Raubenheimer	240 Gm.	48.59	116.616 Gm. $MgSO_4$
Boehm	250 Gm.	48.59	121.475 Gm. $MgSO_4$
Bruder	250 Gm.	48.59	121.475 Gm. $MgSO_4$
Posey	224 Gm.	48.59	108.841 Gm. $MgSO_4$
Diehl	220 Gm.	48.59	106.898 Gm. $MgSO_4$
Hilton	350 Gm.	48.59	170.065 Gm. $MgSO_4$
Beringer	250 Gm.	48.59	121.475 Gm. $MgSO_4$
Mueller	270 (anhyd.)	99.50 (?)	268.65 Gm. $MgSO_4$

(*To be continued*)

SYRUP OF FERROUS IODIDE AND THE OFFICIAL HYDRIODIC PREPARATIONS.*

BY H. V. ARNY, BENJAMIN VENER AND LESLIE C. JAYNE.

INTRODUCTION.

The question of the stability of syrup of ferrous iodide and of syrup of hydriodic acid and of the diluted acid itself has been the subject of many papers. Of these at this time we will mention only papers by Haussmann (1), Alpers (2), Beringer (3), Dunning (4) and Base (5) on syrup of ferrous iodide and those by Raubenheimer (6), Sieker (7) and Lane (8) as far as syrup of hydriodic acid is concerned.

The recent pharmacopœial revision work of one of the present authors brought the subject once more to his attention from the standpoint of stability of these preparations and of their assay and the experiments reported below represents a study of the question over a period of four years:

Part I.

SYRUP OF FERROUS IODIDE.

(Work performed with Benjamin Vener, Ph.G., B.S.)

Four samples of this syrup were prepared:

A. Exactly as directed in U. S. P. IX. The fresh sample assayed 5.436 per cent of ferrous iodide.

B. As directed by U. S. P. IX with omission, however, of the hypophosphorous acid. The fresh sample assayed 5.436 per cent of ferrous iodide.

C. U. S. P. proportions of iron and iodine, hypophosphorous acid omitted, sugar 80 Gm., glycerin 70 Gm. to 250 Gm. of finished syrup. The fresh sample was not quite up to the U. S. P. requirements, assaying 4.325 per cent of ferrous iodide.

D. Iron wire, 3.2 Gm.; iodine, 10.4 Gm.; diluted hypophosphorous acid, 5 cc.; sugar, 100 Gm.; glycerin, 55 Gm.; water to make 250 Gm. The fresh sample assayed 4.921 per cent of ferrous iodide.

Samples A and B were prepared on September 25, 1924. Half of each batch was poured into small, completely filled bottles which were opened only as they were assayed. The other half of each batch was kept in its original container and was assayed regularly; hence was exposed to the action of the air. Sample C was prepared November 23, 1924, and successive samples were drawn from the original

* Section on Practical Pharmacy and Dispensing, A. PH. A., Portland meeting, 1928.

container for assay purposes. Sample D was prepared December 17, 1924, and was assayed three times: when fresh, 10 weeks later, and finally after 19 months, sample being kept in a partially filled bottle in the interval.

In the tables which follow the several columns indicate the following observations made during the study of the samples:

Color of syrup was observed at time of assay. In other words, the darkening of the syrup upon standing was carefully observed.

Presence of scum is a characteristic of certain samples of the syrup that as far as we find has not been noted in the literature. The significance of this scum is discussed later.

Presence of free iodine was detected by the starch test. That the amount developed at any time was insignificant was shown by the fact that the iodide content of the samples remained practically unchanged during the months of observation, and also by the negative result of the starch-iodine reaction.

Percentage of Ferrous Iodide.—This assay was carried out by the U. S. P. silver nitrate—thiocyanate volumetric method. The figures show no loss in iodide content from beginning to end of the observation, the slight fluctuations in figures obtained being of no significance, since the difference between the maximum and minimum figures represent about 0.2 cc. of $N/10$ $AgNO_3$ V. S.

