

eral months ago, by means of a *questionnaire* sent to some of the leading pharmacists of this country. An analysis of 10,000 prescriptions (2) showed that 24% of them contained proprietary medicines, which, though still too high a figure, shows a decided improvement over the figure obtained by Motter (3) in 1906, who as the result of an examination of 5000 prescriptions found 47% calling for proprietaries. This reduction in the use of proprietary medicines by about one-half may, it seems, be justly ascribed to the propaganda in this behalf carried on by the American Medical Association, through its Council on Pharmacy and Chemistry, and by the National Association of Retail Druggists. These figures mean that the preparations of the Pharmacopœia can be made more popular by propaganda. The forthcoming revision of the Pharmacopœia and the National Formulary offers an excellent opportunity for renewing them. Might not this society do its share in advancing the good cause?

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ESTIMATION OF CINEOL IN OIL OF EUCALYPTUS.*

JOSEPH L. TURNER AND RALPH C. HOLMES.

The question of an accurate determination of the quantity of Cineol in Oil of Eucalyptus is still unsettled, notwithstanding the quite considerable amount of research which has been devoted to it, and, judging from its present status, it will not be settled for some time to come. This is to be regretted the more, since it is now established beyond dispute that the value and therapeutic action of eucalyptus oils depend exclusively upon their content of cineol (eucalyptol). Various methods proposed heretofore, without exception, suffer from one shortcoming—gross inaccuracy; either due to the wrong basis of method, or to the instability of those compounds which have been suggested as serviceable for the separation of Cineol.

To the class of methods based on wrong premises belong the "Permanganate Method" proposed by Francis D. Dodge (*Journal Industrial and Engineering Chemistry*, Vol. IV, August, 1912, p. 529), and the "Resorcinol Method" proposed by Schimmel & Co., (*Semi-Annual Report of Schimmel & Co.*, October, 1907); the latter method is now slated for inclusion in the Ninth Revision of the United States Pharmacopœia, and it will thus become responsible for the admission into the pharmaceutical practice of inferior eucalyptus oils, as we propose to show further below.

The methods based on the separation of unstable addition products of cineol, are:—the Phosphoric Acid method and the Hydrobromic Acid method.

The various methods mentioned will be outlined briefly, as it is not our purpose here to enter into a thorough discussion of these. Exhaustive information, both

* Presented at the November meeting of the New York Branch of the American Pharmaceutical Association, November 9, 1914.

pro and *con*, may be obtained from the literature on the subject, and especially by perusing the Semi-Annual Reports of Schimmel & Co.

1. *Phosphoric Acid Method*.—"Introduce into a beaker a solution prepared by dissolving 10 cc. of Oil of Eucalyptus in 50 cc. of purified petroleum benzin; immerse the beaker in a freezing mixture and add phosphoric acid, drop by drop, with constant stirring, until the white magma of cineol phosphate formed, begins to assume a yellowish or pinkish tint; then transfer the magma to a force filter, wash it with cold purified petroleum benzin, and then dry it by pressure between two porous plates. Transfer the precipitate (cineol phosphate) to a narrow graduated cylinder, and add warm water, which will cause separation of the cineol. The volume, in cubic centimeters, of the separated oil, multiplied by 10, represents the volume *per cent.* of cineol (eucalyptol)."

The addition product of eucalyptol with phosphoric acid, as obtained by this method, is a semi-solid sticky substance which decomposes very readily and renders a quantitative separation very difficult, if not altogether impossible. In consequence of this, the results obtained by this method are invariably too low.

2. *The Hydrobromic Acid Method* is carried out as follows:—"In a highly cooled solution (freezing mixture) of 10 cc. eucalyptus oil in 40 cc. low-boiling petroleum ether, (b. p. about 40°), *absolutely dry* gaseous hydrobromic acid is introduced until a precipitate is no longer formed. The pure white hydrobromide of cineol formed is rapidly collected with a suction pump, and washed with cold petroleum ether. Into the filtered-off liquid, hydrobromic acid is again introduced, any precipitate formed is collected separately, and then added to the bulk. For the purpose of removing the petroleum ether, the cineol hydrobromide is left standing for a quarter of an hour in a vacuum; it is then rinsed with a little alcohol into a cassia flask, and decomposed with water. The cineol separated off is brought into the neck of the flask by the addition of more water, and the quantity of the oil read off the scale. By multiplying with 10, the cineol content of the oil employed is obtained in *per cent.* by volume."

