Scoville's

The Art *of* Compounding

By

GLENN L. JENKINS — Dean and Professor of Pharmaceutical Chemistry, Purdue University School of Pharmacy, Lafayette, Indiana

DON E. FRANCKE — Chief Pharmacist, University Hospital, University of Michigan, Ann Arbor, Michigan

EDWARD A. BRECHT — Dean and Professor of Pharmacy, University of North Carolina, School of Pharmacy, Chapel Hill, North Carolina

GLEN J. SPERANDIO — Associate Professor of Pharmacy, Purdue University School of Pharmacy, Lafayette, Indiana

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Preface

The trend in modern medical practice makes pharmacy an increasingly important health profession. The introduction of large numbers of new drugs continues at so rapid a pace that frequent editions of a textbook in the area of compounding and dispensing become necessary. The fact that previous editions of *The Art of Compounding* have been received favorably as an authoritative reference and textbook by the practicing pharmacists and also by teachers and students of pharmacy makes this new (ninth) edition possible.

In the preparation of this edition the authors maintained two prime objectives: first, systematically to present the principles underlying each subject so that the practitioner and student might understand the theories as well as the operations of compounding; second, to so illustrate and detail the principles by prescriptions and exercises as to show their range and variety of application and to indicate the practical utility of the principles at the prescription counter. In seeking to attain these objectives fully, compounding and dispensing are considered as the ultimate work in which all the prerequisite courses such as mathematics, chemistry, biology, and physics are justified and expressed through practice. Consequently, efforts have been made to make the user of the book draw on his basic knowledge, thus developing the analytical and deductive approach that leads to professional competence. Secondary objectives have been to adhere closely to unity of subject matter, to present classes of prescription products in an orderly sequence leading from relatively simple to difficult preparations, to blend the old and new products for illustrative examples in accordance with experience encountered in practice, and to avoid expansion of the book to unwieldly size by the exclusion of subject matter that properly belongs in other courses of instruction. These objectives have been attained by an orderly sequence of chapters, the inclusion of many new prescription examples, the deletion of illustrations and subject matter that are obsolete or should be treated in pharmaceutical administration and manufacturing courses, and the careful revision or complete rewriting of each chapter.

Much new material has been introduced. A complete list of the various changes would occupy considerable space. Those worthy of particular mention include expanded chapters on powders, capsules, and effervescent salts, tablets, parenteral solutions, isotonic solutions, sterilization and disinfection, and ointment and ointment-type preparations, as well as a new chapter on ophthalmic solutions. The chapters on incompatibilities have been revised and extended to

present both a general treatment of principles and specific information for ready reference. Emphasis has been placed on the incompatibilities of the official as well as many unofficial products. The chapters on incompatibilities are arranged so that they may be used as the text for a one-term course.

The use of the book as a text should be supplemented by lecture, recitation, and laboratory instruction. It is obviously impossible to include detailed examples and explanations of every possible compounding problem. Typical prescription problems and compounding techniques are given in sufficient number to meet the requirements of a one-year course. The instructor may select other prescription and compounding exercises for each class of preparations and assign to the students the task of applying the theory and explanation of proper procedure on the basis of information given in the text.

The authors wish to express their appreciation for the many helpful suggestions given them by individuals interested in the book, particularly Joseph L. Kanig, Warren E. McConnell, and Robert V. Evanson. They also are grateful for the courtesy extended by numerous firms which granted permission to use illustrations from their catalogs and books.

Notices of error and suggestions for the improvement of the text will be greatly appreciated by the authors.

