

THE DEPARTMENT OF THE AMERICAN ASSOCIATION OF COLLEGES OF PHARMACY

This second paper on the "Teaching of Incompatibilities" presents the subject from a different point of view than that taken by Professor Husa in the recent paper in this Department. We are glad to present views of different teachers of important subjects in this Department of the JOURNAL and we welcome contributions from any teacher of pharmacy on any subject in the pharmaceutical curriculum. In fact, if space permitted, we would be glad to conduct in this Department an open forum on pharmaceutical teaching.—C. B. JORDAN, *Editor*.

TEACHING INCOMPATIBILITIES IN A TEST-TUBE.

BY W. PAUL BRIGGS.*

I take this liberty of commenting upon the article by Professor Husa in the January issue of THIS JOURNAL, not in a critical spirit but rather to cite my personal views wherein they differ from his.

Undoubtedly one of the principal problems of the teacher is to devise some logical plan whereby a great many types of incompatibilities may be studied without unduly prolonging the course and adding unnecessary burdens to the student. If 500 drugs will make 257,838,552,475 different combinations using from 1 to 5 items per combination, then upon this single point I am opposed to consuming time with test-tube dispensing experiments. I believe that most institutions now require Qualitative Analysis as a prerequisite to, or concurrently with, Dispensing Pharmacy. Assuming that this instruction is thorough and is properly correlated with Dispensing Pharmacy, review should be unnecessary. Personally I feel that it is most successful when given concurrently.

Obviously no one can attempt to present, or expect the student to know, every possible type of incompatibility. The greatest assistance an instructor can have in this field is the keen interest of the student in the subject, and with this as a foundation he can build up sound judgment and reason. Having this, the individual opinions find ready expression, not as a biased dogma, but as an analytical deduction.

My feeling is that if we start the course in Dispensing Pharmacy, upon which we are later to introduce Incompatibilities, with a broad enough scope to cover most types of preparations, we can point back to these in explaining many incompatibilities. In my courses this general plan is followed. Students starting in Dispensing Pharmacy, are first instructed in the necessary technic, after which they compound about 75 prescriptions in which I have tried to illustrate the most common types encountered. Detailed directions for compounding are given but the student is required to answer pertinent questions about the process and product which tends to impress upon him the fundamental reasons for the process followed. Following this, in the same course, the student compounds about 200 prescriptions, without directions for preparing, basing his methods largely upon those used in the beginning of the course. Most of these involve slight incompatibilities which

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are generally remedied by changing the order of mixing, adding small quantities of alcohol, glycerine, etc., emulsifying or suspending insoluble material. The majority of these prescriptions have been compiled from current prescription files and are frequently met with in the Pharmacy, thus removing the idea that there is no connection between the kind of Pharmacy one learns at College and the kind one practices in the retail store. Occasional hints and suggestions are given when these will expedite his work. The results are most gratifying. The student becomes prescription conscious and develops self confidence.

The student is required to record concisely his method of compounding and logical reasons for so doing. Frequently a prescription, which involves no incompatibilities but which is greatly improved by slight modification, is prepared as it would be "at the store," and again as the student thinks it should be, and the products compared. For example, Phenyl Salicylate, Bismuth Subnitrate and Camphorated Tincture of Opium with Peppermint Water as the vehicle, is prepared as written. Then prepared by adding 10 per cent of Acacia, and the two finished products compared. The results speak for themselves, the student has become prescription conscious and no argument is required to convince him of the advisability of such modifications. Scoville's "The Art of Compounding," is used for the didactic portion of the course, which is arranged to parallel the laboratory work. All of the practical work is done from a laboratory manual, which is graded at frequent intervals, and in its corrected form serves as a guide to the course in incompatibilities which follows the next year.

In the course designated as "Incompatibilities," the more serious types, and incidentally the least frequently occurring types, are taught theoretically and practically in the laboratory. These are of a type that can be handled by one of two methods, namely, drastic changes, or to quote an old preceptor, "throw up your hands and send out the mess." Both procedures have their supporters. I take a stand somewhat between the two extremes.

