On February 7th large sloughs appeared on both buttocks in spite of the use of an air bed, etc.; later diarrhoea set in, and the patient succumbed on February 10th, just a month after admission. The treatment maintained throughout was in the direction of local disinfection and supporting the patient's strength, amputation being out of the question.

The case presented many interesting features. The duration of the mental disorder was said to be fourteen days. In any case it was early, so early as to make so gross a trophic change unusual. The gangrene was spontaneous, secondary, infective, the toes being dry and the rest of the foot moist. The exact cause was obscure. Double embolism was possible but not probable, and was practically inadmissible with regard to the sloughs on the buttocks. There was no traumatism, no sore or injury. The question of diabetes arose, but there was neither polyuria nor sugar in the urine. The question of some general change like scurvy, purpura hæmorrhagica, etc., also arose, but succeeding events lent no support to such a view, and the only conclusion one can come to is that the occurrence was due to an obscure neurotrophic change depending upon some morbid change in the central or peripheral nervous system.

A SIMPLE METHOD FOR DEMONSTRATING THE PRODUCTION OF GAS BY BACTERIA.

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The following simple modification of the fermentation tube, which has proved very useful in my hands, appears to be unknown generally. Small test tubes are placed in an inverted position within the ordinary test tubes used for cultivations; it is necessary that they should be freely movable when placed inside. The larger tube is then plugged in the usual manner with cotton wool and sterilised.

The capacity of the small tubes should be measured so that in filling the tubes an allowance of about 50 per cent. in excess of that amount may be made. The tubes are filled in the ordinary manner by means of a burette or other measuring apparatus (a glass three-way cock connected on the one hand with a reservoir, and on the other with a graduated tube, is the form I generally use for all media). They are then sterilised in the steam steriliser on three successive days. In most cases the smaller tubes become completely filled after the first sterilisation; sometimes a tiny bubble remains, but this always becomes disposed of in the second or third steaming; indeed, it is not usual for a bubble to persist after the second. It need hardly be mentioned that the tubes must not be tilted too much when they are inoculated.

The inner tubes can also be filled by boiling the medium *in vacuo* at a low temperature; this was the means of filling which I tried at first; but when the media will not become deteriorated at 100° C., it is much simpler to subject them to the steaming process at the atmospheric pressure.

In testing the power of gas production of any given bacillus in the presence of a given sugar or other fermentable substance, care should be taken that the medium contains no other substances which are capable of producing gas. Theobald Smith has pointed out the importance of using meat broth free from "muscle sugar."

In my own work I never use any meat broth unless the object is to see whether gas is formed from muscle sugar; moreover, care is taken that the media are not exposed to the temperature of 100° C., except when in the neutral condition. A 1 per cent. solution of Witte's peptone (without the addition of salts) in distilled water forms the basis of my gas-testing media. This is carefully brought to the litmus-neutral point by means of a weak solution of citric acid; the substance to be tested (sugar, starch, mannite, etc.) is then added in any desired proportion (1 per cent. is quite sufficient

for most purposes); when this is dissolved the reaction is again tested, and corrected if necessary; the solution is then filtered and placed in the prepared tubes. Some substances, such as mannite, are apt to lead to some precipitation or cloudiness when they have been steamed, so that if a clear medium is desired it must be heated in the water bath, and refiltered or allowed to sediment before it is distributed in the tubes; white of egg is not admissible for clearing purposes.

It should always be remembered that grave alterations may occur in sugars, if they are heated in the presence of acids (mineral) and alkalies. It appears to me that it is an advantage to use media tinted with neutral litmus solution, so that the reducing action of the bacterium on this coloring agent as well as any change of reaction may be observed simultaneously with its gas-producing power.

The use of stab or shake cultivations in gelatinising media, which is one of the modes in common use, necessitates preliminary experiments to ascertain that the gelatine or agar is not a source of possible fallacy; for this purpose combinations have to be tried. Some agar-agar was tested in a strength of 1 per cent.: (1) alone, (2) with peptone, (3) with glucose, by means of two or three of varieties of the *B. coli* group; although growth occurred in the two latter there was no evolution of gas bubbles. The addition of a few drops of glucose solution to the peptone agar, and of peptone to the glucose agar, determined the formation of gas. Gelatine is notoriously variable in its constitution; I have not subjected any samples to this form of test.

The other common mode of determining gas production is by the use of "fermentation tubes"; the form of apparatus described above is, in fact, a modification of the U-shaped "fermentation tube"; but both in filling and in cleansing the use of two separate tubes presents advantages not possessed by the U-shaped tube. Moreover, no special form of rack or support is required. The inoculation of liquid media is less laborious than the process of preparing shake-cultivations.

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A CASE OF PNEUMONIA.

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On February 19th, 1898, B. F., aged 9 years, was found to have well-marked pneumonia on the right side, and some pleurisy near the base in the axillary line. She had a good deal of pain. The temperature was 104° F. and the respiration 40. This pneumonia cleared up under treatment, the temperature falling by lysis, and becoming normal on February 23rd. The physical signs in the lung were clearing well, some pleurisy persisting, and on February 25th and 26th she was so well and bright that she wished to be carried downstairs to the sitting room.

On the morning of February 27th she had again a temperature of 104° F., and intense dyspnoea. There was absolute dullness all over the right lung below the level of the fourth rib behind, with complete absence of local fremitus, resonance, and breath sounds. On February 28th and 29th the temperature varied between 101° F. and 104.5° F., with occasional rigors and perspirations. The diagnosis of empyema was made, and she was admitted into the cottage hospital on the morning of March 1st. The temperature on admission was 103.6° F., pulse 140, and respirations 43. She lay on her back, and turned always towards the left side. There was still complete dullness below the level of the fifth rib, with some ægophony posteriorly. Above the fourth rib the lung was hyper-resonant.

On March 2nd she was seen by Dr. Hurd-Wood, when the physical signs were found to be the same, and he advised exploration for pus, which was done on March 3rd with an aspirator, but with no result. On March 4th the morning temperature was 104.2° F., respirations 30, pulse 136; the evening temperature 99° F., pulse 110, respirations 25. Her condition remained almost unchanged till March 8th, when she was put under chloroform, and the pleural cavity