

His opinion is that of an unprejudiced expert. The Chief of Staff of the Army, himself a trained physician of no mean professional attainments, will, we hope, agree with the surgeon-general. There should be no opposition from any quarter to legislation that would remedy an obviously dangerous condition. The American Medical Association, no less than the American Pharmaceutical Association, is interested in the needs of the Hospital Corps of the Army and its members should give such assistance as is in their power to aid in the passage of a bill increasing the pay of the Hospital Corps."—*Jour. Am. Med. Association*.

DRUG QUALITY DURING THE PERIOD 1906-1911.

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We have felt that statistical data, based on a continuous examination over a period of six years, of three of the principal crude drugs used in this country, might prove of interest to chemists in view of the growing importance of the Pure Food and Drugs Act. For this reason we have collated the results of the assays and tests of these drugs we have made in the laboratories of Sharp & Dohme during that period of time and present them in this paper. The quality of the wild-grown plants depends largely upon atmospheric as well as upon soil conditions of the country where grown. Thus it is pointed out by a large German drug house that not much could be expected from the forthcoming crop of drugs, inasmuch as but little snow had fallen last winter in Europe, that the roots had in consequence been exposed to severe cold weather, and suffered from lack of moisture in the spring; added to this came an extremely hot almost rainless summer in which the growth of the surviving plants was greatly retarded. As but few crude drugs are cultivated as yet anywhere in the world, these uncertainties in extent of crop, and quality of product will continue until such time as raising crude drugs will become as much a business as raising cereals or fodder. The efforts now being made by the Bureau of Plant Industry of the Department of Agriculture under the capable guidance of Dr. Rodney H. True will, if continued, soon make this country more or less independent of other countries in many drugs as well independent of failures of crops or poor climatic conditions. We cannot refrain from expressing the hope that something be done to eliminate the largely used drug Golden Seal from the itching palms of money lenders, because it can truly be said of this drug that it is in the hands of a trust and an unscrupulous one at that. To think of being compelled to pay four dollars and more a pound for a wild and freely growing plant indigenous to this country when it can easily and profitably be raised for less than a dollar a pound, only accentuates the fact that the Sherman law may even be made applicable to crude products of nature. Below follow the results obtained by us in the examination of samples of the drugs offered us by dealers and gatherers in this and other countries.

The samples of *Aconite Leaves*, a drug which is very seldom used, and which, consequently, has been deleted from the U. S. P., showed up very well, only one

sample was below the usual strength (about 0.4%), assaying only 0.24% of ether-soluble alkaloids.

Aconite Root. This drug did not vary very much in the percentage of ether-soluble alkaloids.

Asafetida. It seems to be extremely difficult to obtain a drug which answers the requirements of the U. S. P. The following figures speak for themselves.

	1906	1907	1908	1909	1910	1911 (up to 10/1)
Samples and shipments examined.....	1	1	28	31	40	18
Deficient in alcohol solubility.....	1	0	8	17	24	13
Excess of ash.....	1	0	18 (64.5%)	20 (64.5%)	34 (85%)	17 (95%)
Deficient in alcohol solubility and excess of ash.....	1	0	9	15	23	13

From the above table it is clearly shown that the allowance of more than 15% ash, acted upon by the Government, had a great influence on the inferiority of the drug since the number of samples with an excessive percentage of ash during 1908 and 1909 was increased from 64% to 85% and even 95%. That in some years the conditions are very favorable for the growth of medicinal plants while in other years they are less favorable can be shown by the alkaloidal strength of *belladonna leaves* and *belladonna root*. In 1907 and 1908 we had to reject 26 and 26.5 per cent of the samples of belladonna leaves submitted, on account of deficiency in alkaloids, and in 1910 even 36%. In 1906 only 14% were of inferior quality, and in 1909, which seems to have been the most favorable year for this drug, the rejections dwindled down to only 5%. The samples examined averaged about forty a year.

The rejected samples of belladonna root were more numerous, but this inferiority is due to the excessive standard adopted by the U. S. P. The standard of 0.5% of total mydriatic alkaloids is met only with a limited number of samples. It has, however, been advocated to reduce the standard, and it would be very wise to do so, say to 0.4%. In 1906 53.5%, in 1907 65.5%, in 1908 54%, in 1910 63%, and in 1911 76% of the samples were below the official strength. In 1909 which, as already pointed out, was very favorable for belladonna, the rejections amounted to 39.5% only. It may be mentioned here, that all those samples were rejected which did not assay 0.5% or more of total mydriatic alkaloids. A large percentage assayed between 0.4% and 0.5%, and only a few had to be rejected as assaying below 0.4%.