Glenn L Jenkins
Don E. Francke
Edward A. Brecht
Glen J. Sperandio

Table 1

TABLE OF METRIC AND APOTHECARY EQUIVALENTS

Apothecary Measure	*Approximate Metric Equivalent*	*Exact Metric Equivalent*
LIQUID MEASURE		
1 minim	0.06 ml.	
1 1/2 minims	0.1 ml.	
3 minims	0.2 ml.	
5 minims	0.3 ml.	0.308 ml.
15 minims	1 ml.	
1 fluidram	4 ml.	
4 fluidrams	15 ml.	
1 fluidounce	30 ml.	29.57 ml.
3 1/2 fluidounces	100 ml.	
8 fluidounces	250 ml.	236.58 ml.
1 pint	500 ml.	473.16 ml.
1 quart	1000 ml.	946.33 ml.
WEIGHTS		
1/600 grain	100 mcg.	
1/250 grain	250 mcg.	
1/200 grain	300 mcg.	
1/150 grain	400 mcg.	
1/120 grain	500 mcg.	
1/100 grain	600 mcg.	0.6 mg.
1/60 grain	1 mg.	1.1 mg.
1/40 grain	1.5 mg.	1.6 mg.
1/10 grain	6 mg.	6.5 mg.
1/4 grain	15 mg.	16.2 mg.
1/3 grain	20 mg.	
3/8 grain	25 mg.	
1/2 grain	30 mg.	32.4 mg.
1 grain	60 mg.	65 mg.
3 grains	200 mg.	194 mg.
5 grains	300 mg.	324 mg.
7 1/2 grains	500 mg.	
15 grains	1 gram	
60 grains	4 grams	
480 grains (1 ounce)	30 grams	

Note: One milliliter (ml.) is the approximate equivalent of 1 cc.
One microgram (mcg.) is equal to 0.001 mg.

The approximate equivalents are recognized by the United States Pharmacopeia, the National Formulary, and New and Non-Official Remedies and have been approved by the Federal Food and Drug Administration. The exact equivalents are those given in the United States Pharmacopeia.

However, it should be clearly understood—and is so stated in the Pharmacopeia—that the approximate equivalents represent the quantities prescribed under identical conditions by physicians trained in the two systems. The statement is further made that when prepared dosage forms such as tablets, capsules, and pills are prescribed in the metric system, the pharmacist may dispense the corresponding approximate equivalent in the apothecary system, and vice versa; *BUT for converting specific quantities in a prescription requiring compounding, or in converting a formula from one system to the other, exact equivalents must be used.*

Contents

1

The Prescription

The prescription (L. *prae*, before; *scribo, scribere*, to write) is an order written by a physician, dentist, veterinarian, or other licensed practitioner directing the pharmacist to compound and dispense medication for a patient, and usually accompanied by directions for its administration or use. It is designed to procure for the patient a special remedy, suited to the treatment of his present condition, and in such quantity as appears needful.

The majority of prescriptions are written in the language of the country in which they originate; however, Latin or latinized versions of native words or terms are also used to a considerable extent, the latter practice being common in the English-speaking countries of the world. The use of Latin as the language of the prescription has four outstanding advantages:

1. Latin is a dead language, therefore the meaning of its words is not subject to continual change as is the case with a language in everyday use. This assures accurate interpretation of the prescription during its entire lifetime.

2. Latin is the language of medical science throughout the world. Thus a prescription written in any part of the civilized world, or by a physician of any nationality, may be comprehended readily and compounded correctly by any pharmacist.

3. The Latin names of drugs are definite and do not lend themselves to misinterpretation as do colloquial or vernacular names. Thus the Latin term *Gaultherta* means a definite plant, understood by botanists and pharmacists everywhere, but the English equivalent *wintergreen* might be interpreted as either Gaultheria or Chimaphila. Likewise, *serpentaria* means only a particular and known root, but the English term *snakeroot* may be applied to serpentaria, cimicifuga, senega, or asarum. Moreover, the vernacular name of a plant is one thing in English, another in French, and still another in German, Italian, or Spanish.

4. Oftentimes it is desirable that the nature and ingredients of a mixture remain unknown to a patient, and Latin affords a certain amount of secrecy. This last point should be remembered and respected by the pharmacist, and

inquiries regarding the ingredients and nature of a prescription should be answered with caution.