This method has the same drawback as the Phosphoric Acid method, namely, rapid decomposition of the addition product. Moreover, the procedure for obtaining the cineol hydrobromide is a very complicated one, and is not suitable, therefore, for ordinary practical purposes.

3. *The Potassium Permanganate Method* is based upon the fact, that, in the cold, cineol remains practically unattacked by potassium permanganate, whereas, the remaining constituents of the oils in question (eucalyptus oil and cajuput oil) are oxidized into soluble compounds. The process is carried out as follows:—"10 cc. of the oil under examination are placed in a narrow-necked flask, cooled with ice-water and shaken with a gradually added 5 to 6 *p. c.* solution of potassium permanganate, until the latter is present in excess. The mixture is then left standing in ice-water for from 12 to 18 hours with occasional shaking, after which the manganese peroxide which has separated out is brought to solution by means of a careful addition of sulphurous acid (or sodium bisulphite + hydrochloric acid). The unattacked oil (eucalyptol) is brought into the neck of the flask, pipetted into a graduated tube, washed with a little alkali, and estimated volumetrically. Its sp. gr. should be 0.929 to 0.930 (15°); it should be inactive, and dissolve in 3.5 vols. 60 *p. c.* alcohol at 25°."

We have not investigated this method personally, but are rather willing to ac-

cept the criticism as published in Schimmel & Co.'s Semi-Annual Reports, for April, 1913, p. 62, containing results of experiments on known mixtures of cineol with pinene and terpineol. For instance, a mixture containing 25% cineol and 75% pinene, when estimated by this method, showed a cineol content of 95%; a mixture of 50% cineol and 50% terpineol, on the other hand, yielded only 30% cineol. Time does not permit us to enter into a more complete discussion of these results.

4. *Resorcinol Method*, or more correct, *Resorcinol Methods*, since there is an "original" method as described in Schimmel & Co.'s Reports for October, 1907, in Gildemeister & Hoffmann's "Volatile Oils," 1913, p. 601, and as proposed for the inclusion in the Ninth Revision of the U. S. Pharmacopœia, and also a "Modified Resorcinol Method" as given in Schimmel & Co.'s Reports for April, 1908.

The "original" method is based on the fact that cineol forms an addition product with resorcinol, which is soluble in an excess of concentrated resorcinol solution.

The process is carried out as follows:—

"To 10 cc. of oil contained in a 100 cc. cassia flask enough 50 p. c. resorcinol solution is added to fill the flask about four-fifths. For five minutes the mixture is thoroughly shaken, and then that portion of the oil which has not gone into solution is driven into the neck with resorcinol solution. Any oily particles adhering to the walls of the flask are caused to rise to the surface by rotating the flask or gently tapping it. After the resorcinol solution has become perfectly clear, which usually requires several hours, the volume of oil remaining is read off, the cineol content ascertained by subtracting this amount from 10 and the resultant multiplied with 10 in order to obtain the percentage by volume. Oils very rich in cineol are advantageously diluted with an equal volume of turpentine oil since the cineol-resorcinol occasionally crystallizes from concentrated solutions thus rendering futile the entire process."

It soon became apparent, however, that this method gave too high results, for the reason that constituents of eucalyptus, other than cineol, are also soluble in the resorcinol solution, and further investigation of the subject, led to the "Modified Resorcinol Method," which consists in distilling the oil of eucalyptus at such a rate that only one drop distills over in one second, collecting the portion distilling between 170° and 190° C., and subjecting this portion to the estimation by the above described Resorcinol Method.

We have examined a number of oils, both by the "original" and "modified" Resorcinol Methods, and have reserved our criticism of these for the latter part of our paper.

Many a chemist's patience has been sorely tried by the Phosphoric Acid method of separating cineol, as outlined in the U. S. P. VIII; and, therefore, the Resorcinol Method, as proposed originally by Schimmel & Co., and as described in the last edition of Gildemeister & Hoffman's "Volatile Oils," seemed to afford an easy and accurate means of estimating cineol. However, it became evident at the first application of this method, that the new process was not above suspicion, especially when some eucalyptus oils, persistently refusing to form a semi-solid precipitate with phosphoric acid, showed unusually high cineol content when assayed by the Resorcinol Method.

