

REPORTS OF COMMITTEES

REPORT OF COMMITTEE ON QUALITY OF MEDICINAL PRODUCTS, AUGUST, 1915.*

During the past year there has been no improvement in the record of failure to keep ordinary solutions up to their standard strength. One Board reports over 18 percent of all samples as varying from standard. Forty-one samples of spirit of peppermint were of official strength, while twenty ranged from 24 percent to 80 percent of official strength. Nine samples of spirit of anise were of full official strength, while ten ranged from 0 percent to 89 percent. Nineteen samples of spirit camphor were full strength, while nine ranged from 65 percent to 85 percent. Seventeen samples of spirit wintergreen were all right, but one was 22½ percent. Twenty-seven samples of tincture iodine were of full strength, while twenty-two ranged from 33 percent to 84.5 percent. None of these products offer any difficulty in making or keeping, and it is hard to understand why they should be deficient. Forty-one samples of spirit nitrous ether were satisfactory, while sixty-four were not, ranging from 0.9 percent to 84 percent. This is not to be wondered at, as it is a very unstable product. Messrs. Lythgoe and Nuremberg, chemists for the Massachusetts State Board of Health, contribute very interesting data in relation to it. "A lot carefully made by the U.S.P. process was divided into six portions. A full bottle was kept in an ice-chest, a full white bottle in the laboratory, and a full amber bottle in the laboratory. An amber bottle, half full, was kept in the cupboard, a full white bottle and a full amber bottle in the sunlight. Another sample was made from a tube of concentrated nitrous ether and divided into two portions, one filling a bottle, one half filling a bottle and both kept in a cool place side by side. These samples were examined seven or eight times during nearly four months. The full bottle in the ice-chest showed absolutely no deterioration during this time and was kept in this condition for two years. The full bottle kept in the laboratory showed little deterioration during eighty days. Those kept half full and those kept in the sunlight showed marked deterioration, particularly the white bottle kept in the sunlight, which deteriorated completely in 83 days."

Their contention is that if a druggist complies with the requirement of the pharmacopœia and keeps his spirit nitrous ether in small, full, amber bottles in a cool place, he will have no trouble in dispensing full strength, if prepared within three or four months. Instead, not a few use from a large bottle that is carelessly stored and before it is used are dispensing a very inferior product.

It is of interest to note the reading of the alcoholic solutions in the polariscope and refractometer. Camphor, 5 Gm. in alcohol to make 100 Cc., has an optical rotation of +2.2°. Camphor, 10 Gm. in alcohol to make 100 Cc., has an optical rotation of +4.35°. Camphor, 5 Gm. in alcohol to make 100 Cc., has a refractometer reading of 1.3678 at 24° C. Camphor, 10 Gm. in alcohol to make 100 Cc., has a reading of 1.3730 at 24° C., alcohol has a reading of 1.3620 at 24° C. Increase for first 5 Gm., 0.0058, second 5 Gm., 0.0052 at 24° C.

There are still numerous calls for tablets and pills containing volatile or easily oxidizable substances which cannot be retained in the mass, so that impairment is inevitable soon after being made.

An effort is being made in some directions to obtain a guarantee of the keeping qualities of all products, but this is not practicable. A product carefully stored by one dealer would be good for many months, while carelessly stored by another will very quickly spoil. Beef, iron and wine in one store, kept away from direct sunlight, may keep a year; placed in the window, exposed to sunlight, the same product may spoil inside eight to ten days. Again, there is marked difference of opinion as to the keeping qualities of various products. Some imagine that digitalis leaves or digitalis fluid extract very soon deteriorate. Manufacturers know this is not so. Examination of these products properly kept over two years shows no

* Scientific Section, San Francisco meeting.

change. In the November, 1914, issue of the *JOUR. OF THE AM. PH. ASSOC.*, p. 1559, the statement is credited to Prof. Hatcher that leaves twenty years old have assayed better than leaves a year old. Tinctures ten years old tested, as well as those freshly made and of several fluid extracts, one, fifteen years old, had the highest test. Then it is important to know whether the value of a product is determined by accurate chemical test or inaccurate physiological experiment. This feature is brought out very clearly in the excellent paper by Prof. Wm. C. Alpers, p. 715 of the June, 1915, *JOURNAL*. On p. 720 he cites the instance of standardized tinctures, being put upon the market with certificate of strength, being returned as unknowns to their source of origin, to have some samples pronounced as worthless and some as over-strong. Different lots of any drug will vary as locality of growth, soil, degree of moisture, sunshine, etc., varies. In addition to this the ignorant admixture of crude drugs that have similar characteristics brings about variation as suggested by Prof. J. U. Lloyd, p. 87 *D. C.* Tests of identity by chemical reaction, development of color, etc., may be of no value where the article tested is a mixture. This is well illustrated by the worthless color tests applied to methyl salicylate, oil of birch and true oil of wintergreen. It is also brought out in the tests for cod-liver oil. Mixtures of this oil and other fish-liver oils and with seal oil can be made to pass the color tests. Careful comparison with a known pure sample may show some differences in color that would not be distinguished without such standard comparison. The refractive index is of value in differentiating different pure products, but may be misleading with mixtures.

The following results explain our statement:

	Dogfish Oil (Shark fish Oil)	Seal Oil Refined	Norwegian C. L. Oil	Newfoundland C. L. Oil
Color	Yellowish brown or amber	Very pale yellow	Pale yellow	Decided yellow.
Odor	Offensive.	Not disagreeable.	Not disagreeable.	Not disagreeable.
Saponification Number	161.6	192.4	185.5	
Sp. gr. at 25° C.	0.915	0.920	0.922	0.922
Refractive Index at 23° C.	1.4748	1.4751	1.4779	1.4788
Reduction of temperature	Slight turbidity -6° C. Semi-solid -8.5° C. Solid -13° C.	-6° C. -15° C.	Thickened -6° C. Opaque -13° C.	Thickened -5° C. Semi-solid -13° C.
Sulphuric acid on rod	Brilliant violet purple changing to reddish brown.	Slight blue changing to dirty brown or black.	Violet to brown red or amber.	Deep violet to dirty brown black.
Sulphuric acid and chloroform	Light blue to violet and violet red.	Reddish brown.	Violet to reddish brown.	Blue to reddish brown.
Fuming Nitric Acid	Deep rose violet to decided brown.	No color—after a time faint violet.	Rose red to lemon yellow.	Violet to permanent brown.