In the United States, a decline in the use of Latin in medical instruction has resulted in the replacement of Latin by English titles in prescription writing, and often the abbreviated titles in either language are about the same. Much of the need for secrecy that surrounded the nature and properties of medicines in former times has disappeared with the advent of new highly efficient drugs and a general rise in the intelligence of the laity.

Parts of a Prescription

The complete prescription is made up of several integral parts: the patient's name, the superscription, the inscription, the subscription, the signatura, and the doctor's name.

Name of the Patient. The patient's name should always appear on the prescription and should be placed there by the pharmacist if the doctor fails to do so. This aids the pharmacist in avoiding the possibility of delivering the finished product to anyone other than the person for whom it was intended, or his agent. Also, when the patient's name is transferred to the label of the medicament, there is less danger of its being administered to the wrong member of the household or hospital ward.

Superscription. The superscription consists of the symbol ℞. In the original, this probably was the sign of Jupiter, ♃, placed at the head as a petition to that deity for favor and healing—a custom that was common in the days of mythology and superstition. It is now generally understood to represent a contraction of the Latin imperative *recipe*, "take thou." As such it forms the beginning of a direct order from the writer to the compounder, leaving the latter no choice as to the ingredients to be used or the quantities to be taken.

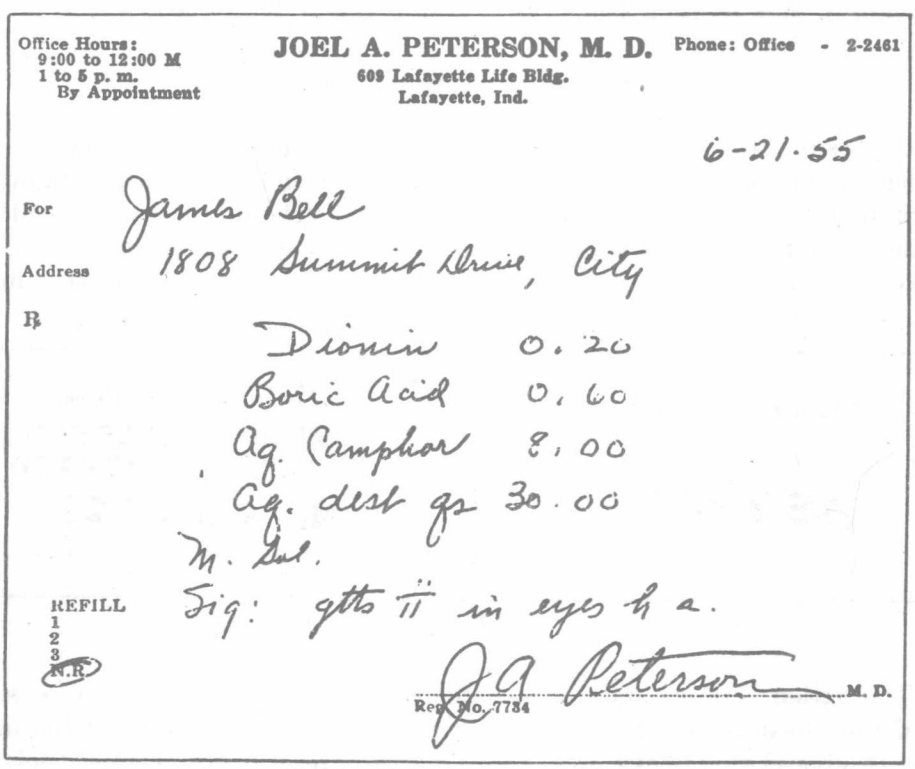
Inscription. The inscription, or "body," makes up the principal part of the prescription, as it is in this portion that the ingredients and quantities are given. These are dependent grammatically upon the verb *recipe*. Therefore the quantity of each ingredient is a direct object of the verb and, when written out, is designated by the accusative case. This is not commonly done, however, as symbols and abbreviations usually are employed to specify the quantities. The names of the ingredients modify the quantities, and are in the genitive case. Hence when these names are written in complete Latin they take the endings characteristic of the genitive case of the declension to which the noun or adjective belongs.

