomica.....	494	Pale Rose Petals.....	444
Knot Grass.....	405	Oak Bark.....	429	Pansy.....	544
Koesambi Oil.....	471	Oil of Ajowan.....	91	Paprika.....	87
Kuzu Starch.....	424	Oil of Allspice.....	373	Paireira.....	101
Lactucarium.....	282	Oil of Amber.....	378	Parsley Fruit.....	358
Ladanum.....	115	Oil of Am. Wormseed.....	99	Parsley Root.....	360
Ladies' Slipper Root.....	175	Oil of Anise.....	267,375	Peanut Oil.....	42
Lavender.....	290	Oil of Bergamot.....	127	Pearl Barley.....	256
Lemon.....	128	Oil of Bitter Almond.....	412	Pellitory Root.....	30
Lemon Balm.....	313	Oil of Cade.....	278	Pennyroyal.....	250
Lemon Juice.....	130	Oil of Cajuput.....	311	Pepper, African.....	88
Lemon Peel.....	129	Oil of Calamus.....	14	Pepper, Black.....	395
Lemon Seed.....	132	Oil of Caraway.....	90	Pepper, Long.....	393
Leptandra.....	539	Oil of Cassia.....	110	Pepper, Red.....	88
Lettuce.....	283	Oil of Chamomile.....	310	Pepper, Spanish.....	87
Levant Wormseed.....	51	Oil of Cherry Laurel.....	418	Peppermint.....	319
Licorice.....	237	Oil of Cinnamon.....	113	Periwinkle.....	542
Lignum Vitæ.....	243	Oil of Cloves.....	206	Peru Balsam.....	519
Lily-of-the-Valley		Oil of Copaiba.....	153	Pharbitis Seed.....	269
Flowers.....	146	Oil of Coriander.....	157	Phellandrium.....	364
		Oil of Cubeb.....	392	Pine Needle Oil.....	4,387
		Oil of Curled Mint.....	318	Pinkroot.....	489
				Pipsissewa.....	100
				Plantain.....	398

Poison Hemlock.....	144	Sassafras Pith.....	465	Tapioca.....	305
Poke Root.....	368	Sassafras Root.....	466	Tar, Beechwood.....	213
Pomegranate Bark.....	425	Sassafras Wood.....	468	Tar, Liquid.....	383
Pomegranate Juice.....	426	Savin.....	280	Tar, Solid.....	384
Pomegranate Rind.....	427	Saxifrage.....	376	Tea.....	510
Poppy Capsules.....	352	Scammony.....	150	Texas Snakeroot.....	46
Poppy Leaves.....	353	Scammony Root.....	149	Thapsia Resin.....	509
Poppy Seed.....	354	Scammony Resin.....	151	Thapsia Root.....	508
Poppy Seed Oil.....	355	Scopola.....	473	Thyme.....	516
Potato Starch.....	487	Scouring Rush.....	195	Tobacco.....	336
Prickly Ash Bark.....	545	Scullcap.....	475	Tolu Balsam.....	520
Prunes.....	416	Scurvy Grass.....	136	Tonka.....	185
Pulsatilla.....	34	Seaweed Tents.....	284	Tormentilla.....	410
Pumpkin.....	163	Senega.....	404	Tragacanth.....	58
Pumpkin Seed.....	164	Senna.....	92	Triticum.....	19
Quassia, Jamaica.....	369	Senna Pods.....	93	Tupelo Tents.....	337
Quassia, Surinam.....	428	Serpentaria.....	46	Turmeric.....	157
Quebracho.....	57	Sesame Oil.....	477	Turpentine, Canada.....	1
Queen's Root.....	491	Shorea Oil.....	480	Turpentine, Chios.....	397
Quince.....	170	Siam Benzoin.....	495	Turpentine, Crude.....	379
Quince Seed.....	171	Simaruba Bark.....	478	Turpentine, Strassburg.....	3
Radix Caryophyllata.....	234	Slippery Elm Bark.....	526	Turpentine, Venice.....	285
Rape Seed Oil.....	75	Soap Bark.....	431	Turpeth.....	271
Raspberries.....	451	Soapwort.....	464	Uva Ursi.....	44
Red Cinchona.....	107	Southern Prickly Ash.....	546	Valerian.....	532
Red Currants.....	440	Sow Bread.....	169	Vanilla.....	535
Red Gum.....	204	Spanish Chamomile.....	158	Venice Turpentine.....	285
Red Poppy Petals.....	350	Spanish Licorice.....	237	Violet Flowers.....	543
Red Rose Petals.....	445	Spanish Pepper.....	87	Virginia Snakeroot.....	46
Red Saunders.....	423	Spanish Saffron.....	159	Wahoo.....	209
Rest Harrow.....	340	Spearmint.....	321	Walnut Leaves.....	274
Rhatany.....	281	Speedwell.....	538	Water Cress.....	335
Rhubarb, Chinese.....	436	Squill.....	529	Water Germander.....	507
Rhubarb, European.....	437	St. John's Wort.....	264	Wheat Flour.....	522
Rice.....	346	Star Anise.....	266	Wheat Starch.....	523
Rice Starch.....	347	Stavesacre Seed.....	183	White Agaric.....	408
Rio Ipecac.....	528	Storax.....	299	White Hellebore.....	536
Roman Chamomile.....	38	Stramonium.....	181	White Mustard.....	481
Rose Petals.....	445	Stramonium Seed.....	182	Wild Cherry Bark.....	420
Rosemary.....	448	Strassburg Turpentine.....	3	Wild Marjoram.....	344
Rosin.....	381	Strawberries.....	222	Wild Thyme.....	514
Rue.....	454	Strawberry Root.....	223	Winter Cherry.....	365
Russian Licorice.....	238	Strophanthus.....	492	Winter's Bark.....	188
Sabal.....	476	Sumach Berries.....	438	Witchhazel Bark.....	248
Saffron.....	159	Sumatra Benzoin.....	495	Witchhazel Leaves.....	249
Sage.....	457	Sumbul.....	216	Wormseed.....	51
Salep.....	341	Sundew.....	189	Wormwood.....	50
Sandalwood.....	462	Surgeon's Agaric.....	407	Yarrow.....	10
Sandalwood Oil.....	463	Swallow-wort.....	173	Yellow Jasmine.....	230
Sandarac.....	83	Sweet Almond.....	413	Yerba Santa.....	197
Sappan.....	79	Sweet Almond Oil.....	414	Zedoary.....	168
Sarsaparilla.....	43	Sweet Clover.....	312		
Sassafras Bark.....	467	Tacamahaca.....	191		
		Tamarinds.....	498		
		Tansy.....	500		

CORRECTIONS.

The following items should be deleted from the U.S.P. IX column:

41. Apocynum Cannabium, Canadian Hemp	209. Euonymus Atropurpureus, Wahoo
130. Citrus Limonum, Lemon Juice	241. Gossypium Herbaceum, Cotton Root Bark

In the list of pharmacopœias, the following items should be corrected as follows:

Farmacopea ufficiale del Regno d'Italia, 3d ed., 1909	Farmacopea Argentina, 1898
Russian Pharmacopœia, 6th ed., 1910	Farmacopea Venezolana, 1898