DETERMINATION OF THE REASONABLE OR PERMISSIBLE MARGIN OF ERROR IN DISPENSING. II. OINTMENTS.*

BY MARVIN J. ANDREWS.[1]

INTRODUCTION.

In the first paper of this series,[2] a report was made of studies undertaken to determine the magnitude and frequency of errors made in the dispensing of powders and capsules. This, the second paper of the series, deals with the errors encountered in the dispensing of ointments.

Ointments called for on prescriptions are usually prepared by mixing the ingredients on an ointment slab or pill tile with the aid of a spatula. In some cases the nature of the ingredients make it necessary to use a mortar and pestle, and occasionally a slab and muller. The bases most frequently ordered are petrolatum, white petrolatum, lard, benzoinated lard, anhydrous lanolin, lanolin, a mixture of lanolin and petrolatum, or a mixture of the above bases. Ointments are usually dispensed in glass or porcelain jars, less frequently in collapsible tubes.

For the purpose of this study, the different types of ointment prescriptions which the pharmacist is ordinarily called upon to dispense were divided into three classes, namely: (1) Those which require no handling further than that necessary to transfer the ointment from a stock container to a dispensing jar. (2) Those in which compounding involves the incorporation of a liquid with a fatty or hydrocarbon base. (3) Those in which the compounding involves the incorporation of a solid with a fatty or hydrocarbon base.

With respect to the magnitude and frequency of the error to be expected in the dispensing of these three types, the capacity of the container, the base used, and the method of preparation of the ointment seem to be the most important factors to be considered. To determine the extent to which each of these factors contribute to the total error, the following studies were undertaken.

EXPERIMENTAL PART.

Three series of tests were made. The first series of tests was carried out using containers of different capacities, but made by the same manufacturer. The objective in this series was to determine the effect on capacity of the following conditions:

(1) Difference in nature of ointment bases. (*a*) Petrolatum, (*b*) lanolin, (*c*) lanolin and petrolatum, and (*d*) benzoinated lard were used for this purpose.

(2) Trituration of each of the above bases on an ointment slab for five- and ten-minute periods previous to packing.

(3) Incorporation of a liquid with each of the above bases.

(4) Incorporation of a solid with each of the above bases.

(5) Size of jar, that is half-ounce, one-ounce and two-ounce.

The principal objective of the second series of tests was to determine the varia-

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[2] JOUR. A. PH. A., 22 (1933), 755, and 22 (1933), 838.

tion in the capacities of jars manufactured by each of the four manufacturers from whom they were purchased.

The objective of the third series of tests was to determine the variation in the capacities of jars purchased at random from retail pharmacists in the City of Baltimore.

In the actual performance of these tests, the ointment jars were filled in each case by 65 members of the senior class in dispensing pharmacy at the School of Pharmacy of the University of Maryland under working conditions similar to those prevailing in the better type of pharmacies. The filled ointment jars were checked for capacity by weighing on a prescription balance, and the standard deviation computed from the results obtained.

In the tests made to determine the variation in capacity due to the nature of the base, one series of jars was filled by melting and pouring the material into them, and a second series was filled by packing the base as received into them with the aid of a spatula. In filling the jars with melted base, the students were instructed to keep the temperature for melting as low as possible, and in the series filled with the base as received instructions were given to pack so as to eliminate air spaces in so far as possible.

TABLE I.—EFFECT OF DIFFERENT CONDITIONS IN PACKING OINTMENT JARS ON THE STANDARD DEVIATION.

Ointment Base.	Treatment and Packing.	1/2-Ounce Jar.	Average Capacity in Grains of 65 Jars.	S. D. in Grains.	Percentage Deviation.
Petrolatum	Packed solid	....	180	21.08	11.71
Lanolin	Packed solid	....	202	19.14	9.47
Lan. and Pet.	Packed solid	....	196	23.78	12.13
Benz. Lard	Packed solid	....	211	26.38	12.50
Petrolatum	Melted and poured	....	196	16.21	8.27
Lanolin	Melted and poured	....	216	14.89	6.89
Lan. and Pet.	Melted and poured	....	213	20.14	9.45
Benz. Lard	Melted and poured	....	199	26.23	13.18
Petrolatum	Trit. on slab 5 min.	....	178	18.65	10.48
Petrolatum	Trit. on slab 10 min.	....	177	19.50	11.01
Lanolin	Trit. on slab 5 min.	....	191	26.23	13.73
Lanolin	Trit. on slab 10 min.	....	185	24.09	13.03
Lan. and Pet.	Trit. on slab 5 min.	....	186	23.54	12.65
Lan. and Pet.	Trit. on slab 10 min.	....	184	26.80	14.56
Benz. Lard	Trit. on slab 5 min.	....	195	20.55	10.53
Benz. Lard	Trit. on slab 10 min.	....	187	24.01	12.84
Petrolatum	5% water incorporated	....	180	23.31	12.95
Lanolin	5% water incorporated	....	197	18.55	9.42
Lan. and Pet.	5% water incorporated	....	192	28.69	14.94
Benz. Lard	5% water incorporated	....	200	31.04	15.52
Petrolatum	5% ZnO incorporated	....	190	19.27	10.14
Lanolin	5% ZnO incorporated	....	207	24.57	11.87
Lan. and Pet.	5% ZnO incorporated	....	198	23.33	11.78
Benz. Lard	5% ZnO incorporated	....	210	22.95	10.93