The character of these color reactions can be varied by amount of acid used in relation to oils and by temperature. Then the quality of the fuming nitric acid modifies this test, which is apparently the best for identifying a pure Norwegian oil. A mixture of seal oil 1 and Norwegian oil 3 volumes tests little different from the straight Norwegian oil, while seal oil 2 and Norwegian oil 2 volumes reacts with the sulphuric acid tests all right, while giving a darker end color with fuming nitric acid. Here again, do we know in any case what we are testing? The Newfoundland oil was said to be from the true cod only (*Gadus morrhua*). The books tell us the Norwegian oil is from the ling, coalfish, dorse, pollock and other varieties of *Gadus*. The Fish Commissioner of Norway testified not long since before an American Court that Norwegian oil is from *Gadus morrhua* only. Who knows the truth about the matter?

The year has been unique in the experience of any person now living. The interruption to the collection of approximately half of the staple foreign drugs, caused by the great war, and even more to their transportation, has carried us back toward a period a century earlier, when ocean transportation was scanty. These conditions have worked in a variety of ways

to disarrange the drug market. Many of the collectors in the regular regions are new and inexperienced and are contributing drugs which are not clean, not judiciously collected and not properly preserved. These conditions are still worse when the drugs come from regions which have not heretofore contributed them. Accidental admixture or substitution has thus occurred. The scarcity has resulted in high prices and this has encouraged some intentional adulteration.

These conditions have lent special value and importance to the federal supervision of drug imports. Those who believe that there is little intentional sophistication of crude drugs are not in a position to realize the force of this fact. It is true that the sophistication of drugs in foreign countries is a regularly organized and extensive business, and is always ready to take advantage of such situations as that now existing. But for the federal authorities' suppression of the first attempts in this direction, the United States would have received a flood of sub-standard drugs during the past year. As it is, we have suffered from a very great scarcity, almost a famine in some articles, but the quality has been well maintained.

Some drugs, formerly peculiarly subject to adulteration, have attained to almost ideal conditions as to grade. Among such may be mentioned saffron, papaw juice, horehound, insect flowers, pareira brava, cardamom seeds, matico and senna siftings. Up to a year or two since, practically all dried papaw juice imported was heavily adulterated with starch or starchy substances and with the dried pulp of the plant. When this was rejected there was a great outcry. It was declared that no other grade was obtainable and that the market would be unable to get supplies. Rejection was persistent and unyielding, with the result that not only are shipments almost always pure, but new and improved methods of drying have been introduced and the quality is very superior to what it was. In the meantime, a new method of adulterating has been tried. The usual method was to break up dried rice bread and mix the fragments through those of the papaw juice. The new method is to dip the bread fragments in the fresh milk-juice, so as to thoroughly coat it. It is always necessary to break the lumps up and not to decide by the superficial appearance.

Attempts to substitute scopolia for belladonna root, or to mix it, have been renewed, but were quickly suppressed. In one case, the Japanese scopolia was employed.

Similarly there has been a slight attempt at adulteration of belladonna leaves with phytolacca and with scopolia leaves. The most serious thing was the shipment from Italy of a lot of herbage of *Physalis Alkekengi* for belladonna leaves, detected by Mr. Mel, of the New York Laboratory. One shipment of belladonna leaves was quite hairy; so much so, that their identity was questioned.

Of late, persistent attempts have been made to import spurious ipecac, the stimulus coming, doubtless, from its exceptionally high price. There has been more shipping of spurious ipecac in the last six months than in the preceding ten years. Needless to say, none of it has reached the channels of trade. Three different tropical roots have been used for this purpose. A curious effect of sea-water on ipecac has been observed. A shipment of this drug went down with a sunken steamer in New York harbor. When the steamer was raised, the ipecac was dried and presented a good appearance, but on assay it was found to contain scarcely any alkaloid.

The addition of stems to drugs which should contain little, if any, has been quite common this year and has specially affected buchu, cubeb, hyssop, thyme, and lavender flowers. These and other drugs have also been unusually dirty and sandy.

What is there in cubeb that leads analysts astray? One state official condemned a popular brand of bronchial lozenges as containing opium and stated that their sale was illegal. As no opium or derivative of opium had ever been on the premises of the manufacturer, the report was a great surprise. He was unable to get a satisfactory statement as to method of examination or unable to get a sample of the lot analyzed, but the official maintained that his work was corroborated by a published formula. If he had looked further he would have found three other published formulas all different. The publication of four different formulas based on examination of a product and none of them agreeing with the original is not very complimentary to the accuracy of organic analysis. Another official claimed to have found conium in the lozenges, but none was ever put in by the manufacturer. Another state official condemned a cubeb bronchial lozenge as containing opium, but it was not there

and from the character of its manufacture could not have been there. If any one can throw any light upon the cause of such wild and injurious statements it would be a public benefit.

TABLE.

Acid Trichloroacetic.—None of the lots examined gave a faint reddish color with FeCl₃ as required by the U.S.P., but even reagent acids refuse to conform to this test.

C. E. VANDERKLEED.

Aconite Leaf.—One sample. 0.355 alkaloid. Standard, 0.2 ether soluble alkaloids.

C. E. VANDERKLEED.

Aconite Root.—Five samples. Highest, 0.626. Lowest, 0.360. Average, 0.497. Standard, 0.5 ether soluble alkaloids.

C. E. VANDERKLEED.

Aloes.—One sample submitted contained no aloin.

W. L. SCOVILLE.

Althæa.—Cut althæa, thinly coated with milk of lime, as Jamaica ginger and German calamus are treated, is of frequent appearance. It is now recognized that other drugs are adulterated when so treated and it would seem that the same view should be taken of this.

H. H. RUSBY.

Alum Dried and Powdered.—Great improvement in moisture content has been noted, none of the samples containing more than 6 percent, which is very close to our arbitrary standard of 5 percent moisture.

C. E. VANDERKLEED.

Two percent water, 1 percent insoluble, 2 percent water, 1.3 percent insoluble, 2.5 percent water, 1 percent insoluble.

E. L. PATCH.

Areca Nut.—A shipment of areca nuts, of very good appearance externally, was found when broken to consist of more than 50 percent of wormy, mouldy and decayed material entirely unfit for use.

H. H. RUSBY.

Asafetida.—Alcohol soluble, 63 percent, ash, 15 percent, ash standard, 10 percent; alcohol soluble, 51 percent, ash, 14 percent; alcohol soluble, 65 percent, ash, 11 percent; alcohol soluble, 58 percent, ash, 14 percent; alcohol soluble, 58 percent, ash, 18 percent.

