training on arabinose peptone water, I have succeeded in getting this fermentation in arabinose broths to occur overnight. On plating out at this stage, the plates may consist entirely of pure fermenters. I have not yet tested this character for permanency. All the three above-mentioned varieties agglutinate with a typhoid serum readily.

Glycerine.

Glycerine provides an illustration of another type of variation. Normal *B. typhosus* ferments glycerine. All the recently isolated strains examined, I have found on plating on glycerine agar to be pure fermenters. Three old laboratory strains I examined have shown, however, mixed plates of fermenters and non-fermenters. Subculture of each of these types has given rise to pure races of the respective varieties. After five subcultures on peptone water, these still retained their pure character. Probably this negative variation is due to the laboratory culture, and the loss occurs so slowly as not to show itself in the same red strain after so few as five subcultures.

It is rather remarkable that pure fermenting strains inoculated on glycerine peptone water take about three to four days to produce full acidity and eight months' training does not quicken this period. After one day the litmus is completely decolorized by the fermenting strains, but on agitation it regains its colour and only the faintest trace of acidity is seen.

I have not yet tested whether the non-fermenting strains can be readily retrained, but in glycerine litmus peptone water they do not show any signs of acidity after two or three weeks. Both strains give all the other fermentation and agglutination tests of *B. typhosus*. The agglutinability of the non-fermenting strain is, however, somewhat impaired.

Isodulcitate.

R. Müller has drawn attention to papillae-formation by *B. typhosus* on isodulcitate. This I have observed in all the strains I have examined. Subculture from these, gives rise to colonies no longer able to form these papillae, but growing much more luxuriantly on isodulcitate-agar. I found that subculture of these new colonies on peptone water thirteen times, failed to restore the papillae-forming power in any of the four strains so tested. This is apparently a mutation. Growth of *B. typhosus* on isodulcitate broth frequently does not produce acidity though it may do so as early as one week. By 1 to 3 subcultures at monthly intervals, all strains I have tested give acidity in forty-eight hours.

The above five variants of *B. typhosus* agreed with the normal type in all their other fermentation and general properties, that is, the fermentation variations seemed to arise without any concomitant qualitative variations in respect of other fermentation and general characters.

Unsuccessful Variations.

I have grown *B. typhosus* (12 strains) in peptone water, containing formates, for about eight months, in order to get a gas-forming strain, but so far without results. Adonite, erythrite, saccharose, amygdalin, and salicin have all failed to select out special strains, though they were used for about nine months in each case.

Do the above-described variations undermine the value of sugar tests? I think not. They show, however, their limitations—namely, that laboratory culture can vary them. Short laboratory culture on particular carbohydrates will change the type, and evidently, in the case of glycerine, subculture on ordinary nutrient agar will do it after a long period. Cultures fresh from the blood or excretions of typhoid patients, however, show an almost absolute conformity to type in respect of fermentation characters, whereas the agglutination tests, when applied to freshly-isolated strains, not infrequently break down. It seems to me, therefore, that, in the recognition of these organisms, fresh from the body, the fermentation characters take a pre-eminent position.

In conclusion, I should like to put in a plea for the value of the fermentation tests in elucidating the laws of bacterial variation. They are easily applied, and if once understood would probably explain many of the most difficult problems in connexion with virulence and other properties of micro-organisms.

A CASE OF DIAPHRAGMATIC HERNIA IN AN ADULT.

BY

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MANY cases of congenital deficiency in the diaphragm, chiefly left-sided, in infants have been collected both in this country and abroad, but the instances of the subjects having lived to adult life are extremely rare, and therefore I feel that no apology is required for recording this case.

M. L., aged 26 years, married three years, no children. She was a seven months child, had acute rheumatism thirteen years ago, was always highly neurotic, was a school teacher before marriage, and had been passed as sound by the medical examiner. She never suffered from digestive troubles. She was always very thin and was in the habit of lacing rather tightly.

In August, 1909, she was examined for uterine and bladder trouble and found to have marked anteversion; nothing abnormal was found on palpation of the abdomen.

The patient became pregnant in November.

In March, 1910, she said she had not felt so well for years as she had during her early months of pregnancy.