It was assumed that the mixing of air with an ointment base would effect materially the weight of the contents of a jar filled with the base. To determine if this was actually the case instructions were given to triturate the above-mentioned

bases on an ointment slab with the aid of a spatula for 5- and 10-minute periods previous to packing.

In the tests intended to show the effect of the incorporation of a liquid with an ointment base, the students were instructed to use 5 per cent by weight of distilled water.

In the tests intended to show the effect of the incorporation of a solid with an ointment base the students were instructed to use 5 per cent by weight of zinc oxide.

In the filling of the jars students were instructed to put in an excess of material and level off the top by running the edge of a spatula over it. They were further instructed to remove any adhering material by carefully wiping the outside of the jar.

The results of the first series of tests are presented in Tables I, II and III.

TABLE II.—EFFECT OF DIFFERENT CONDITIONS IN PACKING OINTMENT JARS ON THE STANDARD DEVIATION.

Ointment Base.	Treatment and Packing.	1-Ounce Jar.	Average Capacity in Grains of 65 Jars.	S. D. in Grains.	Percentage Deviation.
Petrolatum	Packed solid	....	369	22.62	6.13
Lanolin	Packed solid	....	401	32.14	8.01
Lan. and Pet.	Packed solid	....	396	29.93	7.56
Benz. Lard	Packed solid	....	405	32.39	7.99
Petrolatum	Melted and poured	....	390	20.60	5.28
Lanolin	Melted and poured	....	417	26.24	6.29
Lan. and Pet.	Melted and poured	....	415	31.09	7.49
Benz. Lard	Melted and poured	....	397	39.04	9.83
Petrolatum	Trit. on slab 5 min.	....	354	31.35	8.86
Petrolatum	Trit. on slab 10 min.	....	355	31.63	8.91
Lanolin	Trit. on slab 5 min.	....	386	31.25	8.09
Lanolin	Trit. on slab 10 min.	....	373	36.80	9.87
Lan. and Pet.	Trit. on slab 5 min.	....	373	45.37	12.16
Lan. and Pet.	Trit. on slab 10 min.	....	370	47.10	12.73
Benz. Lard	Trit. on slab 5 min.	....	392	36.88	9.41
Benz. Lard	Trit. on slab 10 min.	....	374	38.28	10.24
Petrolatum	5% water incorporated	....	362	35.11	9.69
Lanolin	5% water incorporated	....	396	39.00	9.85
Lan. and Pet.	5% water incorporated	....	390	33.30	8.54
Benz. Lard	5% water incorporated	....	399	34.30	8.59
Petrolatum	5% ZnO incorporated	....	379	34.34	9.09
Lanolin	5% ZnO incorporated	....	411	37.48	9.12
Lan. and Pet.	5% ZnO incorporated	....	389	27.23	7.00
Benz. Lard	5% ZnO incorporated	....	408	40.27	9.87

The accompanying tabulations show that the average capacity in grains increases for the 65 jars packed with the solid base in the following order: petrolatum, 50 per cent mixture of lanolin and petrolatum, lanolin, benzoinated lard. When the base is first melted and then poured into the jars, the increase in the capacity of the jars is in the following order: petrolatum, benzoinated lard, 50 per cent mixture of lanolin and petrolatum, lanolin. Likewise, the jars when filled

by melting and pouring show a greater capacity than when filled with the same base by packing in the solid condition, except in the case of benzoinated lard.

The increase in capacity when the base is melted and poured is no doubt due to the fact that occluded air is driven out in heating, and to the fact that air-pockets are not formed in filling as is the case when the base is packed as solid.

