

Assayed on date of manufacture.	Assayed on reexamina- tion after	Gasometric.	Volumetric.	Color on date of reexamination.
<i>Percent.</i>	<i>Months.</i>	<i>Percent.</i>	<i>Percent.</i>	
4.44	3	3.58	3.65	Colorless
4.29	7	3.51	3.42	Yellowish
4.25	10	3.67	3.75	Pale yellow
4.2	11	3.26	3.66	Colorless
4.4	13	3.22	3.46	Yellow
4.21	21	3.16	3.33	Yellow
4.4	26	1.34	1.47	Slightly
4.34	31	1.27	1.58	Deep yellow
4.27	38	1.17	1.66	Colorless

These results show that spirit of nitrous ether deteriorates shortly after being manufactured and also that the deterioration is a rapid one after about two years' standing. They further show that the color of the spirit gives no indication of the strength of the product, since samples with slight change of color showed as much deterioration as darker ones.

In conclusion we again wish to strongly recommend the adoption of the volumetric method for estimating the ethyl nitrite in spirit of nitrous ether and amyl nitrite, thus eliminating nitrometers and barometers from the utensils required for assaying pharmaceutical preparations altogether. Unfortunately, however, the new Pharmacopœia again gives the gasometric estimation of the ethyl nitrite.

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## THE ASSAY METHODS AND PURITY REQUIREMENTS OF THE PHARMACOPŒIA AND THE NATIONAL FORMULARY.\*

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The new Pharmacopœia of the United States, ninth decennial revision, and the National Formulary, fourth edition, impose additional responsibilities on the manufacturer as well as on the vendor or distributor of drugs and medicinal preparations. For the first time, in this country at least, fixed maximum as well as minimum requirements are made in the Pharmacopœia and in the National Formulary, and it is fair to assert that no books of standards now available come so near to theoretical perfection as do the new editions of our official standards which are now being distributed.

The purity rubrics introduced in the Pharmacopœia of the United States a decade or more ago have been considerably elaborated, and in the present edition the rubric for each article is generally accompanied by a specific method of assay.

This change in the nature of the official requirements is due to the fact that many critics of the previous edition of the Pharmacopœia of the United States have called attention to the desirability of having a clear, concise definition for each article or preparation, with a minimum and maximum limit for the active ingredients, to be accompanied by practical methods for their determination.

It has long since been asserted that it is impracticable, if not actually impossible, to comply absolutely with an inflexible fixed standard and it has also been pointed out that a fixed minimum requirement without a corresponding restriction of the maximum content of active constituent is unsatisfactory, in that it would not insure any degree of uniformity in the nature of the product. These

\* Read before Scientific Section, A. Ph. A., Atlantic City meeting, 1916.

several objectionable features of the previous editions of the official standards for drugs and medicines, it is thought, have been overcome by the modifications introduced in the now official editions.

The comparative table showing the strength of the most important pharmacopœial substances and preparations in the preceding and in the present pharmacopœias includes a total of 192 titles: 85 chemicals, 25 drugs, and 82 preparations. For no less than 34 of these drugs and preparations the previous edition of the Pharmacopœia contained no assay method or purity requirement. The purity requirement in connection with 25 chemical substances has been slightly increased and in connection with 22 chemicals has been slightly decreased, while 1, calcium chloride, has been changed from the anhydrous to the hydrated form, or from 99 to 75 percent of  $\text{CaCl}_2$ . The alkaloidal content of Hyoscyamus has been changed from not less than 0.08 percent to not less than 0.065 percent of the alkaloids from Hyoscyamus, and the requirement for *Pilocarpus* has been raised from 0.5 percent to 0.6 percent of the alkaloids from *Pilocarpus*.

The requirement for Oil of Clove has been changed from not less than 80 to not less than 82 percent of eugenol, and the requirement for Oil of Cassia has been correspondingly changed from not less than 75 to not less than 80 percent of cinnamic aldehyde.

The strength of 9 galenical preparations has been slightly increased and that of 11 preparations slightly decreased.

The more important changes in this connection are those evidenced by the preparations of opium, which are now on a basis of 10 to 10.5 percent of anhydrous morphine in place of from 12 to 12.5 percent of crystallized morphine in the U. S. P. VIII. All of these several changes are, however, negligible in comparison with the now general practice of definitely stating the maximum as well as the minimum strength of preparations of active drugs.