The logical idea then suggested itself of trying arsenic acid instead of phos-

phoric acid, with a view of obtaining a more stable addition product, and the results so obtained exceeded our expectations. Later, a search through the literature revealed the fact that the idea was not original with us, since cineol arsenate became the subject of a patent as early as June 20, 1901 (German Patent No. 132606, U. S. Patent No. 705545), and according to Thoms & Molle (Arch. der Pharmazie, 242 (1904), p. 172), they used arsenic acid in February, 1901, for the purification of cineol as well as for its separation from various fractions of the Oil of Bay Laurel. Nevertheless, we justly claim the credit for being the first to apply arsenic acid to the *quantitative estimation* of cineol.

We found that by adding approximately an equal volume of an 85% solution of arsenic acid to cineol, a white, solid, crystalline substance resulted, which is sufficiently stable to permit handling it in the air, and which is decomposed by hot water into its components, that is, cineol and arsenic acid. A compound obtained by mixing equimolecular quantities of cineol (152.98) and Arsenic Acid (140.9) was tested for its stability when exposed to air at ordinary room temperature with the following result:—

5 hours in open air	Temp. 25° C.	—Loss: 2.9%
22 hours in open air	Temp. 25° C.	—Loss: 6.0%
29 hours in open air	Temp. 25° C.	—Loss: 7.0%
45 hours in open air	Temp. 25° C.	—Loss: 8.4%
69 hours in open air	Temp. 25° C.	—Loss: 9.6%

The determination of cineol in cineol-bearing oils by means of arsenic acid is carried out as follows:—

Deliver from a pipette 10 cc. of the oil into a glass dish (preferably a round bottom one) of 50 cc. capacity, which is imbedded in finely cracked ice. Add 10 cc. of concentrated arsenic acid (containing about 85% arsenic acid; (see "Note" below) and stir until precipitation is complete. When the mixture ceases to congeal further, allow to stand ten minutes in the ice. *At this point*, if the mixture forms a hard mass, indicating an oil rich in cineol, 5 cc. of purified petroleum ether should be added, and the mass mixed well; transfer immediately to a hardened filter paper* by means of a pliable horn spatula; spread evenly over the surface of the paper and lay a second hardened filter paper over the top. Outside of the hardened filters, place several thicknesses of absorbent or filter paper, and transfer the whole to an ordinary letter press, bringing to bear all the pressure possible for about one minute. Change the outside absorbent papers and press again, repeating the operation, if necessary, until the cineol arsenate is apparently dry, and separates readily when touched with a spatula. The pressing is *not* complete when a hard mass remains which is broken up with difficulty; the method usually requires two changes of filter paper, pressing each time for about two minutes; if left too long in the press the compound may decompose. Now, transfer completely the compound by means of the horn spatula to a glass funnel inserted into a 100 cc. Cassia flask with neck measuring 10 cc. graduated in 1/10 cc. Wash the precipitate into the flask with a stream of hot water from a wash bottle, assisting the disintegration with a glass rod. Place the flask in boiling water and rotate until the compound is thoroughly broken up; add enough water to cause the cineol to rise into the neck of the flask, cool to room temperature

* In our work we found most useful Schleicher & Schüll's hardened filters No. 575, 18½ cm. diam.

and read off the volume; on multiplying the latter by 10, the percentage of cineol in the oil is obtained.

In judging whether or not petroleum ether should be added, the following rule should be observed; add enough petroleum ether to soften the cineol arsenate, so as to obtain a plastic mass; the quantity necessary never exceeds 5 cc., and decreases with oils containing less than 80% of cineol. The object of adding petroleum ether is merely to soften the hard mass and to aid in the separation of the non-cineol constituents of the oil; a large excess of petroleum ether will decompose the compound.

The above method is applicable directly to all oils containing above 50% of cineol; in oils containing lower proportions of cineol the precipitate is not solid enough to permit convenient handling; and if the cineol content drops below 25%, the separation of cineol arsenate is not quantitative. We have found that the addition of an equal volume of eucalyptol to such oils (i. e., mixing 5 cc. of the oil with 5 cc. of eucalyptol) successfully overcomes this difficulty; it then, only becomes necessary to subtract from the volume of cineol, as observed in the neck of the flask, 5 cc., and to multiply the difference by 10, in order to obtain the percentage of cineol in the oil.

Note.—The arsenic acid may be obtained in commerce in crystalline form; and may be dissolved in water in such proportion that the resulting solution has the S. G. of 2.173 at 25°, (corresponding approximately to 85% arsenic acid) or it may be conveniently prepared in the laboratory as follows:—

Place in a porcelain evaporating dish 50 cc. Nitric Acid S. G. 1.142, and add 60 gms. arsenic trioxide in small portions, stirring continuously; after the reaction becomes less violent, heat over Bunsen burner until the oxidation is complete and the excess of nitric acid is evaporated; test for freedom from both arsenic trioxide and nitric acid; filter and evaporate to about 100 gms. The resulting solution contains about 85% of arsenic acid (H_3AsO_4 .)

