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Occurrence of Organisms Resembling Pathogenic Members of the Colon-Typhoid Group in Long Stored Feces.

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When saline suspensions of human feces, stored in the icebox for many months, are plated on Endo's agar resultant colonial growth is different from that obtained with the same specimens when fresh. In most specimens, so stored and plated, there occurs an abundant growth of small, white colonies of Gram negative, non-sporing, generally motile, aerobic bacilli which exhibit a variety of biochemical activity, failing however to ferment lactose with acid and gas production, even after prolonged incubation.

Some of these organisms culturally resemble paratyphoid, typhoid and dysentery bacilli and may be mistaken for them. Furthermore, certain of the strains give serological cross-reactions with these known pathogens. Possibly they may be involved in gastro-enteritis, apparently water borne, since organisms similar to those we have under study have been reported from such outbreaks.[1]

Clemesha[2] was probably first to observe these organisms. For some reason he named them "Bacillus P", although noting they were a group of organisms not a species. Clemesha found them in fecal suspensions exposed in shallow dishes to the action of sunlight and observed that they appeared when the conditions of the experiment had eliminated the typical coliform bacteria of feces. Parr and Caldwell[3] encountered similar organisms in great numbers in water deriving from wells evidencing old fecal pollution as shown by chemical tests. Parr[4] again mentions them in a study on the viability of coliform bacteria and elsewhere he[5] states that they may be found occasionally in small numbers in fresh feces.

This report deals with 35 strains of the "Bacillus P" isolated from fecal suspensions stored in the icebox (4°C.) for a number of months and in a few instances isolated from fresh feces. The strains were purified by repeated plating and were then subjected to

1 Cooper, M. L., unpublished data.

2 Clemesha, W. W., *The Bacteriology of Surface Waters in the Tropics*, Calcutta, 1912.

3 Parr, L. W., and Caldwell, E. L., unpublished data.

4 Parr, L. W., *J. Infect. Dis.*, 1937, **60**, 291.

5 Parr, L. W., *J. Bacteriology*, 1937, **33**, 75.

detailed pure-culture study. With 5 strains, examples of different cultural types, antisera were prepared.

Of the 35 strains 11 do not ferment any sugar; 18 strains produce acid, but no gas in dextrose-broth, and of these 7 also ferment lactose to the same degree. Six strains ferment dextrose producing both acid and gas. Two strains produce hydrogen sulphide and 6 liquefy gelatin. All strains but 4 are motile. Of the gelatin-liquefiers one is a typical *Proteus* but the other 5 are not. The "Imvic" reaction[6] (indol, methyl red, Voges-Proskauer, and citrate utilization) which is applied to coliform bacteria divides the 35 strains into 5 groups, *e. g.*, — — — +, — — — —, + + — —, — + — +, and — — + +, but these divisions do not correlate with fermentative differences.

Antisera prepared with 5 of these organisms were tested against 10 known strains, *e. g., E. typhi, S. sonnei, S. paradysenteriæ, S. paratyphi, S. schottmuelleri, S. enteritidis, S. choleræ suis, S. aertrycke,* Proteus X_2, and *A. fecalis.* No relationship was shown for Sonne dysentery but cross reactions occurred for *E. typhi* and *S. paradysenteriæ.* Several of our strains suggest *Alcaligenes fecalis* but the serum prepared with one gave only a weak reaction with a known *Alcaligenes* strain. Strongest cross-reactions were obtained with human types of *Salmonella* against serum No. 2 made with one of the paratyphoid-like organisms. Against a known *S. paratyphi* this serum effected agglutination when diluted 1/320, the titer against its engendering strain being 1/5120.

Such reactions mean no more than some degree of common antigenicity, but that cross-reactions as revealed in our preliminary studies do occur between known pathogens and bacteria existing in large numbers in long stored feces would seem to warrant further investigation of "Bacillus P."

[6] Parr, L. W., *Am. J. Pub. Health,* 1936, **26**, 39.