

Noteworthy is the fact, that large quantities of diabetic mayonnaise have been manufactured in the pharmacy and dispensed in the diabetic store. The formula for this salad topping, a favorite with diabetics, is as follows:

Eggs	12 yolks
Lemons	4 (juice of)
Heavy Mineral Oil	120 ounces
Sodium Chloride	20 Gm.
Mustard, powdered	8 Gm.
Acetic Acid 4%	to taste

These few glimpses into a hospital pharmacy in an institution where diabetic treatment is outstanding will serve, it is hoped, as an indication of the duties of the pharmacist in relation to the diabetic patient. His duties are, beyond any question of doubt, duties of service; indeed, a specialized service; *primarily*, to diabetic wards and floors by supplying them with necessary pharmaceuticals; *secondly*, to the diabetic by making available to him various medicines and supplies; and *finally*, to staff physicians by offering to them assistance and ready coöperation when they call on him for information and suggestions concerning diabetic medications.

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## INCOMPATIBILITIES IN PRESCRIPTIONS. II. A SURVEY OF THE FREQUENCY OF OCCURRENCE OF VARIOUS TYPES OF INCOMPATIBILITIES.\*<sup>1</sup>

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Although numerous surveys have been made regarding various phases of prescription work such as the frequency of occurrence of various ingredients and the prices charged, very little systematic study has been made of the frequency of occurrence of various types of incompatibilities. The purposes of the present survey on incompatibilities were as follows: (a) to obtain data as to the types of incompatibilities which occur most frequently, (b) to ascertain which drugs or classes of drugs cause most frequent trouble in prescriptions, and (c) to furnish data to teachers of Pharmacy regarding the types of incompatibilities in prescriptions that should be emphasized in teaching.

### METHODS USED IN PRESENT SURVEY.

The prescriptions chosen for study were those appearing in the Prescription Forum of the *American Druggist* during the years 1932 to 1938. The incompatibilities were classified into groups according to the classification used in "Husa-Pharmaceutical Dispensing" (1). In addition to this the ingredients causing the incompatibilities were classified into eleven groups. Each prescription was carefully studied and the data regarding the type of incompatibility and nature of incompatible ingredients were entered on suitable cards for tabulation.

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<sup>1</sup> This paper is based on part of a thesis presented to the Graduate Council of the University of Florida by Charles H. Becker, in partial fulfilment of the requirements for the degree of Master of Science in Pharmacy.

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## RESULTS OF PRESENT SURVEY.

From the prescriptions examined, 412 prescriptions showing at least one incompatibility were selected for further study. In this number of prescriptions there were 509 incompatibilities or an average of 1.23 incompatibilities per prescription.

The frequency of occurrence of various types of physical incompatibilities is given in Table I.

TABLE I.—PHYSICAL INCOMPATIBILITIES. OCCURRENCE IN 412 INCOMPATIBLE PRESCRIPTIONS.

Type.	Number of Occurrences.	Percentage (of 509 Incompatibilities).
Incomplete solution	121	23.77
Precipitation	58	11.39
Separation of an immiscible liquid	37	7.27
Liquefaction of solid ingredients	16	3.14
Wrong form prescribed	11	2.16
Gelatinization	0	0
Total	243	47.73

Table I indicates that about half of the incompatibilities studied were physical incompatibilities. The types of physical incompatibility, in order of frequency of occurrence were as follows: incomplete solution, precipitation, separation of an immiscible liquid, liquefaction of solid ingredients and wrong form prescribed. Gelatinization did not occur even once in the prescriptions studied.

The frequency of occurrence of various types of chemical incompatibilities is given in Table II.

TABLE II.—CHEMICAL INCOMPATIBILITIES. OCCURRENCE IN 412 INCOMPATIBLE PRESCRIPTIONS.

Type.	Number of Occurrences.	Percentage (of 509 Incompatibilities).
Formation of a precipitate	119	23.38
Evolution of a gas	68	13.36
Color changes	39	7.66
Explosive combinations	16	3.14
Cementation of ingredients	8	1.57
Separation of an immiscible liquid	3	0.59
Development of heat or cold due to chemical change	3	0.59
Other types of chemical change	2	0.39
Hydrolytic changes	1	0.19
Invisible changes	1	0.19
Development of poisonous substances	0	0
Total	260	51.06

As shown in Table II, about half of the incompatibilities studied were chemical incompatibilities. The most frequently occurring types were as follows: formation of a precipitate, evolution of a gas, color changes, explosive combinations and cementation of ingredients. Hydrolytic changes were encountered more frequently than the table would indicate but in most cases hydrolysis resulted in precipitation and the incompatibility was classified as formation of a precipitate.

With reference to therapeutical incompatibilities, dangerous doses were found 6 times or in 1.18 per cent of the incompatibilities studied.