Calabar Bean. This drug assayed during the last two years 0.15% of ether-soluble alkaloids, while in the years previous beans with as high as 0.31% could easily be bought.

Cinchona Calisaya and Cinchona Rubra. It is surprising how many samples of cinchona calisaya were below the official standard. In 1906 42%, in 1907 38%, in 1908 60%, in 1910 33.2% of the samples submitted assayed below 5% of total alkaloids, and only in the years 1911 and 1909 did the rejections amount to lower figures, 20% and 16.7% respectively. While, however, during the first three years samples with 2% of total alkaloids and even less were not infrequent,

such inferior drugs seem to be no longer present on the market, and only occasionally have samples with 3.5% total alkaloids been found during the last three years. The alkaloidal strength of red cinchona was decidedly higher. All the samples submitted during 1906, 1908 and 1911 came up fully to the official strength, of those submitted in 1907 20%, in 1909 (35 samples examined) 8.6%, and in 1910 10% were rejected.

Coca. This drug assays always in the neighborhood of 1% ether-soluble alkaloids, and very rarely was there an occasion to reject samples. Only during the last year has the alkaloidal strength dropped somewhat, when several shipments assayed only between 0.7 and 0.8%.

Colchicum Root. The conditions up to 1909 seem to have been favorable for the growth of colchicum, only 16.5% of the samples examined being below the official strength, while in 1910 68% of the samples had to be rejected as inferior.

Colchicum Seed. Although the present official assay method gives entirely too high results, as has been pointed out on various occasions, the greater percentage of the samples submitted did not come up to the standard obtained by this method. In 1906 every sample was below the required strength of 0.5% of so-called colchicine. In 1907 50%, in 1908 50%, in 1909 78%, in 1910, 86%, and in 1911 55% of the samples had to be rejected. Apparently a standard of 0.4% would be advisable.

Conium Seed. Almost all the samples answered the U. S. P. strength.

Conium Leaves. Up to date not a single sample has been submitted which contained any appreciable amount of alkaloids.

Cubebs. There was hardly any variation in the percentage of oleoresin in the cubebs examined during the last six years.

Ergot. A distinctly better quality of this drug was put upon the market during the last three years, the rejected samples, i. e., those which contained less than 0.2% of cornutine, amounting to 23%, 26.5% and 16% in 1909, 1910 and 1911 respectively. During the three years previous to this period we were compelled to reject from 66.5% to 70% of the samples submitted. We are as yet unconvinced of the reliability of physiological assay of ergot, in fact, feel that the paper of Edmunds and Hale is self-contradictory. If ergot possesses, as is now generally believed, two distinct and separate effects, due to different active principles, it is clear that no one test, assay or standard can fill the bill. Hence, until we can separate these active principles, and determine each separately, all physiological standards of ergot must be more or less unreliable. Our standardization has always been by the assay for cornutine by Keller's method.

Golden Seal. This drug always comes up well to the official requirements. Samples, however, with 4% and more of hydrastine are not as frequent on the domestic market as in European quarters, where numerous shipments with such a high alkaloidal percentage are quoted. Quite recently a sample had to be rejected which assayed only 2.18% of hydrastine.

Resin Guaiac. Many samples of this drug had to be rejected on account of their insufficient solubility in alcohol. Only in 1911, when 33% of the samples

were rejected, a better quality of the drug could be noticed, in former years the rejections amounted to 50 and even 60%.

Guarana. This drug was always above the U. S. P. standard.

Ginger. The percentage of oleoresin varies considerably, and a standard for this constituent should therefore be established.

Henbane. The conditions of 1910 don't seem to have been favorable for the growth of this drug. In this year, we rejected 63% compared with about 20% in the years previous. The standard adopted by the present U. S. P. is regarded as rather high by several drug dealers. Thus Caesar and Loretz (Halle, Germany,) write in their *Geschaefts-berichte* that it is difficult to supply a drug with such high alkaloidal contents, henbane generally assaying only from 0.05 to 0.07% of total alkaloids.

Ignatia Bean. No material variation in the amount of alkaloids could be noticed in this drug.