In order to test the reliability of the method, we have prepared, to begin with, various mixtures of cineol with turpentine oil, and ascertained their cineol content in the manner above described, with the following results:—

1. 50 vol. % Cineol+50 vol. % Turpentine oil; found 49.5%; 50% Cineol
2. 60 vol. % Cineol+40 vol. % Turpentine oil; found 59 %; 60% Cineol
3. 75. vol. % Cineol+25 vol. % Turpentine oil; found 74 %; 75% Cineol

As stated above, we found that the application of the method to mixtures containing less than 50% cineol is not practicable; and, since adding cineol to such mixtures would have amounted simply to testing known mixtures containing a higher percentage of cineol, we have omitted this part of investigation from the line of our work as originally planned.

In order to test the applicability of our method to various oils containing cineol, we have collected from several sources a number of samples of such oils and subjected them to assaying by the arsenic acid method, comparing our results with those obtained by the Resorcinol Method.

The comparison was carried out both on original oils and on fractions distilling over between 170° and 190° C., as outlined in Schimmel & Co.'s Report, April, 1908 ("Modified Resorcinol Method").

For the purpose of determining the purity of cineol separated by the arsenic acid method, several portions of cineol, obtained in the course of assays of *original* oils, were mixed and subjected to physical examination with the following results:—

S. G. at 25° C.—0.9218; Melting Point—1° C.; Optical Rotation +0°13'.

On the other hand, being already familiar with the fact that results obtained by the Resorcinol Method on original oils are not reliable, we examined only that cineol which was obtained by the "modified Resorcinol Method," and which was thus subjected to considerable purification, at first by distilling the oil, and then by distilling with steam the resorcinol solution containing the soluble portion of the above distillate. Cineol collected in this manner from a number of Resorcinol solutions possessed the following properties:—

S. G. at 25° C.—0.9242; Melting Point—3° C.; Optical Rotation +0°7'.

The criterion of a pure cineol, according to the U. S. P., being S. G. at 25° C.—0.921 to 0.923, Melting Point—1° C.; and optically inactive, the purity of cineol obtained by the arsenic acid method, as evidenced by its physical properties, shows conclusively that none of the constituents of oil of eucalyptus other than cineol are precipitated by the arsenic acid, and that the precipitate of cineol arsenate can be freed, with comparative ease, from the non-cineol portion of the oil in question.

Results of assays made by us on eighteen samples of various oils are incorporated in the accompanying table.

Close agreement of results obtained by the arsenic acid method on original oils with those obtained on the distillate, collected between 170° and 190° C., speaks well for their correctness. An additional argument in favor of this contention is the fact that these results, from the very nature of the process, tend to be somewhat high, rather than low; observing, at the same time, that results yielded by the modified Resorcinol Method are invariably higher than those obtained by our method, we must necessarily conclude, that the latter represent more nearly the true cineol content of an oil; remembering in addition the almost quantitative yield of cineol from its mixture with various proportions of oil of turpentine when precipitated by arsenic acid (see previously), we feel justified in stating that our method gives results which represent the true cineol content within the limits of an experimental error, which in this case does not exceed 2%.

We regard the results of our experiments on known mixtures of cineol with oil of turpentine as conclusive, and our method as directly applicable to all varieties of cineol-bearing oils, for the reason that in such oils, cineol is the only constituent precipitated by the arsenic acid.

The purity of cineol, as well as the close concordance of results obtained by our method before and after distillation, show that oxygenated constituents, other than cineol, are not precipitated by arsenic acid, since fractions distilling above 190° C. carry most of such compounds, and their removal would have resulted in a percentage of cineol lower than that obtained in the assay before distillation, if the opposite were the case.

On the contrary, the numerous experiments carried out by Schimmel & Co. in assaying by the Modified Resorcinol Method, mixtures composed of cineol and fractions of eucalyptus oil distilling *below* 170° and *above* 190° C., do not prove the reliability of this method, since such mixtures do not contain the non-cineol constituents distilling *between* 170° and 190° C., some of which unquestionably are soluble in a 50% resorcinol solution; the latter may be seen from the fact that, in the large majority of oils examined by us, the Resorcinol Method (modified) gave higher results than the Arsenic Acid method.