TABLE III.—EFFECT OF DIFFERENT CONDITIONS IN PACKING OINTMENT JARS ON THE STANDARD DEVIATION.

Ointment Base.	Treatment and Packing.	2-Ounce Jar.	Average Capacity in Grains of 65 Jars.	S. D. in Grains.	Percentage Deviation.
Petrolatum	Packed solid	....	735	39.53	5.38
Lanolin	Packed solid	....	793	52.86	6.67
Lan. and Pet.	Packed solid	....	769	46.19	6.00
Benz. Lard	Packed solid	....	816	44.04	5.40
Petrolatum	Melted and poured	....	773	28.20	3.65
Lanolin	Melted and poured	....	831	34.51	4.15
Lan. and Pet.	Melted and poured	....	804	38.48	4.79
Benz. Lard	Melted and poured	....	774	55.32	7.15
Petrolatum	Trit. on slab 5 min.	....	712	58.62	8.23
Petrolatum	Trit. on slab 10 min.	....	707	54.31	7.68
Lanolin	Trit. on slab 5 min.	....	776	58.73	7.57
Lanolin	Trit. on slab 10 min.	....	752	57.92	7.70
Lan. and Pet.	Trit. on slab 5 min.	....	747	53.89	7.21
Lan. and Pet.	Trit. on slab 10 min.	....	730	54.39	7.45
Benz. Lard	Trit. on slab 5 min.	....	773	52.65	6.81
Benz. Lard	Trit. on slab 10 min.	....	741	68.18	9.20
Petrolatum	5% water incorporated	....	733	39.06	5.33
Lanolin	5% water incorporated	....	775	58.15	7.50
Lan. and Pet.	5% water incorporated	....	779	45.86	5.89
Benz. Lard	5% water incorporated	....	786	53.91	6.86
Petrolatum	5% ZnO incorporated	....	760	51.33	6.75
Lanolin	5% ZnO incorporated	....	808	57.63	7.13
Lan. and Pet.	5% ZnO incorporated	....	794	44.63	5.62
Benz. Lard	5% ZnO incorporated	....	819	48.65	5.94

The decrease in capacity when the jars are filled with benzoinated lard by melting and pouring is due, in part at least, to loss of water by evaporation. The expansion of the lard on heating also accounted for a part of the decrease in weight.

The standard deviation in the case of the jars filled with petrolatum, 50 per cent lanolin and petrolatum mixture, and lanolin is greater in each instance when the base is packed in the solid condition than when melted and poured. The magnitude of the error as shown by the percentage deviation varies inversely to the size of the jar.

The direction of the standard deviation in the case of the jars filled with benzoinated lard is directly opposite to that found for the other three bases, that is, the same volume of base weighs more when packed in the solid condition than when melted and poured in the jar.

The most important point brought out by the data in the above tables is that the frequency and magnitude of error is greater in the cases where the jars are filled with ointment in the solid state than in the cases where the filling is accomplished by melting and pouring.

Unfortunately, in actual drug store practice, the majority of prescriptions for

small quantities of ointments are filled by triturating the ingredients on a slab and packing the finished ointment into a jar with the aid of a spatula. This procedure is followed because the application of heat has a deleterious effect on the ingredients of certain ointments and because the preparation of an ointment by fusion requires that it be allowed to stand until it congeals before it is given to the patient, who is usually in the store waiting for it.

The tabulated data given above show further that the capacity of a jar by weight is decreased by triturating the ointment on a slab previous to packing in the solid state. No doubt this is due to the incorporation of air with the ointment base, thereby increasing its bulk and lowering its specific gravity. The time for which the material is triturated also seems to be an important factor, since in practically all cases the greatest decrease in capacity was shown where the period of trituration was ten minutes instead of five. In the case of benzoinated lard the fact that trituration results in liquefaction may also be a factor.

The incorporation of a liquid of comparatively low specific gravity and which does not readily mix with the base, such as water, appears to produce a decrease in capacity. The cause for this has not been definitely determined. It is believed, however, that the condition is due to emulsification and the occlusion of air. The effect produced by a liquid which is completely miscible with the ointment was not determined.

In cases where the specific gravity of the liquid is higher than that of the ointment base and where the liquid is insoluble in the base, an increase in capacity may be expected. In the case of the official mercury ointments, for instance, where the mercury content is high, the increase in capacity is enormous as shown in the following table.

TABLE IV.—CAPACITIES OF OINTMENT JARS FOR MERCURY OINTMENTS.