E. L. PATCH.

Alcohol soluble, 61.9 percent, ash, 13.1 percent; alcohol soluble, 59 percent, ash, 22.5 percent.

C. E. VANDERKLEED.

Six lots ranged from 36 percent soluble in alcohol to 77.3 percent, and from 40 percent ash to 2.06 percent. Five contained more than 66 percent alcohol soluble matters.

W. L. SCOVILLE.

Balsam Peru.—Specific gravity, 1.157, cinnamein, 53 percent; specific gravity, 1.15, cinnamein, 60 percent; specific gravity, 1.150, cinnamein, 63.6 percent; specific gravity, 1.156, cinnamein, 56 percent.

In answer to criticism of a lot, a leading importer sent the following: "This balsam is of our own direct importation from San Salvador and is absolutely pure and genuine. It does not, however, strictly comply with the U.S.P. requirements in that the percentage of cinnamein is slightly less than the minimum called for, and it varies a little as to specific gravity and acid value. Although we are very large importers of this article, handling about 60 percent of the country's total importation, and testing every parcel that comes to us, we very rarely, in fact practically never, find any balsam that is strictly U.S.P. This condition has been recognized by the federal authorities and will doubtless be taken notice of by the U.S.P. Revision Committee, now at work on the next edition."

E. L. PATCH.

Extract of Beef.—Liable to find it low in proteids, requiring an additional quantity to be used to obtain a beef, iron and wine that will meet the standard.

	Percent	Percent	Percent	Percent	Percent
Moisture	17	20	20	20	20
Salt	16.5	18.5	11.6	18.68	4.5
Proteid	47.69	41.44	48.75	36.56	55

E. L. PATCH.

Beef, Iron and Wine.—Several samples low in iron and proteids were classified as beverages and obliged to pay liquor tax.

E. L. PATCH.

Belladonna Leaves.—Three samples. Highest, 0.350. Lowest, 0.247. Average, 0.300. Standard, 0.300.

C. E. VANDERKLEED.

Three-tenths percent, 0.37 percent, 0.37 percent, 0.3 percent.

E. L. PATCH.

Of late much adulteration, from 20 percent to 80 percent of added leaves of poke root, scapola or aianthus. HAROLD DEAN.

Belladonna Root.—Seven samples. Highest, 0.640. Lowest, 0.424. Average, 0.511. Standard, 0.45. C. E. VANDERKLEED.

Benzoin.—Five lots ranged between 67.8 percent and 76.5 percent in alcohol solubility and 0.96 percent and 1.62 percent ash. C. E. VANDERKLEED.

Six lots yielded from 78 percent to 87.3 percent alcohol soluble constituents.

W. L. SCOVILLE.

Blaud Pills.—Contain from 77 percent to 182 percent of claimed Iron Carbonate contents. AMER. PHAR. ASSOC. JOUR., May, 1915.

Bloodroot.—One sample. 3.98 percent alkaloids. Standard, 2.5 percent.

C. E. VANDERKLEED.

Ten lots gave 1.77 percent to 7.01 percent alkaloids. Seven of the ten contained 5 percent or more. W. L. SCOVILLE.

Blue Mass Powder.—Two lots contained 32 percent and 31.3 percent metallic mercury, both below the standard of 33 percent. C. E. VANDERKLEED.

Buchu.—A number of shipments of spurious buchu, representing several species, have been received. On investigation it was found that the error was due to the ignorance of the collectors. H. H. RUSBY.

Burdock Root.—One lot ground had 20.8 percent ash. Usually has from 7 percent to 10.5 percent. E. L. PATCH.

Calcium Carbonate C. P. Ppt.—Usually gives slight precipitate in test for limit of iron, aluminum and phosphates. C. E. VANDERKLEED.

98.85 percent, 98.35 percent, 98.85 percent, 98.85 percent, 98.35 percent, CaCO₃.

E. L. PATCH.

Calcium Chloride.—One lot left 1.4 percent residue in U.S.P. test for magnesium and alkalis, while the standard is only 0.1 percent. C. E. VANDERKLEED.

Calcium Phosphate Precipitated.—Contained 1 percent chloride. Lot 2, 1.2 percent. Three lots traces only. E. L. PATCH.

One lot contained chloride in excess of U.S.P. allowance.

C. E. VANDERKLEED.

Cannabis Indica.—The genuine *Cannabis indica* of former days has become rather unusual, various forms of cannabis herb, often very seedy, from various countries having replaced it. H. H. RUSBY.

Cantharides.—Six samples Chinese cantharides. Highest, 1.1. Lowest, 0.570. Average, 0.869. One sample of Russian, 0.625. Standard, 0.6 percent cantharidin.

C. E. VANDERKLEED.

Cantharidin contents range from 0.55 percent to 1.15 percent.

W. L. SCOVILLE.

Capsicum.—Six samples. Highest, 20.84 percent oleoresin. Lowest, 13.85 percent. Average, 16.65 percent. Standard, 10 percent. C. E. VANDERKLEED.

Alcoholic extract from six samples, 20 percent to 24.2 percent. Ash, 5.2 percent to 10 percent. E. L. PATCH.

Cardamom.—"Green Cardamoms" have arrived in considerable quantity. These cardamoms have a thin, tough, greenish-brown surface and have not been bleached. This variety is of excellent quality. H. H. RUSBY.

Cascarilla.—Bark has become very poor, being mostly the scrapings of small limbs and twigs. It would appear that this shrub is now almost exterminated in the wild state.

H. H. RUSBY.

Cherry Juice.—Specific gravity, at 25° C., 1.055; residue, 19 percent; alcohol, 11.72 percent; vol. 10 Cc. = 0.4 Cc. normal KOH solution. Specific gravity, 1.037; residue, 14.8 percent; alcohol, 14.5 percent; vol. 10 Cc. = 0.35 Cc. normal KOH solution.

Specific gravity, 1.048; residue, 15 percent; alcohol, 13.26 percent; vol., 10 Cc. = 0.4 Cc. normal KOH solution.

Specific gravity, 1.062; alcohol, 16.2 percent; residue, 22.7 percent; 10 Cc. = 0.35 Cc. normal KOH solution.

Specific gravity, 1.055; alcohol, 11.72 percent; residue, 19 percent; 10 Cc. = 0.4 Cc. normal KOH.

Specific gravity, 1.007; alcohol, 23.04 percent; residue, 8.5 percent; 10 Cc. = 0.7 Cc. normal KOH.

