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Further studies on the effect of bacillus acidophilus therapy on indican excretion.

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The beneficial effects obtained with *B. acidophilus* have raised some interesting problems. One of the most recent to receive attention is the influence of *B. acidophilus* ingestion on intestinal putrefaction, particularly as measured by the excretion of indican in the urine. Kopeloff[1] has demonstrated the therapeutic value of *B. acidophilus* milk in correcting constipation in psychiatric patients. The present investigation is concerned with the indican excretion of these patients as compared with that of a similar group which had received no bacillary treatment. It was undertaken because of the frequent assertions in the literature regarding the intimate and causal relationship between indicanuria and mental disease; and with the hope that alleviation of constipation might be found to affect the indican excretion and some light be thereby thrown on the connection between the indican excretion and the mental condition.

About 500 urinalyses were made on 48 psychotic patients of whom 25 were control cases receiving no treatment. Of the controls 4 were extremely constipated, one had diarrhea, and the remaining 20 had good daily defecations. Twenty-four hour specimens of urine were collected and the following determinations made: volume, specific gravity, color, acidity, and indican according to the method of Myers and Fine. A record was kept of the kind and amount of food consumed by each patient daily, and the number and quality of bowel movements. The fecal flora were determined weekly, both plate and microscopic counts. Accepting 5 to 20 mg. daily excretion as the normal limits there were only 13 instances of abnormal excretion in the 500 analyses. Curiously enough six of these occurred in patients having good daily defecations, while six occurred in constipated subjects. The highest value, 46.5 mg., occurred in a patient with diarrhea.

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* Introduced by Nicholas Kopeloff.

[1] Kopeloff, N., *Arch. Int. Med.*, 1924, xxxiii, 47.

There were only 25 instances of an excretion of 15 to 20 mg.; 11 of these were of constipated subjects, 14 of the patients who had good daily defecations. The remaining determinations were all under 15 mg. and about 300 of these were less than 5 mg.

The intestinal flora of many of these patients was transformed from the putrefactive to the aciduric type and frequently the fecal counts showed a transplantation of 95 per cent *B. acidophilus*. The indican excretion continued variable, however, no correlation being observed between that and the intestinal flora.

The titratable acidity, determined by Folin's method, was found to vary with the *B. acidophilus* preparations. Various preparations were used as previously described by Kopeloff[2] There was a distinct rise in the acidity when *B. acidophilus* milk was taken, and an even more conspicuous increase when lactose was added. This indicates the need of caution in feeding large amounts to individuals who may already have a tendency towards acidosis.

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Immunity results obtained in school children with diphtheria toxoid (modified toxin) and with 1/10 L+ mixtures of toxin-antitoxin.

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Excellent immunity results obtained with 3 L+ mixtures of toxin-antitoxin, which were originally underneutralized but had become on standing neutral for the guinea pig, indicated that the toxoid into which the free or slightly bound toxin had been changed was effective as an immunizing agent. Dissociation of the mixture into toxin and antitoxin is probably not of much importance as a factor in active immunization since mixtures that are overneutralized or just neutral when freshly prepared do not give good immunity results. Three doses of a freshly diluted toxin were found to immunize only 33 to 41 per cent of susceptible children, while three doses for a dilution of an old,

[2] Kopeloff, N., *J. Am. Med. Assn.*, 1923, lxxx, 602.