from an ammoniacal solution and the subsequent weighing as such, will be productive of error.

Calcium was also found to a considerable extent in the ash of the capsules but was absent from the precipitate produced by ammonia in the concentrated fluid extract.

ANALYTICAL DEPARTMENT, ALLAIRE, WOODWARD & Co., Peoria, Ill.

THE QUALITY OF COMMERCIAL BLAUD'S PILLS.*

L. E. WARREN, PH. C., B. S.

In view of the known instability of ferrous salts, it has been generally held that pills of ferrous carbonate U. S. P. (Pilulæ Ferri Carbonatis, U. S. P.), commonly known as Blaud's pills, are unstable. Thus, the U. S. Pharmacopœia directs that they shall be freshly prepared when wanted. Pharmaceutic manufacturing houses, evidently holding this requirement to be unnecessary, almost universally sell ready-made Blaud's pills. On the other hand, some firms sell special forms of the preparation with claims of keeping qualities superior to the ordinary pill. Nevertheless, it was recently pointed out[1] that a proprietary brand of Blaud's pill, which the manufacturer claimed to be greatly superior in keeping quality to the ordinary Blaud's pill, and an ordinary commercial specimen, were each of good quality. To determine whether there is justification for the sale of ready-made Blaud's pills, and to determine whether the existence of special forms of Blaud's pills is warranted, an examination of the principal market brands was undertaken. Twelve freshly purchased specimens were examined, together with a specimen of each of three brands which were known to be several years old. Three specimens of the freshly-purchased pills were what the manufacturers called "soft mass" pills.

Some of the claims made for the "soft mass" pills are:

". . . present advantage of being rapidly soluble and disintegrating in the stomach and intestinal tract. . . . Under proper storage conditions they retain their soft consistency and shape perfectly."

"They disintegrate or dissolve readily in the digestive tract.

"They keep well, i. e., do not lose strength under proper conditions of storage.

"They show little tendency to become hard when kept under reasonable conditions.

"They are strictly true to formula."

The "soft mass" pills were "chocolate-coated." The remainder, except where stated to the contrary, were gelatin-coated. Three of the specimens (one of which was old) were not claimed to have been prepared according to the U. S. P. formula, but in general were claimed to contain the ingredients from which ferrous carbonate is produced, so that after ingestion ferrous carbonate in the "nascent" state would be formed in the alimentary tract. A number of the specimens were proprietary. These included Frosst's Blaud Capsules; Laminoids Ferruginous (nascent) Schieffelin; Laminoids Blaud (a specimen known to be at

* Contribution from the Chemical Laboratory of the American Medical Association. Reprinted from the Journal A. M. A., April, 1915.

[1] Queries and Minor Notes, the Journal A. M. A., Oct. 1, 1914, p. 1315.

least seven years old) Schieffelin; Ferruginous Blaud, Upjohn (one of the "nascent" preparations), and two specimens of tabloids (one of which was old). The laminoids were uncoated. The tabloids were sugar-coated. With one exception all of the preparations were stated to contain 5 grains of Blaud's mass, which is equivalent to about 1 grain of ferrous carbonate. This one was a specimen of Tabloids Blaud Pill and Aloin which was known to be at least six and one-half years old. One specimen of gelatin-coated Blaud's pills (Parke, Davis & Co.) also was known to be at least six and one-half years old.

Concerning Frosst's Blaud capsules, the following claims were made:

"Blaud capsules 'Frosst' represent freshly precipitated Ferrous Carbonate of a high percentage of purity, deprived of moisture and incorporated with Castor Oil that it may be readily incapsulated in a freely soluble gelatine covering. The capsules do not harden with age nor the contents oxidize."

The cost of Frosst's Blaud capsules was nearly twice that of any other brand of Blaud's pills examined.

The following statements were made concerning Laminoids:

"The Laminoids (Ferruginous, Nascent) consist of two lamina, one of ferrous sulphate and the other of sodium bicarbonate, united by pressure. When brought in contact with water or the fluids of the stomach, chemical action at once takes place, producing fresh ferrous carbonate with the accompanying salts. An excess of carbonate is present to neutralize the acid in the stomach.

"In Laminoids (Ferruginous, Nascent) the physician will find an absolutely reliable means of administering Blaud's formula, without the possibility of the efficiency of this time-tried remedy being impaired by oxidation and the formation of more or less inert material."

The total iron content in the several preparations was determined gravimetrically, and the amount of ferrous carbonate determined by titration. In order to obtain information as to the variation among the individual pills, the assays for ferrous carbonate were made on three pills taken together and on each of three pills taken singly, or four assays in all. The average was then obtained by dividing by six. In some instances, additional assays were made. The results in some cases show considerable variation from the claimed amount of medicinal ingredients. In some of the brands the average results found by titration for ferrous carbonate were somewhat higher than those obtained by calculation from the determination of total iron. Evidently this is due to the fact that because of great variations in the weight of individual pills, uniform samples could not be obtained. The total iron content of the real Blaud pills when calculated to ferrous carbonate varied between 77 and 156 percent of the amount claimed, and that of the "nascent" preparation between 88 and 183.2 percent of the amount claimed. The determinations of ferrous carbonate did not markedly fall below this, showing that oxidation had not taken place to any considerable extent. The analytic findings are given in the accompanying table.

