

except as a pathological process. That some such process takes place after ingestion of the cysts by a new host is, of course, possible or even probable.

If "budding" be not a normal process within the bowel, there is no excuse for the naming of a new species. On the other hand, if "budding" be a natural process *E. coli* must be the rarest of intestinal inhabitants and *Councilmania* the commonest.

## 250 (2773)

### Revised formula for the rainbow medium.

By TOYNBEE WIGHT. (Introduced by L. B. Becking).

Since I introduced the Rainbow Medium some three years ago for the study of chemical reactions in the bacterial flora of the gastro-intestinal tract, it has been found possible to simplify the technique of its manufacture to a fool-proof stage.

The formula I now use is:

|                           |          |
|---------------------------|----------|
| Distilled water .....     | 1000 cc. |
| Agar .....                | 20 gm.   |
| Liebig meat extract ..... | 5 gm.    |
| Peptone (Difco) .....     | 20 gm.   |
| Normal soda .....         | 3 cc.    |

Boil till agar all dissolved. Add indicators. (Andrade 10 cc. Saturated aqueous Brom-thymol-blue 40 cc. Saturated aqueous Phenol-sulphone-phthalein 20 cc.—The last indicator may be omitted, though if this be done, the higher degrees of alkaline formation may not be readable).

Filter through a sheet of absorbent cotton repeatedly until the temperature of the filtrate has fallen to 55C. Stir filtrate rapidly whilst adding one gram of Basic Lead acetate in 100 cc. of warm distilled water. Simultaneously add in the correct proportions whatever sugars it is desired to use. Repeat filtration through the cotton two or three times. Fill the tubes to the desired depth. Then plug. Sterilise at 10-15 lbs. for twenty minutes. Make long slants—not short as in double Russell tubes. Stab centrally with needle and stroke surface. (Kligler, for a similar medium, advises stabbing close to the side of the tube at the lower edge of the slant, but this method does not give as much information as the central stab).

Prior to the introduction of the Rainbow medium multiple indicators had not been used in solid media. The advantage of solid medium is that the reaction at any part of the tube may be approximately determined. Bronfenbrenner had previously advocated a mixture of China-blue and Rosolic acid for liquid media.

The middle of the *Rainbow* scale (yellow-green) indicates approximately neutrality. Violet is strong alkali, and red strong acid. It will be noticed among other things that sulphide formation takes place in only alkaline or neutral conditions.

There would seem a possibility that some modification of this medium might be of value to the phyto-physiologist and pathologist.

## 251 (2774)

### The identity of the pigments in the purple bacteria.

By L. B. BECKING.

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There exist certain groups of bacteria which possess a peculiar purple color. This color ranges from a pale bluish pink to a deep crimson, almost like Ruthenium red. The bacteria concerned may be grouped according to their physiological behavior into four distinct classes:

| Name                                    | Chief authors        | Phys. characters                           | React. medium | Relation to oxygen | Relation to light.                                    |
|-----------------------------------------|----------------------|--------------------------------------------|---------------|--------------------|-------------------------------------------------------|
| I. Purple sulphur bacteria. Thiorhodie. | Winogradsky          | Autotrophic                                | Basic         | Oligo-oxyphilous   | Needed                                                |
| II. Molisch bacteria. Athiorhodie.      | Molisch<br>Buder (2) | Heterotrophic. Great carbohydrate consumer | Acid          | Oligo-oxyphilous   | Needed                                                |
| III. Brine bacteria.                    | Peirce               | Heterotrophic. Do without sugar            | Neutral       | Oligo-oxyphilous   | Not needed, but not harmful, even in high intensities |
| IV. "Algal" symbiont of Chloedecton.    | Uphof                | Autotrophic (?)                            | Acid (?)      | (?)                | (?)                                                   |

The morphological variation is also very great.