diastolic blood pressure, heart rate and rectal temperature were not significant. No variation in the frequency or amplitude of the alpha waves was observed in 4 subjects during the breathing of oxygen or during the breathing of a mixture (90% nitrogen, 10% oxygen) until the oxygen had been exhausted.

## 9054

## Unrecorded Form of *Bacterium aurescens*, Sole Colon-Group Representative in a Fecal Specimen.

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Chromogenic members of the colon-group are not unknown. MacConkey[1] listed yellow colon-group liquefiers from horse feces, pond water, rain water, roof washings, oats, beans, malt and ears of corn, and he reported a yellow *B. coli communis* from rain water. Rogers, Clark, and Lubs[2] reported that but few grain cultures are without pigment, many being decidedly chromogenic. They stated that this property is correlated with other characters and consequently is of value in classification. In a collection of colon-bacteria from human feces they found chromogenesis almost entirely absent. All their fecal cultures gave a faint yellow color but this was so slight and showed so little variation that it was of no value in differentiation. They did state, however, that there were a few exceptions to this rule. Wood[3] reported that 7 of 20 colon-group strains isolated from grains, hay and dried eggs and milk produced yellow pigment. In his Pocomoke river series Perry[4] encountered 5 cultures of aërobic, non-sporulating bacteria producing gas from lactose which produced a distinct yellow pigment. He excluded these chromogenic strains from consideration as fecal *coli*.

On January 14, 1936, a fecal specimen was received for study. Although the patient complained of certain general symptoms none referred to the gastro-intestinal tract and the analysis was under-

1 MacConkey, *J. Hygiene*, 1909, **9**, 86.

2 Rogers, Clark, and Lubs, *J. Bact.*, 1918, **3**, 231.

3 Wood, *J. Hygiene*, 1919, **18**, 46.

4 Perry, *Am. J. Hygiene*, 1929, **10**, 580.

taken as part of a routine rather than as an indicated procedure. A suitable saline suspension was at once prepared and adequately plated on citrated agar, blood agar, and Endo's agar. A small bit of the stool was placed in a large tube containing 30 cc. of lactose-indicator-broth. In this enriched medium typical acid- and gas-formation was observed in 24 hours. No colonies appeared on the citrated agar although it was heavily inoculated. On the 3 blood agar plates all colonies were inactive and of a size and type suggestive of colon bacilli. On the 3 Endo's plates all colonies were "typical *coli*," showing the well known metallic sheen; and were flat, round, regular and smooth. Twenty-nine colonies were picked from the blood-agar and Endo's plates, 4 for repeated purification and detailed pure-culture study and 25 for a check on their ability to utilize citrate as a sole source of carbon. None of the 29 colonies developed on citrate.

As the pure-culture study proceeded it was noticed that a colored sediment formed in such uncolored broth mediums as those used for the indol, methyl-red, and Voges-Proskauer tests. When grown on ordinary nutrient agar the strains produced a distinct golden-brown insoluble pigment. This pigment formed as well at 37°C. as at room temperature and was as distinct and of practically the same color as that observed for a typical *Staphylococcus aureus*. That pigment-formation is a true biological function of these strains was shown by the constant appearance of pigment on all mediums capable of revealing it and by its persistence, even at 37°C., on serial transfer. One strain put through 25 transfers on agar and in broth in July and August retained throughout its production of the rich golden-brown color.

The organism is an unencapsulated, Gram-negative, non-sporing, motile rod with the characteristic shape, size and arrangement of coliform bacteria. Acid and gas are produced in mediums containing dextrose, lactose, salicin, galactose, and mannite, but not saccharose, dulcite, cellobiose, alpha-methyl-d-glucoside, inosite, raffinose, inulin, or adonite. Litmus-milk is acidified and coagulated as if by *B. coli communis*. $H_2S$ is not produced nor is gelatin liquefied. Indol is formed from tryptophane, the methyl-red reaction is positive whereas the Voges-Proskauer is negative and citrate does not furnish a suitable source of carbon for the growth of the organism.

Bergey (4th Ed.) lists 22 species of *Escherichia*. Of these the chromogenic strain resembles only *Escherichia paragruenthali* and it differs from this recognized species not only in being chromogenic but in failing to ferment raffinose. Following Jordan (11th

Ed.) we prefer to speak of all *coli-aërogenes* organisms as *Bacterium* instead of *Escherichia* (the *coli*) and *Aërobacter* (the *aërogenes*). For the strain described the name *Bacterium aurescens* is therefore proposed.

The serum of a rabbit immunized with *Bact. aurescens* reacted with the homologous strain to a limit of 1:2560, with agglutination complete at 1:640. This serum did not give distinct reactions with any available similar but non-chromogenic coliform cultures. The strain failed to react distinctly with 2 of 3 anti-coli serums at hand. With the third it gave a complete reaction at 1:320. Unfortunately the exact titre for this serum with its engendering strain is not on record. In a group so antigenically heterogeneous such data suffice only to show distinct difference on the one hand and relationship on the other.

Cruickshank[5] placed *Bact. typhi flavum* in the genus *Chromobacterium*. *Bact. aurescens* is an organism whose habitat, biochemical characters and colonial appearance are definitely those of coliform bacteria. None of the 68 species of *Flavobacterium* or of the 10 species of *Chromobacterium* listed by Bergey closely resemble the organism here described.

The original saline suspension prepared January 14 was stored in the cold room. When plated 248 days later the only lactose-fermenting aërobic bacteria recovered were chromogenic *coli* possessing the same biological characteristics as the original *Bact. aurescens*.

We[6] have shown that where an original fecal suspension contains only *coli*, as far as *coli-aërogenes* organisms are concerned, no amount of storage will reveal any other lactose-fermenting aërobic organisms than *coli*. On the other hand, if the original specimen contained *coli* and *aërogenes* or *coli-aërogenes* intermediates, even though these non-*coli* forms be present in such small numbers as to be missed in the original plating, storage in the cold results in their increase at the expense of *coli* to such an extent that plating then reveals them. This fecal specimen, therefore, probably contained a pure culture (disregarding anaërobes, etc.) of *Bact. aurescens*.

This fact and the commonly current belief, with its sanitary implications, that chromogenic *coli* are non-fecal, lead me to describe the organism and report its occurrence.

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[5] Cruickshank, *J. Hygiene*, 1935, **35**, 354.

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