On May 31st, 1910, she complained of feeling sick, and had "dragging" pains in her abdomen and back; at 3 p.m. she vomited.

On June 1st she was seen by me; her face was very flushed, the respirations 44; pulse 144, regular, low tension; temperature 100.4°. The heart's apex beat was in the fifth space, a little internal to the nipple line; the first and second sounds were normal. The percussion note over the front of the left side of the thorax was dull up to the second rib; above that it was hyper-resonant. The breath sounds were weak except at the third space, where they were bronchial. On the left side at the back there was dullness on percussion, weak breath sounds and diminished vocal fremitus up to the angle of the scapula; above that the percussion note was clear and the breath sounds bronchial; no adventitious sounds were audible anywhere over the left side of the thorax. There was considerable pain at the left costal margin. The patient was constantly eructating about half an ounce of clear yellowish fluid; the bowels acted well. The abdomen was occupied by the pregnant uterus of about seven months.

June 2nd. The patient had a restless night; the pain went away, but the eructations continued, the left back was quite dull on percussion, the breath sounds absent, and the heart's apex beat was in the epigastrium towards the right; aspiration was decided upon, but about 6 p.m. the child was born without any labour pains or warning; the placenta came away normally, and there was very little hæmorrhage. During the kneading of the uterus a large mass was felt in the left iliac and lumbar region; this was thought to be an ovarian cyst, but on examination per vaginam nothing could be made out, and the uterus was quite normal. The patient felt much more comfortable, so it was decided under the circumstances not to aspirate the thorax that night.

On June 3rd my colleague, Dr. Hine, saw the patient with me; the pulse was 144, the respirations 44, temperature 100°; the heart's apex beat was then found to be again in the fifth space, just to the left of the sternum; slight jaundice was noticed. The mass in the left side of the abdomen was freely movable and easily examined, and diagnosed as the spleen. The bowels acted well, the stool being like putty.

June 4th. The patient was markedly jaundiced, the liver edge was felt two fingerbreadths below the costal margin, the eructations continued, the fluid now being quite black; the left thorax remained the same, but the heart's apex beat was again to the right edge of the sternum. The thorax was aspirated in the fifth space at the posterior axillary border and 6 oz. of black fluid came away. The patient became cyanosed and the pulse very small and weak; it was decided not to proceed with the aspiration. The patient continued to vomit small quantities of black fluid throughout the night; she had intense pain on the left side by the costal margin for an hour before death, which took place the next day.

Post-mortem Examination.—The autopsy was made twenty hours after death, at which Dr. Hine assisted me. The uterus was healthy and no larger than is natural after labour; the appendages were normal. The spleen was found five fingerbreadths below the costal margin and approaching the middle line; it was slightly enlarged. The stomach was enormously distended and partially filled with black fluid, about 3 quarts in all; the fundus was situated in the thorax, as far up as the second rib; the pylorus was in its usual position, there being an hourglass constriction where the portion of the stomach passed through the diaphragm, owing to a partial strangulation. In addition the whole stomach was rotated on its long axis; the great curvature was uppermost, the posterior surface being anterior and

covered near the pylorus by the pancreas, which thus became extremely taut. The contents of the fundus could be pressed slowly into the pyloric portion, and the least pressure caused a quantity of the fluid to pour out of the mouth. The stomach walls of the abdominal portion were intensely congested, both internally and externally, and there had been considerable hæmorrhage into the lumen. The large omentum had passed partially through the hernia into the thorax. About one-quarter of the small intestines was in the thorax, and together with the fundus of the stomach and omentum had compressed the left lung against the vertebral bodies. The transverse colon was empty, but still passed horizontally across the abdomen a little below the level of the umbilicus.

The hernia was situated on the left side of the diaphragm, and admitted the whole hand; its edges were formed of distinct muscular bands, the free edge being smooth and rounded; the upper edge formed a well defined falciform border reaching from the middle arcuate

Diagram of the position of the abdominal viscera as found *post mortem*. A, Liver; B, transverse colon; C, distended fundus of the stomach; D, flabby muscular edge of opening in the diaphragm; E, distended posterior surface of portion of the stomach of a bluish-black colour; F, pancreas; G, spleen; H, portion of small intestines and omentum; Z, uterus.

fibres to the attachment of the diaphragm to the twelfth rib.