No.	Name of Oil	S. G. at 25°	O. R.	Arsenic Acid Method		Resorcinol Method		Remarks
				Direct	After Distill.	Direct	After Distill.	
1	Eucalyptus Globulus.....	0.9187	+0° 50'	84% 82%	83%	88%	88%	Boiling-point, 170°-174°
2	Eucalyptus Austral.....	0.9108	+0° 43'	78% 78%	78.8%	90%	85.5%	No distillate below 170° Cineol Fraction=95%
3	Eucalyptus	0.9171		85%	85%	88%	88%	Distilled completely between 170°-190° C.
4	Eucalyptus Bosisto.....	0.9158		84%	84%	90%	90%	Distilled completely between 170°-190° C.
5	Eucalyptus Alger.....	0.9176	+5° 15'	58%	49.6%	see foot-note	57%	Fraction below 170°-14.6 cc., contained 8.32 cc. Cineol
6	Eucalyptus Austral.....	0.9182		84% 84%	84.48%	90%	91%	"Cineol Fraction"=73 cc. (From 100 cc. oil) No distillate below 170° "Cineol Fraction"=96%
7	Eucalyptus Amygdalina.....	0.8640	-44° 10'	see foot-note	14.7% 14.7% 15.6%	36%	14.7%	Dist. below 170°=1.5% "Cineol Fraction"=82%
8	Eucalyptus Globulus.....	0.9171		85%	86%	90%	89%	No distillate below 170° "Cineol Fraction"=95%
9	Eucalyptus Amygdalina.....	0.8680	-36° 38'	no precipitate	5.0% 6.0%	54%	14.8%	Dist. below 170°=2.6% "Cineol Fraction"=78%
10	Eucalyptus Dumosa.....	0.9145		78% 76%	74% 75%	94%	78%	No distillate below 170° "Cineol Fraction"=95%
11	Eucalyptus Globulus.....	0.9179		83%	84.48%	92%	91%	No distillate below 170° "Cineol Fraction"=96%
12	Eucalyptus Austral—50-60%.	0.9254	+4° 24'	64% 65%	66.3%	90%	66.3%	Dist. below 170°=2.6% "Cineol Fraction"=78%
13	Eucalyptus Austral—70-80%.	0.9210		77.5% 78%	78%	92%	87%	No distillate below 170° "Cineol Fraction"=91%
14	Eucalyptus Austral—80-85%.	0.9188		83.5%	84.5%	92%	90%	No distillate below 170° "Cineol Fraction"=96%
15	Eucalyptus Austral.....	0.9178		82% 82% 83%	83%	86%	88%	No distillate below 170° "Cineol Fraction"=95%
16	Eucalyptus	0.9156	+0° 18'	84.5% 85%	86%	88%	88%	No distill. below 170° "Cineol Fraction"=94.5%
17	Cajuput Native.....			60% 61%	49.8% 50.7%	73%	54%	No distillate below 170° "Cineol Fraction"=67% Fraction above 190° contained Cineol
18	Camphor			55%	53%	55%	53%	Dist. below 170°=22% (contained Cineol) "Cineol Fraction"=81%

Foot-note.—Insufficient quantity of oil to complete determinations.

An additional error in the Resorcinol Method is contributed by the solubility of oil of eucalyptus in water, which dissolves from 4% to 5% of this oil, whereas, cineol is almost insoluble; it could not be argued, therefore, that lower results obtained by our method could be due to the solubility of cineol in water.

We have adduced sufficient proof to show that the solubility of certain constituents of cineol-bearing oils must necessarily lead to a higher than actual cineol content when estimated even by the modified Resorcinol Method; it, therefore, becomes superfluous to discuss the total lack of reliability of the original Resorcinol Method in the form proposed for the inclusion into the forthcoming edition of the U. S. Pharmacopœia. Some oils, such as *eucalyptus amygdalina*, may, when assayed by this method, be accepted as a U. S. P. oil of eucalyptus, especially if a small quantity of cineol were added to them. Likewise, oils rich in oxygenated constituents may be freed from a large proportion of their cineol content by freezing and then offered in commerce as a U. S. P. product.

Schimmel & Co., in introducing the modified Resorcinol Method, assume that the fraction of oil of eucalyptus distilling between 170° and 190° carries all of the cineol contained in the oil. We admit that such an assumption may be correct in the majority of oils; we have encountered, however, some oils in which the presence of cineol was proven in portions distilling either below 170° or above 190° C. (see table, oils No. 5, No. 17, No. 18); in such oils, therefore, a certain portion of cineol would not be included into the estimation. Thus, while the modified method is, in a way, an improvement on the original method, yet at the same time, it introduces a new source of error.