At this point, when the student hesitates to make a drastic change and, at the same time, is reluctant to dispense an unsightly, possibly inactive product, I digress to the subject of professional relationship with the physician. The time is opportune, since it seems the only way out and really constructive impressions can be formed.

The laboratory with this lecture course is perhaps a strange mixture. About one-half of the compounding is done from original narcotic prescriptions, taken from the files of many different stores. It need hardly be said that the pharmacist is required to keep these only two years, so that I have a plentiful supply of prescriptions from over 500 different physicians, and two years hardly makes the prescriptions obsolete. These are compounded, omitting the narcotic ingredient. I have not found that this, in even the slightest degree, encourages such omission in actual practice. Thus the student learns to read original prescriptions in various types of handwriting, becomes familiar with proprietary items, compares prevailing prices and, in my opinion, learns much that is lacking from routine laboratory courses or even hospital dispensing, where the variety is most often limited to the extreme.

The other half of the course consists of preparing the so-called hopeless types of incompatibilities, making the necessary changes, but always reserving the

students' personal opinions as to whether this should or should not be done. This sort of training is necessary since pharmacists may encounter such problems and be requested by the physician to correct the incompatibility. In addition some State Boards are giving such mixtures and expecting a product, showing the art of Pharmacy in all its glory.

Finally, let me state why I object to teaching "Incompatibilities" from a test-tube. Since we cannot show every type of incompatibility and, even if we could, no one could remember them all, why should we try? Since we are really trying to develop self-confidence, resourcefulness and logical reasoning, why should we waste valuable time to show reactions in a test-tube that the student may or may not associate with dispensing pharmacy? Would it not be better to show the most common types of prescriptions, reasons for the technic employed in properly compounding these and as many others as time will allow, filled from start to finish just as they would be in actual practice? After all the student, who must be guided in later years by reactions in a test-tube, has not been educated—he has been stuffed with facts. He cannot predict a reaction of a new mixture by pyramiding his fundamental sciences—he can only wish that it were like one he had seen in a test-tube back in his college days.

SOME FALLACIES OF QUANTITATIVE BIOLOGICAL TESTING.

BY H. H. RUSBY, M.D.

Students of our Pharmacopœia note that on page 126, under the heading *Digitalis*, the lethal frog dose of the ten per cent tincture is fixed at six thousandths of a cc. per Gm., while on page 359, that of the ten per cent tincture of *Strophanthus* is given as six hundred thousandths of a cc. It must be admitted that the toxic power of the *Strophanthus* tincture, thus indicated, is one hundred times as great as that of the *Digitalis* tincture. As neither of these tinctures is used in practice for the purpose of killing frogs, it must be assumed that the purpose of these frog standards is to indicate the "Therapeutic usefulness" of the respective drugs. One of them, the *Digitalis*, being one one-hundredth as active as the other, should be given in a dose one hundred times as great; that is, eight hundred minims or more than an ounce and a half, of the tincture. Or, if we assume that the designated dose of *digitalis* is correct, then, to preserve the pharmacological parity, the dose of *Strophanthus* tincture should be reduced to eight hundredths of a minim. Even if we decide on a fifty-fifty compromise, we should get four hundred minims, nearly 7 fluidrachms, for the *digitalis*, while the dose of *strophanthus* would be sixteen-hundredths of a minim. The doses actually stand at 15 minims and 8 minims, respectively. Are our practitioners of medicine this far off in their dosage, or is it true that the power of the drug to kill a frog has no quantitative relation with its usefulness as a human medicine? What is to be done about it?

We are told that both inefficiency and uncertainty in the action of *strophanthus* are due to the slowness of its absorption from the stomach, thus necessitating this large dose, as compared with *digitalis*, but I reply by referring to the fact that the tincture is directed to be made from the seeds of either *S. Kombé* or *S. hispidus*, or