Color of the silver iodide refers to the frequently reported annoyance of the darkening of the precipitate obtained when the silver nitrate V. S. is added to the diluted syrup.

TABLE I.

SAMPLE A. SUCCESSIVE ASSAYS OF SAME SAMPLE CONTAINED IN AN INCOMPLETELY FILLED BOTTLE.

Age.	Color.	Scum?	Free iodine?	Titration. % FeI_2.	Titration. AgI ppt.
Fresh	Pale yellow	None	None	5.436	Reduced
1 week	Pale yellow	None	None	5.277	Reduced
2 weeks	Pale yellow	None	None	5.277	Reduced
3 weeks	Pale yellow	None	None	5.277	Reduced
4 weeks	Pale yellow	Present	None	5.35	Reduced
8 weeks	Pale yellow	Present	None	5.138	Reduced
12 weeks	Pale yellow	Present	None	5.21	Reduced
16 weeks	Pale yellow	Present	None	5.227	Reduced
20 weeks	Dark yellow	Considerable scum	None	5.227	Reduced
22 months	Very dark brown	Black ppt.	None	5.34	Reduced

TABLE II.

SAMPLE A. KEPT IN SMALL COMPLETELY FILLED, TIGHTLY CORKED BOTTLES, EACH OPENED ONLY AT TIME OF THE SPECIFIC ASSAY. THE ASSAY AT THE END OF 22 MONTHS WAS PERFORMED, HOWEVER, ON THE SAME SAMPLE USED AFTER TWENTY WEEKS.

Age.	Color.	Scum?	Free iodine?	Titration. % FeI_2.	Titration. AgI ppt.
Fresh	Faint yellow	None	None	5.436	Reduced
1 week	Faint yellow	None	None	5.277	Reduced
2 weeks	Faint yellow	None	None	5.277	Reduced
3 weeks	Faint yellow	None	None	5.19	Reduced
4 weeks	Faint yellow	Trace	None	5.277	Reduced

8 weeks	Faint yellow	Trace	None	5.21	Reduced
12 weeks	Faint yellow	Trace	None	5.21	Reduced
16 weeks	Faint yellow	Trace	None	5.227	Reduced
20 weeks	Faint yellow	Trace	None	5.227	Reduced
22 months	Dark brown	Brown ppt.	None	5.41	Reduced

TABLE III.

SAMPLE B. SUCCESSIVE ASSAYS FROM SAME SAMPLE KEPT IN AN INCOMPLETELY FILLED BOTTLE.

Age.	Color.	Scum?	Free iodine?	Titration. % FeI_2.	Titration. AgI ppt.
Fresh	Greenish yellow	None	None	5.436	No reduction
1 week	Yellow	None	Present	5.277	No reduction
2 weeks	Yellow	None	Present	5.436	No reduction
3 weeks	Yellow	None	Present	5.436	No reduction
4 weeks	Yellow	None	Present	5.436	No reduction
8 weeks	Yellow	None	Present	5.355	No reduction
12 weeks	Yellow	None	Present	5.355	No reduction
16 weeks	Yellow	None	Present	5.444	No reduction
20 weeks	Brown yellow	None	Present	5.444	No reduction
22 months	Green yellow	None	None	5.418	No reduction

TABLE IV.

SAMPLE B. KEPT IN SMALL COMPLETELY FILLED, TIGHTLY CORKED BOTTLES, EACH OPENED ONLY AT THE TIME OF THE SPECIFIC ASSAY, EXCEPT IN THE CASE OF THE ASSAYS 20 WEEKS AND 20 MONTHS AFTER PREPARATION, WHEN THE SAME SAMPLE WAS USED.