Among eighteen samples of cineol-bearing oils, we found only one in which concordant results were obtained by the Resorcinol and Arsenic Acid methods (see table, oil No. 18). We regard this single exception as a final and conclusive proof of the unreliableness of the Resorcinol Method in general, and of the superiority of the Arsenic Acid Method.

SUMMARY.

1. Arsenic Acid forms with cineol an addition compound which is sufficiently stable for all practical purposes.
2. While the Arsenic Acid method cannot be included among those scientifically exact methods, which give results varying only slightly, even in the hands of a novice, nevertheless, we are convinced that this method is superior to any method yet proposed for the determination of cineol, being directly applicable to all cineol-bearing oils, giving results which are concordant within 2%, and representing, for all practical purposes, the true cineol content of an oil.
3. The Resorcinol Method, as slated for the U. S. P. IX, should not be adopted by the Revision Committee, for it will unquestionably lead to the introduction into commerce, of low grade eucalyptus oils; it would be far better to retain the present unsatisfactory phosphoric acid method, which undoubtedly is responsible for the fact that the majority of eucalyptus oils at present on the market possess a high cineol content, as seen from the analysis of samples obtained by us. We may suggest, however, that the Sub-Committee on Volatile Oils investigate the reliability of the Arsenic Acid method with the view of including it in the forthcoming edition of the Pharmacopœia.

NATIONAL ASSOCIATION OF MANUFACTURERS OF MEDICINAL PRODUCTS.



H. C. LOVIS, M. D.

The fourth annual meeting of this association was held at the Hotel Waldorf-Astoria on February 8 and 9.

The principal features of the meeting were the address of the President, Dr. Henry C. Lovis, the address of the Executive Committee, and the papers read by Dr. Dohme on "Paternalism in Government;" by F. B. Kilmer, on "Cultivation of Medicinal Plants," and by F. W. Bradford, on "Revision of U. S. Patent and Trade-Mark Laws."

The address of the President described the development of the world's commerce during the past year and congratulated the members upon the wisdom of our forefathers in avoiding "entangling foreign alliances," in view of the deplorable condition of Europe at the present time. He analysed the rise in prices caused by the war and said the lesson to be drawn from them, was that we should endeavor to relieve our country of its dependence upon other countries for supplies and he spoke of the necessity for protecting our manufacturers against the competition of foreign manufacturers.

The condition of our country was fundamentally sound and there was every prospect of great and profitable business for every one.

He referred to the new Currency Law as an efficient stabilizing influence to sound business conditions; to the prosperity of our railroads; to the opening of the Panama Canal and to the development of foreign markets, and strongly insisted upon our need of American ships to keep our money at home,—\$270,000,000 of which now goes into the hands of foreign companies. He congratulated the association upon the passage of the Harrison Anti-Narcotic Bill and recommended the continued representation of the Association in the National Drug Trade Conference. He advocated the support of the Price Protection measure, the Variation Clause of the Food and Drugs Act, one-cent letter postage, and extended his hearty thanks to the officers and members and to the drug journals for their coöperation in the work of the Association.

The report of the Executive Committee recommended the rebate of \$100.00 in the annual assessment; advocated the establishment of a system of compiling, registering and publishing lists of trade-names and trade-marks, and of amicable adjustment of differences relating to the same, and protested against increase of freight-rates to the Pacific coast.

The committee also recommended the passage of resolutions commending the Harrison Anti-Narcotic Bill; one-cent letter postage; the revision of the patent and trade-mark laws; and opposed any change of the variation clause of the food and drugs act; and the adoption of the German bi-chloride tablet by the Pharmacopœial Revision Committee.

It advocated changes in the laws of the states to bring them into conformity with the Harrison law and commended the efforts of the Philadelphia Drug Exchange, to remedy the injustice imposed by Section 11 of the Food and Drugs Act.

The retiring officers were re-elected for the ensuing year, and the Secretary, Mr. C. M. Woodruff, was voted an honorarium of \$500.00.

The meeting was addressed by Prof. Henry C. Hynson, Samuel C. Henry, Charles P. Tyrrell and George C. Hall.

The banquet was on Tuesday evening at the Waldorf-Astoria. President Lovis presided and the speakers were Rev. Dr. Cadman, Congressman Chandler and Luther B. Little.