There was no evidence of any tear or laceration, in fact the condition strongly suggested a long duration, if not a congenital deficiency of the substance of the diaphragm between the middle arcuate fibres and the external arcuate band. There was no sac.

It was of interest to note that after reducing the hernia, that is, pulling back the fundus and intestines into the abdomen, the condition at once recurred, being highly suggestive that this migration into the thorax had been of some considerable standing.

Usually in these cases the hernia apparently takes place accidentally (these must be distinguished from traumatic diaphragmatic hernia), but the cause in this case can only be accounted for by the gradual distension and pressure produced by the pregnant uterus; there was no strain nor violence; the hernia had obviously occurred two days before the child was born prematurely, and the absence of labour pains negatives labour as the cause.

THE President of the United States is appointing special committees in the principal cities of the United States to assist in raising an endowment fund of £400,000 for the American Red Cross Society.

SEVENTY-EIGHTH ANNUAL MEETING OF THE **British Medical Association.**

*Held in London on July 22nd, 23rd, 25th, 26th, 27th,
28th, and 29th.*

PROCEEDINGS OF SECTIONS.

SECTION OF OTOLOGY.

EDWARD LAW, M.D., President.

PRESIDENT'S INTRODUCTORY REMARKS.

In the course of his remarks Dr. Edward Law said:—Without the least desire to unduly magnify the importance of our Section, we may unquestionably congratulate ourselves on forming once again a separate Section of Otology. The wisdom of our isolation from any other recognized Section is self-evident when we consider the marvellous growth of specialism, but I must own that I should like to see our programme varied with, and more liberal hospitality shown to, subjects taken from those closely connected but still unrecognized Sections—Rhinology and Pharyngology. It is impossible, in season or out of season, to too strongly or too frequently reiterate and emphasize the great importance, either from the scientific and clinical aspects or on sordid business grounds, of a more pronounced otological sphere of influence in the nose and throat. Rhinology, thanks to the energy, skill, and foresight of enthusiastic laryngological investigators, has made such rapid and wonderful strides that she is now almost ready and eager to stand alone, and the advisability of a distinct Section is occasionally mooted. Such a desirable or undesirable possibility is encouraged by the apathy of aurists in not introducing naso-pharyngeal subjects more frequently into their discussions, and so permitting another Section to exercise more or less complete control over a domain in which we should be coequal. Unless otologists show more interest and enthusiasm in the naso-pharynx, and so get down to the portal of entrance and bedrock of many aural affections, it is probable that rhinology will assume the rôle of the "predominant partner" in the study and treatment of diseases of the throat, nose, and ear. This prognostication may not be verified, but it should incite otological sections to devote more time and attention to prophylaxis, and to the source of origin of a large majority of cases of deafness and middle-ear suppurations. It is advisable for us, as well as for the State and municipalities, to remember the good old adage, "Prevention is better than cure"; and I should like to draw the attention of the members of this Association, and particularly of this Section, to the very interesting and instructive report of Dr. James Kerr, the eminent and zealous Medical Officer (Education) of the London County Council. It is recorded therein that provision for the medical treatment of defects is for the first time accessible to every child; it shows the dire necessity of the compulsory medical examination of school children; it emphasizes the fact that childhood is often the only time for the preventive treatment of deafness and many other troubles in later life. It records an experiment in the treatment of aural cases, particularly suppurating ears, at their own homes; it points out that the congenitally word-deaf child is no longer to be classed as imbecile and neglected in education. The weighty facts revealed throughout this report demonstrate that our representatives in this hugh metropolis are undertaking social work which a few years ago would have been looked upon as impracticable or Utopian, and which, *inter alia*, must have a most salutary and far-reaching influence on the prevention, early recognition, and treatment of aural affections.

This morning is, perhaps, not an opportune moment to touch upon some controversial topics which at the present time are exercising the minds of many of our members—I allude to whether the examination and treatment just referred to should be carried out at the child's home, or