In the complex prescription containing several ingredients, the inscription usually is divided into three parts: **base, adjuvant,** and **vehicle.** The base comprises the principal ingredient(s) and is intended to exert the greater portion of the activity of the mixture. The adjuvant is added either to enhance the activity of the prime substance or to alter or mask its taste, thus rendering the finished mixture more palatable. The vehicle (or carrier) is some material or

liquid that usually is devoid of any therapeutic activity and is used simply as diluent, thus making it convenient for the patient to measure the medicament in terms of common household utensils.

Subscription. The subscription contains the writer's directions to the pharmacist, designating the form in which the medicament is to be dispensed, and usually the number of doses that are to be prepared.

Signatura. The signatura is derived from the subjunctive of the Latin verb *signare*, to write. The signatura consists of directions to the patient, it being intended that this information be placed on the label of the container in which the finished product is dispensed in order that the patient may have specific directions regarding the quantity of the material to be taken, the frequency with which it is to be used, and the manner in which it is to be administered or applied.


Office Hours:
9:00 to 12:00 M
1 to 5 p. m.
By Appointment

JOEL A. PETERSON, M. D.
609 Lafayette Life Bldg.
Lafayette, Ind.

Phone: Office - 2-2461

6-21-55

For James Bell

Address 1808 Summit Drive, City

℞

Dionin 0.20
Boric Acid 0.60
Aq. Camphor 8.00
Aq. dest qs 30.00
M. Sol.
Sig: gtts ii in eyes b i d.

REFILL
1
2
3
N.R.

J A Peterson M. D.

Reg. No. 7784

FIG. 1. Example of prescription.

Name of the Prescriber. Either the name or the initials of the prescriber forms an integral part of the prescription, guaranteeing its authenticity. All other portions of the prescription may be printed or typewritten, but *the doctor's name or initials must be written.* This eliminates much of the danger of dispensing medicaments on spurious orders, thus serving as a protection to both pharmacist and patient.

Prescriptions containing narcotic or other habit-forming ingredients must

also bear the date upon which the prescription was written, the address of the patient, and the address and narcotic registry number of the writer. All of this information must be placed upon the label of the finished product. An additional requirement of prescriptions of this kind is that they be either written with ink or indelible pencil or typewritten. In the latter case they must, of course, be signed with ink or indelible pencil. This assures permanency of such prescriptions, a highly desirable feature since they must be stored in a separate file which is open at all times to inspection by the proper authorities.

Figure 1 is an example of a complete and correctly written narcotic prescription.

This prescription authorizes the pharmacist to compound and dispense 30 ml. of an aqueous solution containing Dionin, a narcotic. The letters "N.R." in the lower left corner of the prescription blank have been circled by the physician to indicate that this prescription is not to be refilled.

Receiving the Prescription

If possible, the pharmacist himself should be the one to receive the prescription from the patient. This should be accomplished with all the dignity at his command, and with a minimum of comment. It should be remembered that the customer is often in a highly nervous and impressionable state and might misinterpret a facetious remark by the pharmacist as minimizing the importance of his ailment or the value of the remedy prescribed.

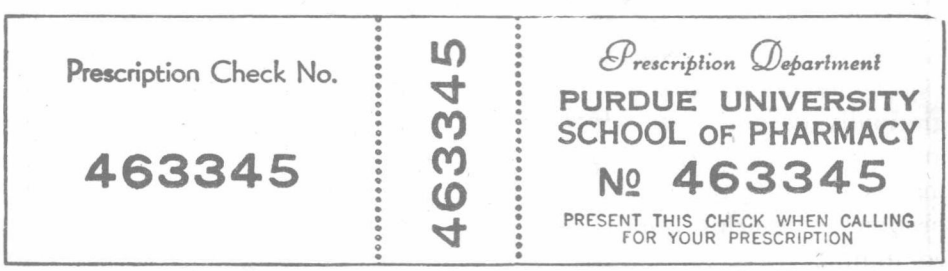


FIG. 2. Prescription check.