Size of Container.	Petrolatum.	Mild Mercurial Ointment.	Stronger Mercurial Ointment.
½-ounce	240 grains	343 grains	425 grains
1-ounce	480 grains	663 grains	838 grains
2-ounce	960 grains	1381 grains	1688 grains

In the case of the incorporation of a solid with the ointment base, it would naturally be expected that the capacity of the ointment jar by weight to be increased if the specific gravity of the solid were higher than that of the base and vice versa if it were lower than that of the base. The results obtained in the tests carried out with 5 per cent zinc oxide ointment show that these expectations are realized in so far, at least, as solids heavier than the ointment base are concerned. The increase in capacity, however, is not constant but varies with the ointment base used as shown in the above table. Evidently physical properties other than specific gravity are factors to be reckoned with, the solubility of the solid in the ointment base for instance. Unfortunately, tests were not made with solids lighter than the base, so that actual data on ointments of this type cannot be given at present.

For the purpose of making it possible to compare the results presented in Tables I to III with similar data that may have been published, but which have not been expressed in terms of the standard deviation, the per cent of deviation from the average has been calculated and is given in Tables V, VI and VII which follow.

TABLE V.—PERCENTAGE DEVIATION FROM THE AVERAGE WEIGHT OF ONE-HALF OUNCE JARS.

Ointment Base.	Treatment and Packing.	Average Capacity in Grains of 65 Jars.	Deviation from the Average Weight of 65 Completely Filled ½-Ounce Jars. 5% or Less.	From 5% Plus to 10%.	From 10% Plus to 15%.	From 15% Plus to 20%.	Over 20%.
Petrolatum	Packed solid	180	46.10%	30.76%	12.30%	6.15%	4.61%
Lanolin	Packed solid	202	70.75%	16.92%	6.15%	3.08%	3.08%
Lan. and Pet.	Packed solid	196	55.36%	16.92%	12.30%	.....	15.38%
Benz. Lard	Packed solid	211	63.06%	13.84%	7.69%	6.15%	9.23%
Petrolatum	Melted and poured	196	66.13%	15.38%	13.84%	.....	4.61%
Lanolin	Melted and poured	216	58.44%	29.22%	12.30%	.....	.....
Lan. and Pet.	Melted and poured	213	44.61%	41.53%	6.15%	1.54%	6.15%
Benz. Lard	Melted and poured	199	40.00%	24.61%	18.46%	6.15%	10.77%
Petrolatum	Trit. on slab 5 min.	178	38.45%	35.37%	12.30%	10.78%	3.08%
Petrolatum	Trit. on slab 10 min.	177	32.30%	27.68%	21.53%	7.69%	10.77%
Lanolin	Trit. on slab 5 min.	191	38.45%	26.15%	12.30%	10.77%	12.30%
Lanolin	Trit. on slab 10 min.	185	40.00%	24.61%	16.92%	6.15%	12.30%
Lan. and Pet.	Trit. on slab 5 min.	186	46.10%	26.15%	10.77%	4.61%	12.30%
Lan. and Pet.	Trit. on slab 10 min.	184	43.06%	30.76%	12.30%	3.08%	10.77%
Benz. Lard	Trit. on slab 5 min.	195	55.37%	24.61%	12.30%	3.08%	4.61%
Benz. Lard	Trit. on slab 10 min.	187	26.15%	29.22%	21.53%	10.77%	12.30%
Petrolatum	5% water incorporated	180	24.61%	29.22%	23.07%	10.77%	12.30%
Lanolin	5% water incorporated	197	43.06%	32.30%	16.92%	4.61%	3.08%
Lan. and Pet.	5% water incorporated	192	49.22%	33.84%	9.23%	3.08%	4.61%
Benz. Lard	5% water incorporated	200	53.83%	16.92%	12.30%	6.15%	10.77%
Petrolatum	5% ZnO incorporated	190	33.84%	41.53%	16.92%	6.15%	1.54%
Lanolin	5% ZnO incorporated	207	50.75%	27.68%	12.30%	4.61%	4.61%
Lan. and Pet.	5% ZnO incorporated	198	36.91%	32.30%	12.30%	6.15%	12.30%
Benz. Lard	5% ZnO incorporated	210	52.30%	23.07%	15.38%	3.08%	6.15%

In Table V, the percentage deviations from the average weight of ½-ounce jars show that in a large majority of cases the error is 15 per cent or greater, where the material filled into the jars was petrolatum, lanolin or 50 per cent lanolin and petrolatum mixture, and where the jars were filled by melting and pouring. If the filling is done by packing in the solid state, the error in the majority of cases is 20 per cent or more. If benzoinated lard is the base used, the error in the large majority of cases is 20 per cent or more, when the filling is done by either of the foregoing methods.