E. L. PATCH.

Chondrus.—Great quantities of chondrus have arrived in an unbleached state, very dark and quite sandy and dirty. It is usually imported as "French moss" or "crude moss." We find that this is mostly used for kalsomining.

H. H. RUSBY.

Chromium Sulphate.—Two lots examined assayed 85.4 percent and 87.1 percent $\text{Cr}_2(\text{SO}_4)_3$, respectively.

C. E. VANDERKLEED.

Cinchona, Red.—One lot, 8.35 percent. Yellow cinchona, ten lots, highest, 11 percent, lowest, 6.5 percent. Average, 8.56 percent. Standard, 5 percent total anhydrous alkaloid.

C. E. VANDERKLEED.

Coca Leaves.—One lot, 1.053 percent. Standard, 0.5 percent ether soluble alkaloids.

C. E. VANDERKLEED.

One lot, 0.93 percent.

E. L. PATCH.

Cocculus indicus.—Two shipments of cocculus indicus or fish berries have come under the name of "Sumac," an error that we have not been able to explain.

H. H. RUSBY.

Colchicum Seed.—Three lots. Highest, 0.850 percent. Lowest, 0.660 percent. Average, 0.780 percent. Standard, 0.45 percent colchicine.

C. E. VANDERKLEED.

Colchicine.—Continues to contain excessive amounts of chloroform and moisture. Thirteen lots lost 2.2 percent, 4.2 percent, 8.3 percent, 9.1 percent, 9.3 percent, 10.3 percent, 10.6 percent, 12.1 percent, 12.6 percent, 12.7 percent, 12.9 percent, 22.3 percent, and 29.2 percent of their weight at 102° C., the loss in each case, with the exception of the 4.2 percent figure, being chiefly due to chloroform. This lot lost moisture only. There is probably no excuse for the excessive quantities of chloroform left in this alkaloid, as it is readily driven off on heating without appreciably affecting the color of the alkaloid. It is difficult to obtain a good qualitative reaction with U.S.P. hydrochloric acid-ferric chloride-chloroform test if the mixture is heated only to boiling, as required by the U.S.P., but if the boiling is continued one or two minutes, guarding against excessive evaporation, a good reaction is always obtained.

C. E. VANDERKLEED.

Cramp Bark.—Spurious cramp bark has this year been seized in interstate commerce. Efforts to secure orders for genuine cramp bark have not met with much success.

H. H. RUSBY.

Cresol.—Only two of sixteen lots examined had a specific gravity within the U.S.P. limits of 1.036-1.038, these two giving 1.037 and 1.038, respectively. One was 1.039, one 1.016 and the other twelve ranging from 1.030 to 1.033. All of the samples answered the requirements of 90 percent distilling between 195° and 205° C., except one of which 86 percent distilled. It is almost impossible to obtain a cresol soluble in 60 parts of water, but as a rule the insoluble portion is very small in amount. All other U.S.P. requirements were met by the samples.

C. E. VANDERKLEED.

Dandelion Root.—Lot of powdered, 45 percent ash. Usually 9 percent.

E. L. PATCH.

Digitalis Leaves.—Two samples. Highest, 0.365 percent. Lowest, 0.293 percent. Average, 0.329 percent. Standard, 0.25 percent digitoxin.

C. E. VANDERKLEED.

0.27 percent, 0.30 percent, 0.28 percent, 0.26 percent. Ash, 8 to 9.5 percent.

E. L. PATCH.

Ergot.—Six lots. Highest, 0.380 percent. Lowest, 0.115 percent. Average, 0.256 percent. Standard, 0.15 percent cornutine.

C. E. VANDERKLEED.

Formaldehyde.—Lot, 38.2 percent. Formaldehyde contained copper.

E. L. PATCH.

All examined exceeded the U.S.P. requirements of 1.075 to 1.081 in specific gravity. The average was between 1.082 and 1.087. Most gave reactions for chloride, sulphate and calcium, but were otherwise U.S.P.

C. E. VANDERKLEED.

Gelsemium.—Four lots. Highest, 0.849 percent. Lowest, 0.503 percent. Average, 0.630 percent. Standard, 0.4 percent alkaloids.

C. E. VANDERKLEED.

Ginger, African.—Two samples. Highest, 8.90 percent. Lowest, 7.99 percent. Average, 8.44 percent. Standard, 6 percent oleoresin. C. E. VANDERKLEED.

Ginger, Jamaica.—One sample, 3.93 percent. Standard, 4 percent oleoresin. C. E. VANDERKLEED.

Alcoholic extract, 7.7 percent, 4.4 percent, 4.4 percent, 6.3 percent, 4.5 percent, 4 percent, 4.9 percent, 6.2 percent, 5.3 percent, 5 percent, 6.5 percent, 5.3 percent, 4.4 percent, 6 percent, 4.5 percent. E. L. PATCH.

Guaiac.—Alcohol solubility ranged between 77.5 percent and 99.2 percent, only one being below the U.S.P. standard of 85 percent. Ash ranged between 0.51 percent and 5.7 percent, only one being above the U.S.P. standard of 4 percent. C. E. VANDERKLEED.

Yielded from 70.3 percent to 97 percent alcohol soluble matter. Four out of fourteen lots were below 80 percent, and seven between 80 percent and 90 percent.

W. L. SCOVILLE.

Black Hellebore Root.—

Ash per cent.	Extract per cent.	Ash per cent.	Extract per cent.
8.4	31.7	9	30
7	30	7	31
9.5	22	5	30.8
9	23	8	31.8
10	21.9	7.5	30.8
10	23	8	31.2
7.5	31.2	8.5	31
6	32	6.5	30

E. L. PATCH.

Hellebore, White.—One lot powdered, 1.41 percent alkaloid. Others, 1.04 percent, 0.9 percent. Ash, 11 percent to 13 percent. E. L. PATCH.

Hydrastis.—Five samples. Highest, 3.98 percent. Lowest, 3.16 percent. Average, 3.63 percent. Standard, 2.5 percent hydrastine. C. E. VANDERKLEED.

One lot only 2.7 percent ether soluble alkaloid. W. L. SCOVILLE.

3.2 percent, 4 percent, 4.2 percent alkaloid hydrastine. E. L. PATCH.

Hydrogen Peroxide.—Twenty-three lots examined were satisfactory with the exception that two gave total solids of 0.0479 and 0.340 Gm. per 20 Cc. instead of 0.030 as required by the U.S.P. C. E. VANDERKLEED.

Hyoscyamus.—Twenty lots. Highest, 0.140 percent. Lowest, 0.031 percent. Average, 0.073 percent alkaloids. Standard, 0.08 percent. C. E. VANDERKLEED.