In many instances the permissible variation is less than 5 percent above or below the mean which usually corresponds closely to the previously official requirement. In but one instance (Spirit of Nitrous Ether), the permissible variation from a whole number slightly exceeds the maximum of 10 percent above or below the average of the now official requirement. In connection with several drugs and preparations containing small proportions of alkaloids the permissible variation is somewhat high.

No pharmacopœia now in force contains so many directions for assay as does the new Pharmacopœia of the United States. The total number of assay requirements in the new Pharmacopœia aggregates 287, 157 of which are for chemicals, 44 for drugs and 86 for preparations.

Of the 44 drugs, 16 are directed to be assayed chemically for alkaloids, 1 is to be assayed biologically for the relative activity of its constituents, and in connection with 5 additional drugs a biological method of assay is recommended. One of the drugs, aconite, is to be assayed both chemically as well as physiologically. Three drugs are to be assayed for resins, 3 enzyme preparations are to be tested for their enzyme action and 13 volatile oils are to be assayed for active constituents.

Of the 86 preparations, 36 are to be assayed chemically for alkaloids, 3 are to be tested biologically for their activity and for 11 others an alternative biological method of testing is recommended.

The assay methods for galenical preparations include 7 assays for diluted acids, 1 alkaloidal assay for a plaster, 9 chemical assays for alkaloidal content of extracts and 1 biological assay, 11 alkaloidal assays for fluidextracts and 3 bio-

logical assays, 1 required and 2 recommended. Of the 18 tinctures included in the list 12 are to be assayed for alkaloids, 2 for their chemical constituents and 1 is required to be assayed biologically and for 4 others a biological assay is recommended.

The National Formulary includes methods of assay under 52 different titles: 23 preparations, 7 drugs and 22 chemical substances. Of the 7 drugs, 4 are to be assayed for alkaloids, 1, rennin, is to be tested for its milk curdling properties, 1, lime juice, is to be tested for acid content, and 1, oil of bergamot, is to be assayed for linaloyl acetate. The requirements for chemical substances in the National Formulary are quite as high as the requirements that have been included in the Pharmacopœia and the permissible variation is frequently not more than 5 percent from the apparent average on which the variation is based.

The question naturally arises, are our theoretically much improved standards practically applicable at the present time and are the standards for excellence that have been set in connection with the maximum and minimum limitations equitable and attainable from a practical point of view, or have the limitations, in many instances at least, been fixed at too narrow a range? With the Pharmacopœia as yet not available (August) to a large proportion of the pharmacists of the country, it is, of course, entirely premature to discuss the practical results that will follow its promulgation as a standard, but it is fair to point out at the present time that the permissible variations from the mean of the standards have in many instances been fixed at a very much more limited range than has heretofore been the practice in connection with the enforcement of pure drug laws. Even a superficial comparison of the requirements of the Pharmacopœia with the reports of state food and drug chemists will readily demonstrate that a strict interpretation of the now official requirements will insure to the consuming public drugs and medicines more uniform in strength and composition than have hitherto been available.

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### REPAYING ALMA MATER.

A Chicago boy, James V. Nash, who worked his way through college, has given the first \$1,000 of his earnings since graduation to the institution that gave him the educational equipment wherewith he faced the world. His attitude of mind may not be unusual, but his practical exemplification of his theory goes much further than most baccalaureates are willing to carry their loyalty. He bears witness to his gratitude with a sacrifice that is as generous, in proportion, as the rich man's gift of many thousands. To many a man the payment of his term bills discharges most of his obligation to his college. He does not consider the bounty he receives from those who endowed professorships and founded scholarships and erected dormitories before his time for his present-day inheritance. The sum he pays is an inconsiderable fraction of the value of the bounty he receives. In after days he complacently permits the begging-bowl to pass by him without a contribution. He owes his college nothing but a little reunion enthusiasm at commencement, a few cheers for the wine, a song or two at a festal banquet. The young Chicagoan holds a different philosophy. He did not choose to wait till he reached the apex of his "pile" before making repayment for the value he felt he had received. No college would have a struggle for survival if it could count on the support of a number of like-minded alumni.—*Public Ledger*.

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