In Tables VI and VII, the percentage deviations from the average weight of 1- and 2-ounce jars, respectively, show that in a majority of cases the error falls within 10 per cent when the base is melted and poured into the jars, whereas the error is 15 per cent when the base is packed in the solid condition, or when other ingredients are incorporated with the base prior to transferring it to the jar. When benzoinated lard is the base used, the error is 20 per cent in the case of one-ounce jars, and 15 per cent in the case of two-ounce jars.

TABLE VI.—PERCENTAGE DEVIATION FROM THE AVERAGE WEIGHT OF ONE-OUNCE JARS.

Ointment Base.	Treatment and Packing.	Average Capacity in Grains of 65 Jars.	Deviation from the Average Weight of 65 Completely Filled 1-Ounce Jars. 5% or Less.	From 5% Plus to 10%.	From 10% Plus to 15%.	From 15% Plus to 20%.	Over 20%.
Petrolatum	Packed solid	369	63.06%	24.61%	9.23%	1.54%	1.54%
Lanolin	Packed solid	401	59.98%	24.61%	9.23%	.....	6.15%
Lan. and Pet.	Packed solid	396	55.37%	30.76%	7.69%	3.08%	3.08%
Benz. Lard	Packed solid	405	55.37%	32.30%	6.15%	1.54%	4.61%
Petrolatum	Melted and poured	390	79.98%	18.46%	1.54%	.....	.....
Lanolin	Melted and poured	417	69.21%	24.61%	3.08%	3.08%	.....
Lan. and Pet.	Melted and poured	415	67.67%	18.46%	10.77%	.....	3.08%
Benz. Lard	Melted and poured	397	64.60%	16.92%	10.77%	4.61%	3.08%
Petrolatum	Trit. on slab 5 min.	354	47.68%	26.15%	19.99%	6.15%	.....
Petrolatum	Trit. on slab 10 min.	355	44.60%	29.22%	19.99%	6.15%	.....
Lanolin	Trit. on slab 5 min.	386	50.75%	35.37%	6.15%	4.61%	3.08%
Lanolin	Trit. on slab 10 min.	373	46.10%	27.68%	13.84%	7.69%	4.61%
Lan. and Pet.	Trit. on slab 5 min.	373	53.83%	23.07%	10.77%	1.54%	10.77%
Lan. and Pet.	Trit. on slab 10 min.	370	55.37%	24.60%	6.15%	4.61%	9.22%
Benz. Lard	Trit. on slab 5 min.	392	55.37%	21.53%	12.30%	6.15%	4.61%
Benz. Lard	Trit. on slab 10 min.	374	38.45%	26.15%	13.84%	12.30%	9.23%
Petrolatum	5% water incorporated	362	44.60%	29.22%	18.46%	4.61%	3.08%
Lanolin	5% water incorporated	396	63.06%	24.61%	6.15%	1.54%	4.61%
Lan. and Pet.	5% water incorporated	390	56.91%	18.46%	16.92%	3.08%	4.61%
Benz. Lard	5% water incorporated	399	64.60%	18.46%	9.23%	4.61%	3.08%
Petrolatum	5% ZnO incorporated	379	53.83%	19.99%	16.92%	6.15%	3.08%
Lanolin	5% ZnO incorporated	411	61.52%	23.07%	7.69%	1.54%	6.15%
Lan. and Pet.	5% ZnO incorporated	389	55.38%	21.53%	15.37%	4.61%	3.08%
Benz. Lard	5% ZnO incorporated	408	58.44%	32.30%	1.54%	1.54%	6.15%

TABLE VII.—PERCENTAGE DEVIATION FROM THE AVERAGE WEIGHT OF TWO-OUNCE JARS.