Alkaloid, 0.084. Ash, 27 percent. Alkaloid, 0.700. Ash, 35.8 percent. E. L. PATCH.

Annual or "seedling" henbane continues to arrive. The greatest defect is the large amount of earth adhering. When clean, its assay figure is usually good.

H. H. RUSBY.

Infusorial Earth.—If used for filtering purposes must be watched closely for carbonate. Even insoluble carbonates are detrimental and carbonates are frequently found.

W. L. SCOVILLE.

Ipecac.—Six lots whole. Highest, 2.380 percent. Lowest, 1.846 percent. Average, 2.221 percent. Three lots powdered. Highest, 2.130 percent. Lowest, 1.666 percent. Average, 1.872 percent. Standard, 1.75 percent. C. E. VANDERKLEED.

1.71 percent, 2.28 percent, 1.85 percent, 1.96 percent. E. L. PATCH.

One lot of Rio, 1.67 percent. W. L. SCOVILLE.

Fluid extract ipecac proved to be an aqueous solution of tartar emetic colored with caramel. N. A. R. D. JOURNAL.

Iron Sulphate Dried.—Continues to vary greatly in 2FeSO₄·3H₂O content; 15 lots ran 80 percent, 83.1 percent, 88.5 percent, 91.3 percent, 91.9 percent, 92.3 percent, 92.6 percent, 93.4 percent, 93.4 percent, 95.2 percent, 96 percent, 96 percent, 99 percent, 103 percent and 104.3 percent. C. E. VANDERKLEED.

Jaborandi.—One lot, 1.06 percent. Standard, 0.5 percent. C. E. VANDERKLEED.

Jalap.—One sample, 7.17 percent. Standard, 7 percent total resin. C. E. VANDERKLEED.

Jalap Resin.—One lot was not completely soluble in five times its weight of ammonia water.

C. E. VANDERKLEED.

Keiselguhr.—Much offered for pharmaceutical use; contains organic matter from which it should be freed by ignition.

C. E. VANDERKLEED.

Kola.—Ten lots. Highest, 2.02 percent. Lowest, 1.4 percent. Average, 1.582 percent. Standard, 1 percent.

C. E. VANDERKLEED.

Lime Chlorinated.—Standard, 30 percent chlorine. 20 percent available chlorine, 8 percent, 10 percent; 34 percent available chlorine, 30.7 percent, 33.7 percent.

E. L. PATCH.

Liniment of Camphor.—10 percent, 35 percent, 66 percent, 69 percent of official.

N. A. R. D. JOURNAL.

Lobelia Herb.—One lot, 0.5910. Standard, 0.5 percent. 0.520 percent to 0.56 percent.

C. E. VANDERKLEED.

E. L. PATCH.

Lupulin.—Ten lots gave ether soluble portion 55.5 percent, 55 percent, 57.1 percent, 58.6 percent, 54.7 percent, 67.6 percent, 55.3 percent, 44.2 percent, 69.2 percent and 68.2 percent. Ash, 8.23 percent, 7.72 percent, 7.6 percent, 10.7 percent, 19.4 percent, 13.3 percent, 18.3 percent, 28.4 percent, 12.8 percent and 14.4 percent. The U.S.P. requires 60 percent soluble in ether and 10 percent ash.

C. E. VANDERKLEED.

Five lots varied from 2.5 percent to 14.1 percent ash. Conditions have improved with this article.

W. L. SCOVILLE.

Magnesia Calcined.—Water, 10 percent, 96.14 percent MgO in ignited residue; water, 4 percent, 93.7 percent MgO in ignited residue; water, 5 percent, 95.93 percent MgO in ignited residue; water, 5 percent, 96.2 percent MgO in ignited residue.

E. L. PATCH.

One lot contained only 93.9 percent MgO after ignition. U.S.P. requires 96 percent. None of the lots examined the past year gelatinized with water as required by the U.S.P. and most contained an excess of calcium over the U.S.P. limits.

C. E. VANDERKLEED.

Varies much in its lightness. Uniformity in this respect is very desirable for stock preparations, but less important for other purposes.

W. L. SCOVILLE.

Magnesium Carbonate.—Two of six lots were low in MgO after ignition, assaying 92.6 percent and 94.8 percent, respectively. Five of the six contained calcium in excess of U.S.P. limits. Otherwise all were U.S.P.

C. E. VANDERKLEED.

Varies in density.

W. L. SCOVILLE.

Magnesium Carbonate.—44.4 residue representing 92.93 percent MgO; 45 percent residue representing 92.58 percent MgO; 45 percent residue representing 93.03 percent MgO; 44 percent residue representing 92.86 percent MgO; 44 percent residue representing 94.69 percent MgO; 44 percent residue representing 91.95 percent MgO.

E. L. PATCH.

Magnesium Sulphate.—Dried, purified, gave usual variation in water content. Five lots contained 14.9 percent, 26.9 percent, 27.7 percent, 29.8 percent and 31.5 percent.

C. E. VANDERKLEED.

Magnesium Sulphate.—Cryst. Of 15 lots, only one was free from chloride. The others contained from a trace to 0.5 percent.

E. L. PATCH.

Manaca.—There has been considerable dispute over the identity of genuine manaca, a drug that is coming to be used very extensively. The manaca that was formerly most seen was cylindrical, purplish-brown, smoothish and mostly of the thickness of the fingers. Then sometimes came, and of late usually, an irregular, thick, heavy, hard, tapering root with a surface covered with a scaly, tissue-like membrane. It was a question which was genuine until we found both attached, the former being the stem, the latter the root.

H. H. RUSBY.

Manganese and Ammonium Citrate.—Mn₂O₃, 26 percent, 26 percent, 26 percent, 26 percent, 24 percent.

E. L. PATCH.

Manganese Dioxide C. P.—One lot contained some insoluble residue in test for antimony sulphide and insoluble substances, but was otherwise U.S.P.

C. E. VANDERKLEED.

Manganese Sulphate.—Continues to vary greatly in water content. Seven lots gave 29.4

percent, 31.7 percent, 32.3 percent, 32.5 percent, 35.9 percent, 37.3 percent and 37.4 percent. Four were above the U.S.P. limit of 32.3 percent. These figures for moisture were obtained by employing the lowest possible red heat on the manganese sulphate in a porcelain crucible. The U.S.P. directs gentle ignition. Different loss is occasioned by different degrees of ignition.