In classifying the substances causing incompatibility into groups, inorganic salts were classified under the heading of the positive or negative ion responsible for the incompatibility. Other substances were classified as shown in Table III.

TABLE III.—CLASSES OF DRUGS RESPONSIBLE FOR INCOMPATIBILITIES.

Class.	Number of Occurrences.	Percentage of Total.
General pharmaceutical preparations	237	20.66
Negative ions	195	17.00
Positive ions	178	15.52
Organic chemicals	156	13.60
Simples (beeswax, acacia, etc.)	130	11.34
Pharmaceutical preparations containing free acid	80	6.97
Proprietaries	69	6.02
Alkaloids	60	5.23
Pharmaceutical preparations containing free alkali	38	3.31
Glandular products	3	0.26
Dyes	1	0.09
Total	1147	100.00

The ten individual ingredients responsible for the greatest number of incompatibilities in the prescriptions studied are as follows: distilled water, sodium bicarbonate, acetylsalicylic acid, liquid petrolatum, sodium phenobarbital, compound elixir of pepsin, sodium salicylate, aminopyrine, syrup of wild cherry and glycerin. Six of these ingredients, *i. e.*, distilled water, sodium bicarbonate, acetylsalicylic acid, compound elixir of pepsin, sodium salicylate and glycerin, are also on the list of the eleven most frequently occurring ingredients in prescriptions as shown in "The Prescription Ingredient Survey" (2). Approximately 75 per cent of the incompatible ingredients studied are official, a large majority being in the U. S. P.

The present survey gives no indication of the proportion of all prescriptions which are incompatible. However, in a study of 500 prescriptions, Taylor (3) found that incompatibility had to be taken into consideration in 62 prescriptions.

#### SUMMARY.

A survey was made to determine the frequency of occurrence of various types of incompatibilities. Physical and chemical incompatibilities occur with about equal frequency and together make up almost all of the incompatibilities, therapeutic incompatibilities rarely being a source of difficulty to the pharmacist.

The most frequently occurring physical incompatibilities are incomplete solution, precipitation, separation of an immiscible liquid and liquefaction of solid ingredients. The most common chemical incompatibilities are formation of a precipitate, evolution of a gas, color changes, explosive combinations and cementation of ingredients.

#### REFERENCES.

(1) William J. Husa, "Pharmaceutical Dispensing," Husa Brothers, Iowa City, Iowa, pages 251-255.

(2) E. N. Gathercoal, "The Prescription Ingredient Survey," AMERICAN PHARMACEUTICAL ASSOCIATION, pages 16, 17, 19 and 22.

(3) A. C. Taylor, JOUR. A. PH. A., 19, 1003 (1930).

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## PRESCRIPTIONS AT YOUR FINGER TIPS.\*

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Much is heard these days concerning the separation of professional pharmacy from the more commercial and commoner type of drug store. It should not be forgotten, however, that a great percentage of the drug stores of the country are located in towns too small in size to support a strictly professional establishment. This fact is apparently overlooked by many proponents of a division.

The discussion of this subject seems far less important than the attention that could be given to the development of what is available to all types of pharmacists if they saw fit to reach out and obtain it. By that is meant real, worthwhile, sustained effort to emphasize medical products, biologicals, prescription compounding and merchandise related to professional pharmacy. The course of least resistance, however, rather than necessity appears all too often as the factor that stamps a drug store as a service station with long hours rather than a source of supply for physicians and their patients.

It should be clearly understood that there is no intention on my part to belittle so-called commercial pharmacy. Most certainly it has its place and satisfies a demand on the part of the public. It is, however, a highly competitive field. Fountain pens, stationery, toiletries and cosmetics are by no means exclusive drug-store merchandise. Even the soda fountain, and sandwich unit, a good money-maker when properly managed, is spotted in a dozen places on main street in almost any town.

What is least competitive? Many will agree at once that it is the drug store business as such. But, comes the qualifying thought, there isn't enough volume because the proprietor has not bestirred himself to study ways and means of going after it and digging it out. Of course the pharmacist can't create illness, and illness is the source of prescriptions. It is amazing, however, how much real drug business there is that has little or nothing to do with the sick bed.

If you would go over the profit-and-loss statement of drug stores situated in different sections of the United States, you would find one outstanding fact which is consistently established. Stores that enjoyed handsome returns from what appeared to be comparatively small or just fair volume proved invariably to be the stores that majored in prescription and drug store services; while other stores doing five or ten times the volume of the more professional stores are dealing in merchandise of all types, sometimes showed an actual loss or only a small profit.

In a national survey there appeared an evaluation of the actual figures of 152 drug stores that filled 651,181 prescriptions in 1937. The average per store over a

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