The patient's name and address should then be placed upon the prescription if the physician has failed to do so. It is customary in some of the larger stores to give claim checks upon receiving the prescription. These checks are numbered or lettered, and the corresponding mark is written upon the prescription or a duplicate check is attached to it. This mark or check is then transferred to the package containing the finished product, thus preventing mistakes in delivering the medicines. A satisfactory prescription check is illustrated herewith. Part C is given to the customer when the prescription is received, part B is attached to the back of the prescription, and part A with the customer's name written on it is attached to the outer wrapping of the finished prescription.

A rapid examination of the inscription and subscription usually will be

sufficient to enable the trained compounder to give the customer an estimate of the time that will be required to complete the preparation ordered. During this examination he must not appear to be too casual because here again there is a possibility of creating the wrong impression in the mind of the patient. Neither must the pharmacist appear to be startled or puzzled by anything that appears on the prescription, as therein lies the danger of creating suspicion or actual distrust.

Consulting the Physician. If any ambiguity, dangerous dose, undesirable incompatibility, or other feature of the prescription makes it desirable that the physician be consulted before the prescription is compounded, the customer should never be allowed to suspect that anything is under question. He may be dismissed with the information that the prescription will require an hour or two to compound, or some similar excuse, and the physician may then be telephoned or the prescription may be sent to him by messenger. *Faith in both physician and pharmacist is an important factor in medical treatment and should be fostered at all times.*

Checking the Prescription

Once he has reached the privacy of his prescription room, the pharmacist should study the prescription carefully and thoroughly, and *make it a rule never to dispense a prescription any part of which is not well understood.* The character or strength of a mixture often depends upon a single word or sign, and a careful scrutiny is always necessary.

Legibility. The legibility of a prescription is often as much a matter of experience in the compounder as of the chirography of the writer. Dispensers gradually become accustomed to certain combinations of therapeutic agents, and in this way the presence of one ingredient suggests another, or at least makes the interpretation of an obscure line easier. Also, pharmacists soon become familiar with peculiarities in the handwriting of physicians in their community, and prescriptions which may seem to be hieroglyphics to the novice or to dispensers in another locality may be simple and plain to them. Therefore the ability to decipher a badly written prescription depends as much upon experience in dispensing as it does upon skill in interpreting badly formed letters. If the prescription cannot be deciphered, the prescriber should be called upon for verification.

Dosage. Potent or Highly Active Materials. The doses of potent or highly active materials should be carefully scrutinized. Many a life has been saved, and the reputation of the physician preserved as well, by the watchfulness of the pharmacist in this regard. Thus the pharmacist stands as a safeguard between the physician and the patient, protecting both from the possible consequences of any error that might have been committed during the writing of the prescription. In order to emphasize the importance of this function and to impress it upon the pharmacist, laws have been written into the statutes to the

effect that *he be held criminally liable with the physician if he compounds and dispenses a prescription containing a fatal amount of poison in a dose.* Hence he has a personal as well as a philanthropic motive for refusing to dispense dangerous overdoses of toxic materials.

There are many factors which must be taken into account when judging the safety of a given dose (see p. 437). The Pharmacopeia of the United States and the National Formulary state usual doses, in terms of a range. The usual dose is intended to serve as a guide to the physician, who may vary it to produce the desired therapeutic effect in accord with the needs of each patient. The dose range is given in the official compendia to guide the pharmacist in confirming the dosage of prescriptions that call for unusually large or small amounts of active ingredient. These statements are intended to apply to dosage for adults, implying that the dose of a drug to be given an adult is uniform. Even with adults, however, the sex and physical condition of the patient make a great difference in the action of drugs. As a rule, a woman will experience a more pronounced reaction to a drug than a man, and a heavy, muscular man will tolerate a larger dose than a light and nervous one. It is usually safe, however, to administer the average dose of a drug or medicine to an adult without regard for sex or weight, the universal exception being the individual who is allergic to a substance, in which case that substance cannot be administered even in quantities much less than the therapeutic dose.

