Notes from the Reports of Public Analysts.

The Editor would be glad to receive the Annual or other Reports of Public Analysts containing matter of interest to the Society. Notes made from such reports would be submitted to the Publication Committee.

CITY OF BIRMINGHAM.

Report of the City Analyst for the Fourth Quarter, 1925.

Of the 1298 samples submitted for analysis during the quarter, 1121 were analysed under the Sale of Food and Drugs Acts, and 177 were examined for various Corporation Departments. Among the 55 samples submitted by the Health Department were 4 samples of apples. One contained 1/100 grain of arsenic per lb. (present on the skin); the other three samples were free from arsenic.

Of the 1121 food and drug samples, 1084 were bought informally (21 adulterated), and 37 were bought under the provisions of the Acts (3 adulterated). The total percentage of adulteration was 2·1.

Milk.—Twenty-one of the 578 samples contained less than 11·5 per cent. of total solids. One of 153 samples of bottled milk contained only 8·1 per cent. of solids-not-fat, but a subsequent sample was genuine.

Margarine.—Thirteen of the 166 samples from 9 vendors were in wrappers which did not bear the word "Margarine."

Lard.—Two samples sold as "pastry lard" were found to consist of compound lard and were reported as adulterated.

Chicory.—Five samples were genuine, but one sample was adulterated, the ash being 8·3 per cent., which included 3·7 per cent. of sandy matter.

Drug Tablets.—Forty-two samples were examined, and 2 of them had false labels (*vide infra*).

French Chalk.—The British Pharmaceutical Codex defines two varieties of talc, one of which is called "French Chalk," and the other, which has been treated with acid, is termed "Purified Talc." The "Powdered Talc" of the B.P. has been purified with acid.

Eight samples bought as *French chalk* yielded 92·0 to 98·3 per cent. of ash; the amount soluble in dilute acid varied from 1·9 to 13·2 per cent.; and the calcium in the acid soluble portion was equivalent to 1·9 to 10·6 per cent. of ordinary chalk.

Three samples were bought as *purified talc*. They yielded 95·7, 98·4 and 99·2 per cent. of ash; the amounts soluble in acid were 2·5, 2·0 and 0·4 per cent.; and the soluble calcium expressed as chalk, 1·0, 2·1 and 0·9 per cent. It is doubtful whether two or these samples had been treated with acid, as they resembled some of the samples of French chalk sold at a much lower price.

The amount of arsenic was trivial, being from 0 to 4 parts per million. The samples yielded almost a constant amount to cold water, the ash of the soluble matter being from 0·3 to 0·4 per cent. of the talc taken.

J. F. Liverseege.

EXAMINATION OF DRUG TABLETS.

Machines used for making tablets have a cavity of adjustable size which is automatically filled with the material; the die then descends and forms the tablets by compression. If the mixture is not in a uniform state of division, equal volumes will not correspond with equal weights, and some tablets will weigh more than others.

By weighing over 1700 individual tablets a good indication was obtained as to the uniformity of weight of the tablets in each bottle. It was found that the weight of 91·8 per cent. of the tablets did not vary more than 5 per cent. from the mean weight of the tablets of the sample; 7·3 per cent. showed a variation from the mean of 5 to 10 per cent.; and 0·9 per cent. an error exceeding 10 per cent. from the mean.

Some samples were remarkably uniform in weight. In one bottle of 100 sodium citrate tablets the lightest weighed 2·42 grains and the heaviest 2·57 grains. In another bottle of 50 the corresponding weights were 1·88 and 2·10 grains—figures which show how uniform tablets can be made.

The total weight, *i.e.* the weight of the drug with starch, talc, etc., showed a good deal of variation in different samples. Average weights of 5 grain tablets in a bottle varied from 6·7 to 4·5 grains, the excess being due to the talc, starch, etc., and the use of partly dried drug accounting for the lighter weights.

For the production of satisfactory tablets not only must the powder be uniform, but the cavity of the machine must be adjusted to contain a volume which represents the correct weight of the drug, otherwise the tablets may be uniform, but contain an excess or deficiency of the drug. Each tablet of one sample of aspirin tablets, for example, was within 5 per cent. of the mean weight, but 9 tablets showed an excess of 5 to 10 per cent. above the stated 5 grains of aspirin, and the other 16 tablets showed an excess of more than 10 per cent. Experiments showed that the composition of the heavier tablets was the same as that of the lighter ones, so that a heavy and a light tablet did not each contain the correct amount of drug with more or less of the binding material.

There was considerable difference in the rate of disintegration of the tablets. The appearance was not satisfactory evidence of the solubility of a tablet in cold water, as sometimes a skeleton of talc or starch retained the original appearance, although the soluble matter had been removed. Speaking generally, the tablets containing the largest proportion of French chalk or talc disintegrated the most slowly.

