in the mortality of the two groups. The control group showed a mortality of twenty-four per cent as compared with seven per cent in the group treated with calcium.

We have analyzed our results according to the severity of the infection, believing that by doing so, we should have a better comparison. Fig. 4 compares the mortality as to severity of the disease, giving the number of cases in each grouping. Fig. 5 gives the percentage of deaths in each grouping. It will be noted that the death rate decreased 50 per cent by the use of calcium in the "intense" (+++) group, while in the ulcerated (+++++) group, the mortality was 58 per cent, as compared with 5 per cent in the calcium group. An analysis of the deaths according to age groups further showed that the decrease was more marked in the 60 to 80 year group (see Fig. 3). An analysis of the deaths according to age groups further showed that the decrease was more marked in the 60 to 80 year group (see Fig. 3). An analysis of the deaths according to age groups further showed that the decrease was more marked in the 60 to 80 year group (see Fig. 3). An analysis of the deaths according to age groups further showed that the decrease was more marked in the 60 to 80 year group (see Fig. 3). An analysis of the deaths according to age groups further showed that the decrease was more marked in the 60 to 80 year group (see Fig. 3).

An interesting observation was the decrease in the morbidity (the average number of days of hospitalization) of patients receiving calcium (see Fig. 6). The more rational patients stated there was a marked recession of abdominal cramps as soon as the intravenous injection was given. Some complained of a sensation of intense body heat following the injection. Over 900 injections of calcium were given without any local rea- tion or pain.

REFERENCES

CONCLUSIONS
1. In sixty cases of bacillary dysentery the combined calcium and kaolin method of treatment herein described reduced the mortality by 50% to 75% depending upon the severity of the infection.
2. The period of hospitalization was reduced, but not notably.
3. The best results were obtained with intravenous or intramuscular injections of calcium gluconate supplemented by oral dosage with calcium gluconate and kaolin.
4. Parathyroid extract has but slight value in the intensification of calcium effects and its high cost does not warrant its use.
5. While the detailed action of the calcium and kaolin treatment used cannot be wholly explained, nevertheless, it seems entirely logical that the beneficial effects obtained are due to a combination of several well known properties of both substances.
6. Combined treatment with calcium and kaolin is more satisfactory than therapy with either of these medicaments used alone.
7. The above described therapeutic method is not offered as a specific but as a valuable adjunct to other proved medical measures.

ACETYL-BETA-METHYLCHOLINE chloride (mecholyl) is a choline compound closely related to acetyl choline. In physiologic research and in therapeutics, it has to a large extent replaced this latter drug because it is more nearly a total parasympathetic stimulant. While the general effects of acetylcholine include a parasympathetic effect with the inhibition of cardiac action and an intensification of intestinal tonus, a vasodilating action, and a nicotine-like effect causing a rise in blood pressure when the other actions have been abolished, acetyl-beta-methylcholine, although it is a parasympathetic stimulant and causes a dilatation of the peripheral blood vessels, has no nicotine-like effect. The general physiologic actions of acetyl-beta-methylcholine are (a) marked flushing of the skin extending over the face, chest, and upper part of the abdomen; (b) increased pulse rate; (c) a deeper and slower respiratory cycle; (d) a marked drop in blood pressure; (e) marked salivation; (f) marked laceration; (g) profuse alkaline diaphoresis; (h) slight cyanosis at the tips of the extremities with a drop in the surface temperature; (i) diuresis in certain persons; (j) occasional substernal pressure; (k) changes in electrocardiogram with temporary inversion of T waves in one or more leads; (l) increased intestinal tonus, peristalsis, and defecation rate. To

Human Autonomic Pharmacology

XVII. The Effect of Acetyl-Beta-Methylcholine Chloride on the Gall Bladder*

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the best of our knowledge there are no studies upon the effect of this drug upon this viscus. It is the purpose of this paper to present such a study.

**METHOD**

The patients in this study were all mentally ill but physically normal. All of them were males with an age range of from 22 to 40 years. Each patient was used as a control on himself and on the entire group.

**Control Study.** Before the drug study was started, each patient was given a gall bladder dye test to determine the size and rate of emptying of the gall bladder. The night before the test the patient received a light meal, which consisted of dry toast, tea and sugar. One hour later he was given the gall bladder dye, tetraiodo-phenolphthalein sodium orally. The following morning after a fast of at least 15 hours, X-ray films were taken of the gall bladder region. He was then given a meal rich in fat, which consisted of two slices of white bread thickly spread with butter, and two glasses of a milk and cream mixture into which had been beaten four raw eggs. After lapses of from 1 to 2 hours, X-ray films were again taken. Only those individuals were used in whom there was either a marked diminution or complete absence of the gall bladder shadow on the X-ray films that had been taken after the fatty meal. This method of dye administration and type of meal were used throughout the work.

**Acetyl-beta-methylcholine study.** Group 1. In this series the patient was given 30 mg. of mecholyl subcutaneously after the initial X-ray films of the dye-filled gall bladder had been taken. Two hours after the administration of the drug films were again taken, and the patient was immediately given the fatty meal. The films were again repeated two hours later.

Group 2. In this series after initial X-ray films had been taken, the patient was given 30 mg. of mecholyl subcutaneously, and subsequent X-ray studies were made 5, 15 and 30 minutes, 1, 2 and 4 hours after the drug had been administered. Each patient was then given the fatty meal and the films repeated in 2 hours.

**RESULTS**

Charts 1 and 2 are tracings of gall bladder shadows as visualized on the X-ray films of the patients in Groups 1 and 2 respectively.

Group 1. The effect of mecholyl on the dye-filled gall bladder was studied in these patients before the administration of the fatty meal. The X-ray films that were taken 2 hours after the drug had been given show little, if any, change in the size of the gall bladder shadow. In Cases 6 and 8 there was a slight increase and in Case 7 a decrease in the size of the shadow. The fatty meal was given to the patients and subsequent films, taken two hours later, showed a gall bladder shadow in every instance. In Case 6 the gall bladder shadow had increased in size.

Group 2. In this series of cases the effect of mecholyl on the dye-filled gall bladder was studied at frequent intervals over a 4 hour period before the administration of the fatty meal. These films, taken at 5, 15 and 30 minutes, 1, 2 and 4 hour intervals after the administration of the drug, showed no important changes in the size of the gall bladder shadows. The fatty meal was given to each patient 4 hours after the drug had been administered, and subsequent films showed an absence of the gall bladder shadow in only two cases.

**DISCUSSION**

The motor innervation of the gall bladder is unquestionably autonomic. Mann (1) in 1924 after reviewing the older literature concluded that the parasympathetic and sympathetic nerves to the gall bladder each carry both motor and inhibitory fibers, but that the parasympathetic was predominantly motor and the sympathetic inhibitory. More recent literature (2, 3, 4, 5, 6) on the cat and dog indicates that parasympathetic stimulation has little effect on the gall bladder as measured by evacuation. Whitaker (5) filled the gall bladder of the dog and cat with iodized oil and stimulated one vagus in the neck centrally and peripherally after recovery from anes-