CHILDREN'S DOSAGES. For children the dose usually is regulated according to age, a fraction of the adult dose calculated on this basis being given. There are several formulas for calculating this fraction in use throughout the United States, the two more commonly employed being those of Drs. Young and Cowling.

Young's Rule. The more popular of the two, Young's rule derives its fraction by dividing the age of the child *in years* by the age plus 12. This usually is stated simply as "age over age-plus-12." Calculation of the dose to be administered to a child of 3 years is accomplished in the following manner:

$$\frac{3}{3+12} = \frac{3}{15} \quad \text{or} \quad \frac{1}{5}$$

Thus the dose given would be one-fifth that given to an adult.

Cowling's Rule. According to Cowling's rule, 1 is added to the age of the child in years and this figure is divided by 24. For convenience this is condensed to "age-plus-1 over 24." Calculation of the dose to be administered to a child of 3 years is carried out as follows:

$$\frac{3+1}{24} = \frac{4}{24} \quad \text{or} \quad \frac{1}{6}$$

Thus the dose given would be one-sixth that given to an adult.

Fried's and Clark's Formulas. For calculating the fraction of an adult dose to be administered to an infant less than 1 year old, the formulas of Drs.

Fried and Clark usually are employed. The former bases the calculation upon the age of the infant in months, the latter upon the weight of the baby in pounds. In either case the figure is divided by 150. These formulas result in rather widely divergent figures, the dose for a child 6 months old and weighing 15 lb. being $\frac{1}{25}$ of the adult dose by the former method and $\frac{1}{10}$ of the adult dose by the latter. Both methods have their proponents, however, and the pharmacist should refrain from criticizing the dosage prescribed if he has reason to believe that it can be administered with safety. It is perhaps well to mention in passing that the method based upon body weight of the patient is employed by many physicians in calculating the dosage for all children, regardless of age.

In checking the dosage in a prescription for a child, the pharmacist should always bear in mind that, regardless of the method used for that calculation, the result *always* represents the *fraction of the adult dose* that is to be administered and *not* the fraction of a grain that can be given. Further, he must remember that *infants and young children are extremely sensitive to morphine and opiates*, death occasionally resulting from seemingly very small doses of these substances. Therefore, judgment as well as rules must be applied in each case.

MEASURING THE DOSE. In judging the safety of a dose, consideration must be given to the manner in which it is to be measured by the patient. The most common measure for liquids is the teaspoon; i.e., teaspoonful doses are prescribed. Most of the foreign pharmacopeias designate a teaspoonful as measuring 5 ml., and numerous measurements of the capacity of the average teaspoon in common use in the United States have shown that average also to be 5 ml. As early as 1902 the American Pharmaceutical Association adopted a resolution to the effect that "the following equivalents be recommended: One teaspoonful equals 5 ml.; one dessertspoonful equals 2 teaspoonfuls, or 10 ml.; one tablespoonful equals 3 teaspoonfuls, or 15 ml." This resolution was endorsed the following year by the American Medical Association, and most schools of medicine now teach that the teaspoonful measures 5 cc., or 5 ml. In spite of these facts, many United States authorities have continued to teach that a teaspoonful is equivalent to a fluidram, or 4 ml. This may seem unimportant, but it assumes magnitude when large and possibly dangerous doses are being considered, for it may make a considerable difference whether one calculates on the basis of eight or six doses to the fluidounce. Six is the more likely to be administered in the average case.