C. E. VANDERKLEED.

Methyl Alcohol.—40 percent found in a hair lotion.

JOUR. AM. PH. ASSOC., Jan. 15, Page 135.

Methylene Blue.—Continues to show ash in excess of U.S.P. limit of 0.008 Gm. per 2 Gms. of sample.

C. E. VANDERKLEED.

Has to be watched closely for zinc. Many lots contain it.

W. L. SCOVILLE.

Mustard.—Several peculiar forms of mustard, both yellow and brown, have come to us this year. One was straight *Brassica juncea* and another a yellow seeded variety of the same. Another was *Brassica cernua*. All mustard imported has undergone a very remarkable improvement as to cleanliness and freedom from weed seeds.

H. H. RUSBY.

Myrrh.—Considerable difficulty has been experienced with myrrh, several lots of which have contained many dark, soft and sticky pieces, of peculiar, intense, bitter taste. It has been successfully maintained that this is genuine myrrh. If so, the U.S.P. description should be so changed as to include them.

H. H. RUSBY.

Nitroglycerin Tablets.—1-50 gr., 89.3 percent of standard strength, 93.3 percent, 103 percent, 100 percent; 1-100 gr., 99.73 percent of standard strength, 100 percent, 83.3 percent, 100 percent; 1-100 gr., 106.6 percent of standard strength, 103 percent.

E. L. PATCH.

Nux Vomica.—Seven lots. Highest, 1.328 percent. Lowest, 0.705 percent. Average, 1.013 percent. Standard, 1.25 percent strychnine.

C. E. VANDERKLEED.

1.175 percent, 1.195 percent, 1.1155 percent, 1.155 percent, 1.23 percent.

E. L. PATCH.

The difficulty of obtaining supplies of *nux vomica* has been the cause of the importation of considerable quantities of *ignatia*, probably for the extraction of strychnine.

H. H. RUSBY.

OILS.

Oil Benzaldehyde.—Contaminated with chlorine products.

Oil Cinnamon Leaf.—Substituted for oil Ceylon cinnamon.

Oil Turpentine.—Adulterated with mineral oils.

Oil Cottonseed.—Adulterated with corn oil and sunflower oils.

Oil Sandalwood.—Substituted by mixture of oil of *Amyris* and oil *copaiba*.

Oils of Lavender, Juniper Berries and Red Thyme.—Not of U.S.P. quality.

DEPT. AGRIC.

Oils Volatile.—The oils distilled in this country have given no trouble, but the difficulties of importation have led to some attempts at adulteration. The mixing of natural and synthetic products seems to have increased and some oils are difficult to obtain of satisfactory quality. Oil rose, oil rose geranium, oil eucalyptus and oil neroli are instances of oils difficult to obtain of satisfactory quality. Oils of lemon and orange differ as usual, particularly the terpenes oils. Oils of bitter almond, lavender, eucalyptus, savin and sandalwood require careful watching, not only for chemical vagaries, but for physical results. Artificial and synthetic oils vary much more than before the war and are difficult to secure of satisfactory quality.

W. L. SCOVILLE.

Oil Anise.—Two lots were *nil* in optical rotation but answered all other U.S.P. requirements. U.S.P. requires *laevogyrate* rotation.

C. E. VANDERKLEED.

Oil of Birch.—Twenty-two packages consisted in whole or part of methyl salicylate.

DEPT. AGRIC.

Oil Lemon.—Six lots tested; 3.52 percent, 3.56 percent, 3.63 percent, 4.08 percent, 4.18 percent and 4.32 percent citral by the method of J. C. Umney in *Perfume and Essential Oil Record*, 1913, 4-269.

Oil Lemon, Extra Strong.—There is no declared citral content on this product and it varies accordingly. Two lots gave 12.55 percent and 21.5 percent by method of J. C. Umney.

C. E. VANDERKLEED.

Oil Mineral.

	Specific gravity
Odorless, tasteless, colorless	0.847 at 25° C.
Odorless, tasteless, fluorescent	0.854 at 25° C.
Odorless, foreign taste, fluorescent	0.853 at 25° C.
Odorless, tasteless, yellowish	0.867 at 25° C.
Odorless, tasteless, colorless	0.837 at 25° C.
Odorless, tasteless, colorless	0.853 at 25° C.
Odorless, fluorescent, tasteless	0.856 at 25° C.
Odorless, fluorescent, tasteless	0.860 at 25° C.
Odorless, colorless, tasteless	0.857 at 25° C.
Odorless, colorless, tasteless	0.877 at 25° C.
Odorless, colorless, tasteless	0.880 at 25° C.
Odorless, colorless, tasteless	0.849 at 25° C.

Several samples gave dark color with sulphuric acid test.

E. L. PATCH.

The Russian variety being practically unobtainable, recourse must be had to oil from other sources. These oils are difficult to obtain free from kerosene taste and fluorescence and are much lower in specific gravity than is desirable.

C. E. VANDERKLEED.

The disappearance of the Russian oil from the market caused much trouble for a time, but the conditions now are met satisfactorily with American oils and the Russian oil is no longer missed.

W. L. SCOVILLE.

Oil Wintergreen.—Three packages in whole or part, methyl salicylate. One, 75 percent methyl salicylate.

DEPT. AGRIC.

Oil Wormseed.—One lot adulterated with 44 percent of a fixed oil. Oil wormseed ordinarily averages 1.5 percent of non-volatile residue.

C. E. VANDERKLEED.

Opium Gum.—Nine lots. Highest, 12.35 percent. Lowest, 11.31 percent. Average, 11.74 percent. Standard, 9 percent crystallized morphine.

C. E. VANDERKLEED.

Opium, Powdered.—Six lots. Highest, 12.58 percent. Lowest, 11.84. Average, 12.11 percent. Standard, 12 percent to 12.5 percent morphine.

C. E. VANDERKLEED.

Opium Antidote in Capsules.—Prove to be 4 1-5 grains of opium assaying 11.74 percent morphine in each capsule.

E. L. PATCH.

Origanum.—Great quantities of origanum for use as a condiment continue to arrive as thyme, the thymol taste being very strong.

H. H. RUSBY.

Oxgall, Powdered.—All lots were free from starch, a decided improvement in this product.

C. E. VANDERKLEED.

Papain.—Two lots inferior, no starch present but only half usual power. One other, 16.7 in neutral, 22.4 in alkaline solution, and one 18.6 and 24.

E. L. PATCH.

Paw Paw Juice.—Of fourteen samples nine were below standard. Several of these contained starch. One sample was 135 percent of standard.