In order to obtain some information as to the relative disintegrating properties of the several brands of pills, tests were carried out by treating a specimen of each (1 pill) with 90 cc. of 0.2 percent hydrochloric acid at ordinary temperature in a 100 cc. Erlenmeyer flask, and agitating the mixture by inverting once every ten minutes. This process was continued until the pill had become disintegrated, or until the experiment had continued for nine hours. In a second series of tests at the end of six hours, the acid was removed from such of the pills as had

TABLE SHOWING QUALITY OF COMMERCIAL BLAUD'S PILLS

Product	Manufacturer	Claims; Composition	Ferrous Carbonate Calculated from Determination of Total Iron. Percent of Claim	Ferrous Carbonate (by Titration of Ferrous Iron). Percent of Claim	Disintegration in Acid Solution (Hours)	Disintegration in Alkaline Solution Following Acid (Hours)
Blaud Capsules	Charles E. Frosst & Co.	5 gains, approximately ½ grain of iron in the ferrous state	77	79.2*	No effect except to dissolve coating	No effect
Blaud Pill	Sharpe and Dohme	5 grains U. S. P.	91.8	92.6	6.00 5.00 6.00+	0.50
Blaud Pill, Soft	Sharpe and Dohme	5 grains U. S. P.	99.5	96.2	3.00 2.00 3.50 2.00	
Blaud Pill	John Wyeth and Brother	5 grains U. S. P.	114.2	113.9	8.50 6.00	
Blaud Pill	Eli Lilly & Co.	5 grains U. S. P.	117.7	112.5	3.50 2.00 4.00	
Blaud Pill, Soft	Eli Lilly & Co.	5 grains U. S. P.	121.4	120.1	6.00 7.00 6.00+	1.00
Ferrous Carbonate (Blaud)	Parke, Davis & Co.	5 grains U. S. P.	117.6	121.3	4.50 4.00	
Ferrous Carbonate (Blaud) soft	Parke, Davis & Co.	5 grains U. S. P.	156.2	153.9	2.00 2.50	
Ferrous Carbonate (Blaud) (old specimen)	Parke, Davis & Co.	5 grains U. S. P.	142.3	143.7	7.00 6.00+	6.00†
Ferruginous Blaud	Wm. S. Merrell Chemical Co.	5 grains	117.4	105.9	1.00 2.00 3.00	
Ferruginous (Blaud's)	The Upjohn Company	5 grains	183.2	169.5	5.50 8.00 6.00+	4.00
Laminoids Ferruginous (nascent)	Schieffelin & Company	5 grains	121.3	126.4	1.50 2.00	
Laminoids Blaud's (old specimen)	Schieffelin & Company	5 grains	87.7	74.9	1.00 1.00	
Tabloid Blaud Pill	Burroughs, Wellcome & Co.	5 grains	104.3	104.1	7.00† 6.00+	6.00†
Tabloid Blaud Pill and Aloin (old specimen)	Burroughs, Wellcome & Co.	Blaud Pill 4 grains (20% ferrous carbonate); Aloin 1/20 grain	106.1	113.1	8.50 6.00+	6.00†

* The apparent discrepancies between the amount of ferrous carbonate as calculated from the determination of total iron and that obtained by titration of ferrous carbonate are explained elsewhere in this paper.

† Not completely disintegrated in twenty-four hours.

not become completely disintegrated, and 90 cc. of a 1 percent solution of sodium carbonate substituted. The digestion was then continued as described above until the pill had become completely disintegrated, or until a period of six hours had elapsed. Although the disintegration would undoubtedly have taken place more rapidly at a temperature of 37° C. and possibly faster in a weak pepsin solution, it is believed that for comparative purposes the results obtained are sufficient.

The results not only showed great variation among the several brands, but also considerable variation among the several pills of the same brand. The Laminoids disintegrated the most readily, but these were not coated. The next in order were the Parke, Davis & Co. brand of soft mass pills and the Sharp & Dohme brand of soft mass pills. It should be noted that the Lilly brand of soft mass pills disintegrated more slowly than the ordinary kind from that firm. The results are given in the table.

The results of the examination refute the commonly assumed instability of ready-made Blaud's pills. On the other hand, it is seen that the Blaud's pills of the market are not very reliable as to iron content. A range of from 77 to 182 percent of the claimed amount of ferrous carbonate denotes carelessness in manufacturing or lack of proper analytic control over the finished product. Further, the examination demonstrates that the "nascent" preparations, the soft mass pills, and the gelatin encapsulated oily suspension show no advantage over the ordinary kinds. In view of the findings, physicians should consider the advisability of directing the pharmacist to prepare Blaud's pills according to the U. S. P. whenever they are prescribed.

THE N. A. R. D. DRAFT FOR A STATE ANTI-NARCOTIC LAW.

J. H. BEAL, URBANA, ILL.

The N. A. R. D. Draft for an Anti-Narcotic Law suitable for state enactment was prepared by a special committee of three appointed by the N. A. R. D. Executive Committee, the special committee consisting of J. H. Beal, Mr. Hugh Craig, Editor of the N. A. R. D. Journal, and Frank H. Freericks, Esq., of Cincinnati.

The principal purposes of the draft are:

(1) To promote uniformity in state legislation respecting the possession and sale of anti-narcotic drugs.

(2) To provide a body of well-considered provisions from which selections can be made for use in states where the existing laws need to be revised in order to bring them into correspondence with the Harrison Act.

(3) To provide a list of provisions that can be utilized in preparing substitute bills for less acceptible measures which may be introduced into state legislatures.

To the objection that the bill seems rather lengthy it may be said that it is not really as long as it seems to be, its apparent length being due mainly to the separation of Section One into series of brief sub-sections or paragraphs, each dealing with some particular subject or exemption. It is true that all of these sub-sec-