Age.	Color.	Scum?	Free iodine?	Titration. % $Fe\ I_2$.	Titration. AgI ppt.
Fresh	Pale greenish yellow	None	None	5.436	No reduction
1 week	Pale greenish yellow	None	None	5.277	No reduction
2 weeks	Pale greenish yellow	None	None	5.436	No reduction
3 weeks	Pale greenish yellow	None	Present	5.277	No reduction
4 weeks	Pale greenish yellow	None	Present	5.436	No reduction
8 weeks	Pale greenish yellow	None	Present	5.355	No reduction
12 weeks	Pale greenish yellow	None	Present	5.355	No reduction
16 weeks	Pale greenish yellow	None	Present	5.444	No reduction
20 months	Pale greenish yellow	None	Present	5.444	No reduction
22 months	Pale greenish yellow	None	None	5.418	No reduction

TABLE V.

SAMPLE C. FIVE ASSAYS FROM SAME SAMPLE KEPT IN AN INCOMPLETELY FILLED BOTTLE.

Age.	Color.	Scum?	Free iodine?	Titration. % FeI_2.
Fresh	Green yellow	None	None	4.3425
2 weeks	Brown	None	Present	4.3425
4 weeks	Brown	None	Present	4.3425
15 weeks	Brown	None	Present	4.431
20 months	Green yellow	None	None	4.412

TABLE VI.

SAMPLE D. THREE ASSAYS FROM SAME SAMPLE KEPT IN AN INCOMPLETELY FILLED BOTTLE.

Age.	Color.	Scum?	Free iodine?	Titration. % FeI_2.
Fresh	Pale green	None	None	4.921
12 weeks	Pale green	None	None	5.227
19 months	Yellow brown	Trace	None	5.108

The following comments on the four samples, A to D, supplement the tables just given:

Sample A.—The color of the sample, after 20 weeks, is a *ferric yellow* rather than an iodine brown. The "scum" mentioned in the tables refers to a grayish precipitate forming at the top of the syrup. This scum, after collection on filter paper and thorough washing with water, gave the ferric test with potassium thiocyanate and upon ignition gave off inflammable phosphine vapors. Attempts to produce a scale salt with sodium citrate was only partially satisfactory. The yellow color of the syrup was not bleached upon exposure to sunlight. After 22 months, however, serious decomposition had set in, the product was dark brown, did not bleach when exposed to sunlight, although it did not respond to the starch test for iodine and showed no diminution in iodide content.

Sample B.—After 20 weeks the scum noted in Sample A was missing. Sample darkens to brown rather than to yellow color. Color bleached on exposure to sunlight and comes back when taken away from direct sunlight, the darkening first appearing at the top of the syrup. A brownish sample responding to the starch test for iodine before bleaching by exposure to sunlight, did not respond to the free iodine test, after it had been bleached. After 22 months, however, the color had returned to a light green, there was no response to the starch test for iodine—in short, after 22 months the sample was in better condition than after 20 weeks.

Sample C.—After 20 weeks, no scum was noted; color brownish yellow rather than green; presence of free iodine indicated by the starch test. After 20 months, color was green-yellow and no free iodine could be detected by the starch test.

Sample D.—After 12 weeks, color pale green; no scum noted; no free iodine. After 19 months, color darkened to yellow-brown; trace of precipitate; no free iodine.

(To be continued)

HISTORY OF PHARMACY A VALUABLE ASSET TO THE PHARMACIST.*

BY OTTO RAUBENHEIMER, PH.M.

There is much more to pharmacy than the dispensing of drugs and medicines, the preparation of galenicals and incidently the sale of candy and cigars, soda water and ice cream, which side lines, in recent years, have been still further enriched by a luncheonette with such ethical signs as "Roast Beef Sandwiches" and "Clam Chowder on Fridays."

There is a fascinating field of study which should be attractive to every pharmacist and druggist who is interested in his profession, namely, History of Pharmacy, as it shows him the growth and development of his beloved calling.

It was Cicero, the great Roman orator (106–43 B.C.) who spoke thus: "History is the witness of the times, the torch of truth, the life of memory, the teacher of life and the messenger of antiquity." Goethe, the German poet and scientist (1749–1832), even went further in the words "The History of a Science Is Science itself."

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* Section on Historical Pharmacy, A. PH. A., Portland meeting, 1928.