W. L. SCOVILLE.

Pepsin.—Pepsins are said by Ernest Quant to be frequently contaminated with bacteria.

Potassium Binoxalate.—One Gm. usually requires 11.65 Cc. normal KOH solution to neutralize. One lot was weak. Three samples from different parts of the container required 8.2 Cc., 9 Cc., 9.8 Cc.

E. L. PATCH.

Potassium Cyanide.—Contents so labeled tested for carbonate and contained 3.1 percent cyanide.

E. L. PATCH.

Prescription Variation.—The following prescriptions were summarized, and while the data given show some variations, as a whole they were better than what has previously been shown with reference to compressed tablets on the market.

R No. 1—	No. of samples	Variation
Antipyrin, gr. ii	1.28 gr. to 2.17 gr.	= - 36 percent to + 8 percent
Sodii salicylat., gr. v	16 4.49 gr. to 6.22 gr.	= - 10 percent to + 20 percent
Make 10 such capsules.		
R No. 2—		
Antipyrin, gr. ii	1.9 gr. to 2.7 gr.	= - 5 percent to + 35 percent
Sodii bicarb., gr. x	18 4.9 gr. to 10.2 gr.	= - 50 percent
Make 10 such powders.		

R No. 3—

Phenacetine, gr. v 4.2 gr. to 5.46 gr. = - 16 percent to + 11 percent
 Salol, gr. v 20 3.81 gr. to 5.25 gr. = - 24 percent to + 5 percent

Make 10 such capsules.

R No. 4—

Salol, gr. iii 2.17 gr. to 3.44 gr. = - 27 percent to + 15 percent
 Quinina sulphat., gr. iii . 20 1.79 gr. to 3.56 gr. = - 40 percent to + 18 percent

Make 10 such capsules.

R No. 5—

Acetphenetidini, gr. iii . . 1.5 gr. to 3.8 gr. = - 50 percent to + 27 percent
 Bismuth subnit., gr. iii . . 55
 Sodii bicarb., gr. x

Make 10 such powders.

Prescription No. 1 showed two substitutions of acetanilide for antipyrin; under no conditions was this excusable. No. 5 likewise showed two substitutions of acetanilide for acetphenetidini and one for bismuth subnitrate, subcarbonate being used; in this prescription there is possibly some excuse for acetanilide being found, and if the prescription had called for a liquid in connection with the combination, the pharmacist would have been justified in using bismuth subcarbonate.

N. A. R. D. JOURNAL, 1915.

Prune Juice.—Specific gravity, 1.049. Extractive, 18 percent alcohol, 17.58 percent vol. 1 Cc. required 0.4 Cc. N/10 KOH.

Specific gravity, 1.087. Extractive, 26 percent alcohol, 13.26 percent vol. 1 Cc. required 0.9 Cc. N/10 KOH.

Specific gravity, 1.057. Extractive, 21 percent alcohol, 17.6 percent vol. 1 Cc. = 0.4 Cc. N/10 KOH.

Specific gravity, 1.049. Extractive, 19.3 percent alcohol, 18.58 percent 1 Cc. = .36 Cc. N/10 KOH.

Specific gravity, 1.057. Extractive, 20.5 percent alcohol, 18.58 percent 1 Cc. = .52 Cc. N/10 KOH.

E. L. PATCH.

Quassia.—Ash, 2.2 percent; extractive, 6 percent; ash, 2.2 percent; extractive, 4 percent; ash, 2.8 percent; extractive, 6 percent; ash, 2.4 percent; extractive, 5.8 percent; ash, 3.0 percent; extractive, 3.3 percent; ash, 8.0 percent; extractive, 7.0 percent.

E. L. PATCH.

Quebracho.—Two lots. Highest, 1.22 percent. Lowest, 0.95 percent. Average, 1.08 percent. Standard, 1 percent alkaloids.

C. E. VANDERKLEED.

Quinine Alkaloid.—Extreme variation in water content. Nine lots gave 0. percent, 7.3 percent, 9.3 percent, 11.3 percent, 12.5 percent, 12.7 percent, 13 percent, 15.1 percent and 20 percent. The U.S.P. allows 14.3 percent.

C. E. VANDERKLEED.

Quinine Pills.—

2 gr. gave 2.035 grains of Quinine Sulphate 7H₂O.

2 gr. gave 2.077 grains of Quinine Sulphate 8H₂O.

5 gr. gave 4.942 grains of Quinine Sulphate 7H₂O.

5 gr. gave 5.044 grains of Quinine Sulphate 8H₂O.

2 gr. gave 2.035 grains of Quinine Sulphate 7H₂O.

2 gr. gave 2.075 grains of Quinine Sulphate 8H₂O.

2 gr. gave 1.8 grains of Quinine Sulphate 7H₂O.

E. L. PATCH.

Rose.—Several shipments of "rose petals" have been received which consisted of the entire bud with calyx attached.

H. H. RUSBY.

Saffron.—Powdered stamens of crocus, and so labelled, among the interesting shipments of the year.

H. H. RUSBY.

Santonica.—Many large shipments have arrived of a form of this drug that is most puzzling. It so closely resembles the genuine that it may well be regarded as a young form of it and its odor is exquisite. On assay it is found to contain less santonine, often very little and sometimes none. It is shorter, greener and often has a short piece of peduncle attached. It is much in need of investigation.

H. H. RUSBY.

Sarsaparilla, Mexican.—Two shipments of Mexican sarsaparilla were of such a peculiar appearance as to suggest that they represented a different species of smilax.

H. H. RUSBY.

Soap.—Powdered castile soap has 1 percent to 6 percent moisture. Two lots only partly dissolved in hot alcohol and solidified on cooling.

E. L. PATCH.

Sodium Bisulphite.—One lot assayed but 64 percent NaHSO_3 .

Sodium Iodide.—One lot assayed 95.2 percent NaI , the low assay being due to moisture.

C. E. VANDERKLEED.

Sodium Phosphate Monobasic.—99 percent anhydrous. Triturated, 94.14 percent NaH_2PO_4 anhydrous. 108.27 percent of monohydrated.

E. L. PATCH.

Sodium Salicylate.—Two lots assayed 97.2 percent and 98.4 percent instead of the U.S.P. 99.5 percent.

C. E. VANDERKLEED.

Spirit Ammonia Aromatic.—Lots deficient in ammonia carbonate and in ammonia water. One lot, three times too much ammonia, showed that 28 percent instead of 10 percent had been used.