Ipecac. Caesar and Loretz (*Geschafts-berichte*, 1907) write that there was no reason for the U. S. P. to reduce the already low requirement of 2% alkaloids to 1.75%, since a drug with 2.5% was readily obtainable. Drugs of a better quality, therefore, seem to be shipped to Europe, as only a few lots with such a high alkaloidal percentage were offered to us, as may be seen from the attached table:

Year	Samples Examined	2.5% and Above	2-2.5%	1.75-2%	Below 1.75%
1906	12	1	9	2	0
1907	25	1 (2.75)	23	1	0
1908	13	0	10	2	1 (1.7)
1909	10	0	9	1	0
1910	8	0	7	1	0
1911	26	0	11	12	3

Jalap. The quality of jalap has improved, as may be seen from the table below. During the last three years lots with 16 to 20% of resin were not infrequent.

Year	Samples Examined	Below 5%	5-7%	7-8%	8-10%	10% and More
1906	14	1	6	5	2	0
1907	1	0	0	0	1	0
1908	5	0	1	2	1	1
1909	14	0	3	1	1	9
1910	37	2	11	4	2	18
1911	42	7	10	4	9	12

Jaborandi Leaves. The quality of this drug was a constant one. The alkaloidal percentage always was in the neighborhood of 1 per cent.

Kola Nut. This drug, which will be official in the next U. S. P., varies considerably in the percentage of caffeine. Taking 1.5% of caffeine as a fair standard, we were compelled to reject 30% of the samples submitted in 1907 and 1910, and 40% in 1911. The samples submitted in the years previous came up to the standard, but only a limited number of specimens had been examined during this time.

Mandrake. We had no difficulty in obtaining good mandrake root in the years 1906 to 1908. Only during the last three years has the quality of the samples

submitted been very poor. In 1910 only two samples assayed above 4.5% of podophyllin, and in 1911 only one. Samples with 3.5, 3 and 2.75% of resin were not infrequent.

Nux Vomica. About 30% of the samples submitted had to be rejected as assaying below the required amount of strychnine. During the current year all the samples came up fully to the official requirements.

Opium. The variation in strength of this drug was very slight only. We were always able to purchase opium with about 11% of crystallized morphine. In 1906 and 1911 samples were encountered which were below U. S. P. strength, assaying only 8.4% and 7.3% respectively. The latter lot consisted of hard, black balls with a polished surface, such as were reported quite recently by Carles (Journ. de pharm. et chim., 1911, page 343). On the other hand, samples with 14% morphine were not infrequent.

Scopola Root. The percentage of samples assaying below 0.5% of total mydriatic alkaloids amounted to: 1906 none, 1907 50%, 1908 64%, 1909 73%, 1910 40%. It is hardly conceivable that the percentage of proper strength drugs should have dropped so much on account of atmospheric conditions, etc. The poorer quality may be due to the presence of scopola japonica in the shipments of scopola atropoides, the former assaying as is well known about 0.3% of total mydriatic alkaloids. It seems a pity to drop this drug from the Pharmacopoeia, simply because the physician and the public do not know its name, and that hence there is no demand for it, and it cannot legitimately be substituted for belladonna. In our judgment, it should be given as an alternative in the Pharmacopoeia for belladonna, so that it can legally and legitimately be used for belladonna. Its effect and its constituents are practically identical with belladonna. As it is now, plaster manufacturers must use the higher priced belladonna at the public's expense, while the much cheaper scopola is relegated to the scrap heap.

Stramonium Seed. Very little variation was noticed in the alkaloidal percentage of this drug.

Stramonium Leaves. There was no reason for reducing the standard from 0.35% to 0.25%, since shipments with more than 0.35% are easily available. Only very few samples with less than 0.3% were met with. The quality of the drug was almost alike during the six years.

In concluding, we cannot refrain from an expression of high appreciation of the good effect the Pure Food law has had on the quality of crude drugs; spurious and almost worthless specimens being now very rarely met with on the market.

THE RELATIONS OF SUCCESS AND DUTY.

"The workman who drops his tools at the stroke of twelve, as suddenly as if he had been struck by lightning may be doing his duty—but he is doing nothing more. No man has made a great success of his life or a fit preparation for immortality by doing merely his duty. He must do that—and more. If he puts love into his work, the 'more' will be easy."—*William George Jordan.*