			Deviation from the Average Weight of 65 Completely Filled 2-Ounce Jars.				
Ointment Base.	Treatment and Packing.	Average Capacity in Grains of 65 Jars.	5% or Less.	From 5% Plus to 10%.	From 10% Plus to 15%.	From 15% Plus to 20%.	Over 20%.
Petrolatum	Packed solid	735	70.75%	19.99%	7.69%	1.54%	....
Lanolin	Packed solid	793	61.52%	30.76%	4.61%	3.08%	....
Lan. and Pet.	Packed solid	769	61.52%	32.30%	4.61%	1.54%	....
Benz. Lard	Packed solid	816	69.21%	19.99%	7.69%	1.54%	1.54%
Petrolatum	Melted and poured	773	90.74%	6.15%	3.08%	....	....
Lanolin	Melted and poured	831	86.13%	9.23%	4.61%	....	....
Lan. and Pet.	Melted and poured	804	76.90%	16.92%	6.15%	....	....
Benz. Lard	Melted and poured	774	53.83%	29.22%	12.30%	4.61%	....
Petrolatum	Trit. on slab 5 min.	712	52.29%	24.61%	18.46%	4.61%	....
Petrolatum	Trit. on slab 10 min.	707	55.37%	30.77%	9.23%	4.61%	....
Lanolin	Trit. on slab 5 min.	776	59.99%	27.68%	6.15%	3.08%	3.08%
Lanolin	Trit. on slab 10 min.	752	90.74%	4.61%	1.54%	....	3.08%
Lan. and Pet.	Trit. on slab 5 min.	747	49.22%	33.84%	12.30%	4.61%	....
Lan. and Pet.	Trit. on slab 10 min.	730	59.98%	24.61%	7.69%	7.69%	....
Benz. Lard	Trit. on slab 5 min.	773	53.83%	33.84%	9.23%	3.08%	....
Benz. Lard	Trit. on slab 10 min.	741	30.76%	36.92%	27.69%	4.61%	....
Petrolatum	5% water incorporated	733	64.60%	27.68%	7.69%	....	....
Lanolin	5% water incorporated	775	55.37%	27.68%	12.30%	4.61%	....
Lan. and Pet.	5% water incorporated	779	64.60%	30.77%	3.08%	1.54%	....
Benz. Lard	5% water incorporated	786	61.52%	32.30%	6.15%	....	....
Petrolatum	5% ZnO incorporated	760	52.30%	30.77%	15.39%	1.54%	....
Lanolin	5% ZnO incorporated	808	61.52%	36.91%	....	1.54%	....
Lan. and Pet.	5% ZnO incorporated	794	78.44%	13.84%	7.69%	....	....
Benz. Lard	5% ZnO incorporated	819	72.29%	18.46%	4.61%	4.61%	....

(*To be continued.*)

DISPLAY OF DENTAL ITEMS OF THE NATIONAL FORMULARY VI.

BY RALPH E. TERRY.*

Occupying a prominent space in the display of *Dental Pharmacology* at the Mid-Winter meeting of the Chicago Dental Society held at the Stevens Hotel, February 26th to March 1st, the Dental Items of the National Formulary VI attracted much attention. The Mid-Winter meeting of the Chicago Dental Society attracts members of the dental profession from the entire middle west, and visitors from the entire country. At the meeting just held, more than 3500 registrants were present.

As a part of the scientific exhibits, the College of Pharmacy of the University of Illinois prepared and displayed a number of materials of interest to dental practitioners. The exhibit was planned with the coöperation of Professor Gathercoal and Dr. Blayney of the Dental Sub-committee. It consisted of three sections and occupied 40 feet of wall space. Special glassware was provided for the exhibit and no expense was spared to make it as neat and attractive as possible. About one hundred placards were used, and nearly that many individual items were displayed.

One of the sections consisted of the mouth wash or rinse formulas suggested by Dean Geo. C. Schicks of Rutgers University, College of Pharmacy, who has been active in this work for some time. Three National Formulary items were used, Liquor Antisepticus, Liquor Aromaticus Alkalinus and Liquor Sodii Boratis Compositus. In addition, four mouth rinse formulas furnished by Dean Schicks were featured. Half-liter testing bottles were provided and small paper cups made it possible for those interested to test the products. Much interest was evinced over this section of the display.

The second part of the display consisted of a series of typical dental prescriptions such as analgesics, anodynes, sedatives, stimulants and local anesthetics. These were given on cards as formulas and the finished product was shown. In addition, a number of simples such as amyl nitrite, ether and other substances were shown. This section was planned by Dr. Blayney to demonstrate the proper manner of prescribing those official medicinal materials of value to the dentist.

The third section of the display consisted of the dental formulas of the National Formulary VI. Again the finished product was shown with the formula given on a card. Grouped around each product, the materials needed to make each formula were shown. This section of the display caused much interest, for the dental profession is becoming very much awakened to the need for knowing what it is using in the practice of dentistry. Dental preparations of the National

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