The other implement commonly used for measuring liquid medicaments in the home is the dropper. Here again there has been a decided lack of uniformity in the quantity actually administered. The volume of a drop varies considerably, being dependent upon such factors as the surface tension of the liquid, the temperature, the rate of dropping, and the surface from which it is dropped. To the pharmacist this is extremely important since it is only the most potent liquids that are measured in drop doses and lack of uniformity might result in either overdosage or—and equally important—underdosage. In the former case there is, of course, the danger of poisoning; in the latter the danger lies in

insufficient medication with consequent failure on the part of the patient to respond to treatment.

With a view toward securing uniformity in the size of drops of the same liquid, a feat which is not possible when the ordinary medicine dropper is used, the Brussels Conference of 1902 established standards for a normal dropcounter which was recommended for adoption by the various pharmacopeias. The standard dropper, which has an external diameter of 3 mm. and discharges drops of distilled water at 15°C. of such size that 20 drops weigh about 1 Gm., has been adopted and made official for use in the United States. Drops obtained from such a dropper will have some degree of uniformity in the same liquid, but since the surface tension of different liquids varies considerably, even this will not give uniform drops with different solutions. This is best illustrated in Table 2, showing the number of drops of the liquids obtained at 15°C. with the standard dropper.

The difference between a minim and a drop should always be borne in mind by the pharmacist when calculating the safety of a dose. Reference to a table similar to Table 2 will furnish him with some idea of the number of drops contained in a fluidounce or a fluidram of the solution being considered and he can then proceed to calculate on this basis rather than upon that of 480 drops to the fluidounce.

VETERINARY DOSES. Pharmacists are sometimes called upon to advise regarding the doses for animals. In general, the doses should correspond to the weight of the animal, but there are some exceptions to this rule. Although of the same weight, cows are less susceptible to medicines than horses, hence they require and tolerate larger doses. The following general table usually can be applied when calculating the dosage for animals:

Horses. 16 times the dose for man.
Cows. 24 times the dose for man.
Sheep and Goats. 3 times the dose for man.
Swine. 2 times the dose for man.
Dogs. Corresponds to man according to weight.
Cats. ½ the dose for man.

There are certain medicines which have peculiar action upon animals, and attention must be paid to these peculiarities when the dose is being calculated. *Opium* affects animals strongly and should be given in relatively smaller doses than most medicines. Cats are excited by it and it also causes diarrhea in them; therefore it must be given in extremely small doses, if at all. Dogs respond to opium in a more normal way. *Nux vomica* and *strychnine* are extremely active when administered to dogs or cats and should be given to these animals very cautiously. Other animals respond normally. *Phenol* is especially deadly to dogs and cats and should not be used on these animals even as an antiseptic. *Cresol* is much safer, but it also must be used cautiously. *Jaborandi* and *pilocarpine* cause diaphoresis in horses but not in other animals. *Vermifuges* act on all ani-

mals in a way corresponding to the action on man, the dose being best regulated according to the weight of the animal. It should be remembered that all vermifuges are poisonous and act by virtue of their toxic action on the worms, hence they must be used cautiously.

Table 2

NUMBER OF DROPS OBTAINED FROM A STANDARD DROPPER AS RECOMMENDED BY THE BRUSSELS CONFERENCE, TEMPERATURE 15°C.

