

bacteriology and physics in such a manner that he could also do laboratory work be of any value to a hospital such as yours?"

Every one interrogated was quite enthusiastic. It would seem to the author that men so trained and possessing any business ability at all would make very desirable managers of such hospitals.

Once in close contact with the doctor, such men would easily gain respect by their ability. The answer to this question of gaining recognition among the various associations seems to be to attack the smaller hospital by means of men better suited to their needs rather than by requesting the employment of pharmacists as such. If this can be done, naturally the value of the pharmacist to the hospital would be enhanced.

A MODIFIED 1-2-3 ENEMA.*

BY RAYMOND J. HANSEN.¹

One of the most common methods in the hospital for emptying the colon is the use of an enema. Its action depends largely upon a stimulation, through distention of the lower bowel, (1) however, in an enema containing a dissolved salt, such as magnesium sulfate or sodium chloride, salt action, or osmosis is also present. The most widely used to-day are the normal saline and the soap suds enemata.

At times a more drastic enema than one of plain tap water or normal saline is desired, and as a result, a solution of magnesium sulfate in glycerin and water is commonly used. This enema consists of 1 oz. of magnesium sulfate, 2 oz. of glycerin and 3 oz. of water and is known as the 1-2-3 enema. The magnesium sulfate is first dissolved in the water and then the glycerin is added. Goldsmith and Dayton (2) developed that the colonic mucosa was impermeable to sulfates, while chlorides and other salts passed through the wall into the blood stream, hence, the use of normal saline enemata in kidney disease is contraindicated, while that containing magnesium sulfate will have no appreciable effect. Consequently, an enema containing magnesium sulfate can be used more often than the plain normal saline enema with less chance of being harmful. H. W. Soper (3) recalls that Meltzer found that solutions of sodium sulfate incited contractions of the colon while solutions of magnesium sulfate produced a relaxation and dilatation. Soper suggests the use of sodium sulfate and recognizes the value of the magnesium sulfate enema in post-operative conditions.

With the recent advance in the price of glycerin, the hospital pharmacist was faced with the problem of keeping the amount of glycerin used at a minimum and it became advantageous to find some substitute for glycerin in these 1-2-3 enemata. Hirschman (4) suggests the use of hydrogen peroxide, one part to two parts of warm water. However, in our experience this has proved as costly as glycerin. In concentrated form we know that glycerin has a dehydrating action and is somewhat of a local irritant, however, in a 50% solution or less, it no longer exhibits this action, but rather becomes an emollient (5). As the concentration of glycerin in the 1-2-3 enema is approximately 40%, the action obtained is probably more as an

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emollient than as an irritant. It was then decided to try as a substitute, a mucilage of tragacanth made by using 1 Gm. of tragacanth to 120 cc. of distilled water. I regret that it was not possible to obtain sufficient cases, however, in the twenty cases on which these enemata were used the results were gratifying.

The cost of preparing this mucilage is based on a quotation from one of our local wholesale-retailers on the price of tragacanth. This price was \$2.40 per pound. Since there are 454.6 Gm. to the pound, if we use 450 in our calculations, we shall be safe in our conclusions. At this rate each Gm. will cost approximately $\frac{1}{2}$ cent. Remembering that one Gm. is used to make 120 cc. which is twice the amount used in one enema, the cost, then, for the tragacanth is but $\frac{1}{4}$ cent per enema. The cost of the distilled water depends largely on whether or not it is manufactured, however, a safe estimate on the cost is 15 cents per gallon. Hence, the cost of the distilled water used in making this mucilage will be about $\frac{1}{4}$ cent, thereby bringing the total cost of the mucilage to $\frac{1}{2}$ cent. The fluctuation in the price of glycerin makes it somewhat difficult to determine the cost definitely, but if we take 30 cents per pound as an average we find the cost of 2 oz. of glycerin to be $4\frac{1}{2}$ cents. In comparison to the cost of the mucilage, it is evident that glycerin is nine times more costly.

Naturally, the problem of preparing the mucilage must be considered. The procedure followed in preparing 1200 cc. of this mucilage is as follows:

- (a) Weigh out 10 Gm. of tragacanth and place it in a receptacle capable of holding 1500 cc.
- (b) Add 1200 cc. of distilled water.
- (c) Allow to stand with occasional shaking until a uniform mucilage results.

Should this mucilage be prepared in large quantities, the use of a preservative would probably be necessary. Dr. Army (6), in the "American Druggists' Formula Compendium," suggests the use of salicylic acid, one part to 1000 parts; benzoic acid, 2 parts to 1000 parts; or boric acid, 16 parts to 1000 parts.

At Hackley Hospital, a one-hundred-bed hospital, we were able to give only twenty of these enemata this past month, realizing, of course, that 20 cases are too few from which to draw definite conclusions, an analysis of these cases is interesting. Ten were post-operative patients and eight of these gave excellent results. The two remaining were fair, but were as good as with glycerin on these same patients. Seven of these twenty cases were pneumonia patients, and six of these gave excellent results, with one poor. The three remaining cases gave fair results, however, two of these cases were hemiplegics and it is doubtful whether or not anything would have given better results. A total summary shows out of twenty cases, thirteen excellent, six fair and one poor. These results are as good as can be expected from any enema and therefore we shall continue this work, keeping accurate records.

This enema is easy to make, gives satisfactory results, and involves a worthwhile saving. This saving, of course, increases according to the size of the hospital and the period of time over which this formula is used.

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SOME OBSERVATIONS ON THE USE OF OBJECTIVE TESTS IN PHARMACY.*

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Modern educational theory advances the proposition that besides serving as a basis for selection, examinations should: (1) act as learning exercises and motivate the student to further effort, (2) enable the instructor to judge how closely learning is actually paralleling teaching, (3) aid the instructor in determining whether students have properly attained the objectives set up for the course. Experience in the fields of elementary and secondary education has demonstrated that the traditional essay examination is not adequate as a testing instrument for these purposes. While it is probably the best form of examination yet devised for some purposes, the essay examination offers several disadvantages in a program such as was outlined above. Of these, probably the most important are the highly subjective rating of essay tests and the fact that they are not customarily scaled finely enough to make their results entirely comparable.

In the light of these facts we determined several years ago to attempt the use of objective examinations as a teaching device in pharmacy. At the same time, we have continued to use the essay examinations in our mid-year and final examinations. These new type examinations are truly objective only in the provisions which they make for impartial scoring. Considering this, and in view of the fact that no examination is more valid than the basic assumptions upon which it is constructed, we felt that our first step should be a reformulation of our course aims in terms of minor objectives. Accordingly under the three headings of: (1) factual knowledge objectives, (2) ability to use facts in reasoning, (3) ability to locate and use desired information, we grouped a formidable array of specific objectives. These were gathered from such sources as: Charter's Basic Material for a Pharmaceutical Curriculum, the New York State Pharmacal Syllabus, the National Syllabus, various textbooks, and prescription ingredient surveys. From these lists we have constructed our new type tests.

At one time or another we have attempted to utilize all of the types and modifications of objective tests which we have found in various standardized tests and in literature. For the past two years, however, we have been limiting ourselves to variations of the Matching, Multiple Choice and Completion items. We felt that

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