N. A. R. D. JOURNAL.

Spirit Camphor.—2 percent, 30 percent, 40 percent, 43 percent, 80 percent, 82 percent of official. One lot, 33 percent alcohol.

N. A. R. D. JOURNAL.

Stramonium Leaves.—One sample, 0.219 percent alkaloids. Standard, 0.25 percent.

C. E. VANDERKLEED.

Strontium Peroxide.—One lot assayed only 69.2 percent absolute SrO_2 which is below the 84.5 percent stated by the N. & N. R. for a good product.

C. E. VANDERKLEED.

Strychnine Alkaloid.—One lot was dark colored and contained excess of brucine.

E. L. PATCH.

Tablets Below Standard.—Acetanilide, 1.86 gr. instead of 3 gr.; 2.46 gr. instead of 3 gr.; acetanilide, 1.847 gr. instead of 2.5 gr.; 2.563 gr. instead of $3\frac{1}{2}$ gr.; caffeine, 0.47 gr. instead of 1 gr.; 0.22 gr. instead of 0.5 gr.; quinine sulph., 0.66 gr. instead of 3 gr.; phenacetin, 2.35 gr. instead of 3 gr.; sodium salicyl., 4.24 gr. instead of 5 gr.; salol, 1.94 gr. instead of 2.5 gr. morph. sulph., 0.0206 gr. instead of 0.0417 gr.; strychn. sulph., 0.036 gr. instead of 0.025 gr.

DEPT. AGRIC.

Terra Alba.—The trade still differs as to what the composition of terra alba should be. Most of the lots examined were calcium sulphate, but one lot was clay, another clay with much calcium sulphate, and another clay with a little calcium sulphate.

C. E. VANDERKLEED.

Tragacanth.—The year has been characterized by a great deal of dark, dirty and inferior tragacanth. As I have before remarked, a tragacanth several shades darker than the U.S.P. makes a perfectly white powder, and its use should be permitted. A great deal of this year's shipment, however, has been of a grade quite unfit for any but technical uses. It is not at all unlikely that considerable of it, admitted for technical use, has been sold in powdered form for medicinal purposes. The sale of India gum as tragacanth has ceased, for the simple and sufficient reason that the India gum has become the more valuable of the two. This is because of its very extensive use for one of the most contemptible forms of adulteration, that of ice-cream.

H. H. RUSBY.

Triticum.—Our market has received a good deal of rather inferior triticum. The U.S.P. requirement "deprived of its roots" is met by cutting each internode of the rhizome off close to the nodes, which bear short root fragments. These nodes are supposed to be rejected, but this year many of them have been offered for import. Probably they were intended for use in nostrums, of which this drug is a common ingredient. Some triticum with the nodes attached has been received and there have been several shipments, under the name triticum, of a totally different grass rhizome.

H. H. RUSBY.

Veratrum.—One lot, 1.32 percent. Standard, 1 percent alkaloid.

C. E. VANDERKLEED.

Wormseed.—A great amount of spurious Levant wormseed, or santonica, has been offered. This variety has an agreeable lemon odor and is of a light green color. The heads are shorter and more rounded than the genuine and mostly have a short stem attached. The article contains very little santonin.

H. H. RUSBY.

Zinc Oxide.—99 percent ZnO; 99 percent ZnO; 99.16 percent, 98.96 percent. One lot, 96.93 percent, contained lead.

E. L. PATCH.

Considerable difficulty was experienced in securing a quality to meet the U.S.P. test for heavy metals. Most gave only a slight test, but were not U.S.P.

W. L. SCOVILLE.

COMMITTEE { EDGAR L. PATCH
LYMAN F. KEBLER
H. H. RUSBY

NOTE.—After the paper was printed, except the last sheet, a letter was received from C. E. Vanderkleed of the Committee, objecting to the statement in the last paragraph on the first page, in relation to keeping qualities of digitalis and to the reference to chemical and physiological tests. Aside from this, he approved the report. His letter follows:

July 20, 1915.

In reply to your letter of July 12th, containing preliminary sheets of the report of Committee on Drug Market, I beg to state that for the most part I approve of the report as outlined. I am not entirely in accord, however, with certain statements in the last paragraph on the first page.

I quite agree with the report that it is not practicable to guarantee the keeping qualities of all products. Neither can the manufacturer, be he large or small, regulate how preparations, prone to deterioration, are going to be kept after they leave his laboratory. So far, so good.

I am not in accord, however, with the references to the paper of Prof. Hatcher, who, basing his opinion on a relatively small number of drugs and preparations, concludes that digitalis does not deteriorate. In my own laboratory, having access to the records of tests of hundreds of samples, I am prepared to maintain that digitalis preparations *may* deteriorate, and often *do* deteriorate.

I do not question for one minute the results which Dr. Hatcher got with the preparations which he tested. It is entirely possible that he may have found a twenty-year-old sample that assayed better than a year-old sample. It is also even possible that he may have had a ten-year-old tincture testing as good as some freshly made.

We have records of many digitalis preparations, which, on re-examination after several months or years, show no deterioration. But, on the other hand, we have numerous instances where a considerable amount of deterioration did occur. Consequently, it is not safe to presume, because certain preparations did not deteriorate, that this drug and its preparations are not prone to deterioration.

I also object to the sentence reading as follows: "Then it is important to know whether the value of a product is determined by accurate chemical tests or inaccurate physiological experiment." The above sentence is certainly true when it comes to comparing really accurate chemical tests with really inaccurate physiological experiments. What I object to in the sentence is the implication that chemical tests are always accurate and physiological experiments always inaccurate. I have seen, and we have all seen, many chemical tests that fall far short of accurately portraying physiological activity, and we also know of many physiological determinations, such, for example, as those used for the standardization of adrenal preparations, which are far more accurate than any chemical test that has been devised.

It is, therefore, not merely a question of the accuracy or inaccuracy of the individual operator, but chemical tests may sometimes lead to wrong conclusions quite as well as physiological experiments. Take, for example, aconite preparations. On deterioration, a tincture of aconite may continue to show by chemical assay the full amount of required alkaloid, but on physiological test be found to be relatively inert. I would, therefore, suggest that this sentence be eliminated.

Please consider that this criticism of the report comes from one who is primarily a chemist, not a physiologist. Nevertheless, I do not deem it wise, in a report of this kind, to allow a discussion as to the relative merits of two different kinds of work, each absolutely essential to the standardization of drug products, to appear.

If these modifications can be made, I should be very glad indeed to have my name added to the report.

Very truly yours,

(Signed) CHAS. E. VANDERKLEED.