Sodium Salicylate Tablets (5 *grains*).—The average amount of sodium salicylate per tablet in 6 samples was 4·9 to 5·0 grains, but individual tablets varied from 4·4 to 5·6 grains. Four samples contained no talc, the other two, 5·2 and 6·9 per cent. The last also contained starch, whilst the other five contained glucose, but not starch.

Aspirin Tablets (5 *grains*).—The following table shows the composition of 12 samples:—

	Grains of aspirin per tablet.			No. of tablets incorrect.			
	Average.	Max.	Min.	Under 5 per cent.	5 to 10 per cent.	Over 10 per cent.	Talc. Per Cent.
1	4·8	5·1	4·3	19	4	2	2·1
2	5·1	5·3	4·9	20	5	0	2·3
3	4·7	4·9	4·6	12	13	0	1·9
4	5·6	5·8	5·3	0	9	16	0
5	4·8	5·5	4·3	12	9	4	2·7
6	4·9	5·1	4·7	22	3	0	4·5
7	4·9	5·3	4·6	17	8	0	0·9
8	5·0	5·2	4·8	25	0	0	0
9	5·0	5·1	4·8	25	0	0	0
10	4·6	4·9	4·5	5	20	0	2·1
11	4·8	4·9	4·7	10	6	0	0
12	4·9	5·2	4·7	25	0	0	0

The average weight of aspirin in No. 4 and No. 10 was 5·6 and 4·6 grains, respectively. The labels stating that they were 5 grain tablets were therefore false. None of the tablets of No. 4 was within 5 per cent. of the proper amount, and only 5 of No. 10. Five of the samples were free from talc, and the other 7 contained from 0·9 to 4·5 per cent. The British Pharmaceutical Codex orders 2 per cent. of purified talc to be used in the preparation of these tablets. The tablets containing 4·5 per cent. and 2·7 per cent. of talc were very slow in breaking down in cold water. In the author's opinion aspirin tablets which dissolve more rapidly are preferable.

Calcium Lactate Tablets.—Calcium lactate, according to the British Pharmacopoeia, should contain not less than 93 per cent. of pure calcium lactate. On drying, pure calcium lactate loses 29·2 per cent. of water. The five grain tablets may therefore contain from 3·29 to 3·54 grains of dried calcium lactate.

Eleven samples were marked "Calcium Lactate, 5 grains," and the average amount of the dried salt varied from 3·4 to 3·7 grains,—figures which suggest that the B.P. limit of 93 per cent. is unnecessarily low. In the remaining sample the average was only 3·1 grains. In 4 samples the average weight of the tablets varied from 4·5 to 4·8 grains, a result which at first suggested an insufficient amount of calcium lactate, but the proper amount of dried lactate was found to be present—showing that the drug had been partly dried, and a proportionately smaller quantity taken.

The amount of talc varied from a trace to 7·0 per cent. Starch was present in 5 samples, and in most cases the tablets disintegrated rapidly in water.

Sodium Citrate Tablets.—Sodium citrate is not included in the British Pharmacopoeia. The B.P. Codex of 1907 stated that the drug contained $5\frac{1}{2}$ molecules of water of crystallisation (= 27·7 per cent. of water). The 1923 edition of that work prefers 2 molecules of water (12·3 per cent.), but states, "Some of the sodium citrate in commerce contains $5\frac{1}{2}$ molecules of water." This position is very unsatisfactory, as five grains of the one are equivalent to 6 grains of the other. Undoubtedly the article should be added to the Pharmacopoeia.

The following table gives the results of the examination of 12 samples of tablets:—

No.	Grains stated on label.	Water-free equivalent. Grains.	Water-free average. Grains.	Talc. Per Cent.
1	5	4·4 or 3·6	4·3	0·5
2	2	1·8 or 1·4	1·7	0
3	2	,,	1·4	0
4	2	,,	1·6	3·1
5	2	,,	1·7	2·2
6	2	,,	1·6	2·5
7	2	,,	1·6	3·6
8	2	,,	1·7	1·0
9	2	,,	1·7	0·1
10	2	,,	1·4	3·8
11	2	,,	1·8	2·9
12	1	0·9 or 0·7	0·7	0

The first three samples were made by one firm, the following four by another, and the next two by a third firm. Ten of the 12 samples were prepared with the drug containing 12·3 per cent. of water, and two (Nos. 10 and 12) with the drug containing 27·7 per cent. Sample No. 3, which was some years old, contained an

amount of the former equivalent to 2 grains of the latter. The quantity of either one salt or the other was near the stated amount in all the samples.

Seven of the samples contained talc (1·0 to 3·8 per cent.). As sodium citrate is largely used for adding to babies' milk it would seem better that an insoluble substance like talc should be absent, although the author has no information that its presence in milk is harmful. None of the samples contained starch. Although they differed in solubility, no objection could be taken to any of them for insolubility.

ANALYTICAL DEPARTMENT,
CITY OF BIRMINGHAM.

J. F. LIVERSEEGE.