Liquid	*Drops per Gm.*	*Drops per Ml.*	*Drops per Fluidram*	*Drops per Minim*
Distilled water	20.0	22.2	81.5	1.36
Acid, hydrochloric	19.5	23.8	88.0	1.46
" hydrocyanic, dilute	20.0	22.2	81.5	1.36
" nitric	22.9	40.0	148.0	2.46
Alcohol	65.5	50.0	185.0	3.10
Chloroform	58.8	100.0	370.0	6.16
Creosote	37.4	45.5	161.0	2.70
Ether	90.0	66.5	246.0	4.10
Fluidextract, belladonna	55.2	50.0	185.0	3.10
" ergot	52.6	50.0	185.0	3.10
Glycerin	23.1	33.3	123.0	2.05
Guaiacol	38.1	43.5	161.0	2.70
Oil, sandalwood	41.5	50.0	185.0	3.10
" wintergreen, synthetic	40.6	50.0	185.0	3.10
Phenol, liquefied	35.5	40.0	148.0	2.46
Solution, arsenious acid	19.3	22.2	81.5	1.36
" Donovan's	19.7	22.2	81.5	1.36
" iodine, strong	32.0	40.0	148.0	2.46
" potass. arsenite	21.1	22.2	81.5	1.36
" potass. bromide, 10%	20.0	20.0	74.0	1.23
" potass. iodide, 50%	18.7	28.6	106.0	1.76
Spirit, ammonia, aromatic	57.3	50.0	185.0	3.10
" nitrous ether	65.5	59.0	218.0	3.63
Syrup, ferrous iodide	18.9	25.0	92.5	1.54
Tincture, aconite	56.3	50.0	185.0	3.10
" digitalis	48.1	50.0	185.0	3.10
" ferric chloride	53.3	55.5	205.0	3.41
" hyoscyamus	50.8	50.0	185.0	3.16
" iodine	63.3	66.5	246.0	4.10
" nux vomica	57.3	50.0	185.0	3.10
" opium	50.9	50.0	185.0	3.10
" opium, camphorated	50.9	50.0	185.0	3.10
" strophanthus	57.2	50.0	185.0	3.10
Water, bitter almond	29.3	27.0	100.0	1.66

Judgment is needed in interpreting veterinary doses since it is obvious that a dog weighing 3 or 4 lb. cannot tolerate a dose that would be small for a mastiff weighing 120 lb. In general, the age, breed, size, and general condition of the animal must be considered for all veterinary doses.

Compounding the Prescription

The manner of compounding will be determined, of course, by the form of medication prescribed. The first thought of the compounder should be the aim of the prescriber. To interpret this intelligently a general idea of the uses of medicines should be had, so that minor changes may be suggested if improvements can be secured thereby. The pharmacist does not have the authority to make changes in a prescription which would affect its medicinal activity or alter the intent of the physician. Alterations or additions may be made only after consultation with the physician. It is customary, however, for the physician to rely upon the pharmacist for the proper compounding of prescriptions. Often such procedures as choice of excipient or vehicle, filtration or straining, or addition of a suspending agent are not indicated but are left to the discretion of the pharmacist. Any change made by the pharmacist should be noted on the prescription so that duplication of the product will be secured if the prescription is refilled. Most physicians welcome suggestions which lead to better pharmaceutical preparations and usually will grant the desired permission when the situation has been explained. However, the pharmacist should never indulge in criticisms or suggestions regarding the therapeutic action of a remedy or its value in the specific case being treated since this lies outside the scope of pharmacy and undoubtedly will antagonize the physician.

Mistakes in compounding are always a personal matter and are best avoided by personal care. Mistakes of all kinds are best avoided by attention. Rarely is a mistake made in compounding when the pharmacist has the possibility of error in mind. The danger comes when the attention is divided between the prescription at hand and some foreign subject, or when the prescription is not completely understood and an unwarranted venture is assumed. The following points should be borne in mind by the compounder:

1. He should refuse to divide his attention when compounding and should fill only one prescription at a time. If attention to another matter is demanded, it is better for him to note his position on the prescription and then leave it completely for the time required than to attempt to attend to both matters at the same time.

2. He should read carefully and be sure that he understands every part of the prescription before he attempts to compound it.

3. When compounding he should read the label of every container from which he removes material *at least three times:* once when he takes the container from the shelf or drawer; again just before weighing or measuring; and a third time when returning the container to its proper place. Countless errors which might have been fatal had they been allowed to slip past the pharmacist have been detected in this way.

4. He should refuse to relax his attention until the product is in the hands of the customer. Incompatibilities should receive full attention and be avoided whenever possible. When the prescription calls for a liquid, a clear mixture