was 99.2°. At 10 p.m. she was much worse, with a dull, heavy appearance and pains all over the body, but most marked in the lumbar region. Temperature 102.2°.

On January 7th the evening temperature was 99°. On January 8th the evening temperature was 98.4°, and the patient felt quite well. One spot on the left malar bone, one on the right eyebrow, and a symmetrical grouping of about twenty vesicles, surrounded by a red areola in the lumbar region and upper part of buttocks, were present. This case was also reported. None of the patients presented supernumerary vesicles on the vaccinated arms.

I vaccinated one of my own children, also my wife and a patient's baby with calf lymph from the same source. All were successful and without any secondary rash appearing.

The points of interest are that the two primarily vaccinated cases were the first to become infected, and of these the younger one by preference. That although not fully protected, which may be accounted for by the lateness of the operation, still the beneficial effects of vaccination were borne out by the attacks being very modified in type; and, lastly, the saving of the lives of the two younger children. No traces, moreover, remain to show they have had small-pox.

My cases seem to bear out Dr. Hale's conclusions that vaccinia and variola were both running their clinical course together; also the efficacy of vaccinating previously unvaccinated individuals who have already been infected or brought into contact with variola is established.

NOTE ON THE DETECTION OF RAW MILK AND FORMALDEHYDE.

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DURING some recent investigations I have observed a very striking reaction of raw milk which may prove useful in the examination of sterilized or scalded milk. On treating milk with a solution of orthomethylaminophenol sulphate $[(O H). C_6 H_4. N H M e]_2$, $H_2 S O_4$, and then adding hydrogen peroxide solution, a very vivid deep red colour is produced. Milk that has been previously boiled and cooled remains uncoloured, a faint pink only developing on standing. The red colour is so strong and pronounced that so little as 1 per cent. of raw milk, if added to heated milk, may be detected with ease. A convenient way to apply the test is as follows: To 9 or 10 c.cm. of the milk add 1 c.cm. of a recently prepared 1 per cent. aqueous solution of orthomethylaminophenol sulphate and then one drop of commercial hydrogen peroxide solution (circa 3 per cent.). The red colour develops within 30 seconds if there is any raw milk present in the sample. Any slight tint which may subsequently appear should be disregarded. It is important to obtain the best results that excess of hydrogen peroxide should not be added, as it tends to weaken and bleach the colour. Dilute acids do not affect, caustic alkali destroys, the colour. The presence in the milk of boric acid, borax, formaldehyde, or sodium carbonate or bicarbonate does not interfere with the reaction. If the milk has become sour, the acid should previously be neutralized.

It seemed interesting to note the temperature at which the active agent in the reaction was destroyed. Milk maintained at 70° C. for one hour still reacted readily; if kept at 75° C. for half an hour it failed to give the colour. It would appear that the milk loses its power to react at about the temperature at which enzymes are destroyed. It will be seen, therefore, that although the test will not prove that a milk has been properly sterilized by heat, yet any sample giving the reaction cannot have been heated sufficiently, or must after sterilization have been mixed with raw milk. The reaction did not appear to be due to the casein. Milk from which all the fat and proteids separable by saturation with magnesium sulphate had been removed still gave the colour. The probability is that it is caused by the presence in milk of an oxidizing enzyme destructible by heat. This test is not open to the objections which have been urged against the potassium iodide¹ and guaiacum² tests, and it is equal in delicacy to the paraphenylenediamine³ reaction.

As difficulty may be experienced in obtaining the aminophenol derivative I have mentioned, it may be found convenient to use the photographic developing agent sold under the name of "ortol." This substance appears to be a mixture of orthomethylaminophenol sulphate with quinol. The latter body may be removed from it by extraction with ether. In practice, however, the presence of a small quantity

of quinol may be ignored, as it does not interfere with the reaction—indeed, it may slightly assist it.⁴

The reaction will serve as one method of distinguishing orthomethylaminophenol from its isomer paramethylaminophenol. The latter body gives a pale *café au lait* tint to the milk. Its sulphate is well known to photographers under the commercial name of "metol."⁵

It may be worth while recording the result of some experiments with orthomethylaminophenol sulphate as a test for the presence of formaldehyde in milk. I noticed that on adding nine or ten volumes of milk to a 1 per cent. solution of the salt, and allowing the mixture to stand, a pink colour is gradually produced in the presence of formaldehyde. The reaction is quite distinct where the milk contains 1 part in 100,000 of formaldehyde, or more. The length of time necessary for the tint to develop varies considerably with the temperature. On further investigation it appeared that the reaction is really an acceleration of the development of a colour which ultimately is produced in milk free from formaldehyde. This, and the fact that formaldehyde shares the property with other aldehydes and ketones, seriously diminishes its value as a test. It will not, therefore, compare with the modified sulphuric acid reaction of Hehner⁶ or the recent "amidol" (1:2:4—diaminophenol hydrochloride) test of Manget and Marion.⁷

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MEMORANDA: MEDICAL, SURGICAL, OBSTETRICAL, THERAPEUTICAL, PATHOLOGICAL, ETC.

PRIMARY ABDOMINAL PREGNANCY.

IN the leading article of the BRITISH MEDICAL JOURNAL for March 7th on Witthauer's case of primary abdominal pregnancy, it is stated that such a condition as a fertilized ovum developing in the abdominal cavity between the ovary and the tube has not been demonstrated until the publication of Witthauer's case.

I believe that a specimen shown by me at the Obstetrical Society of London in February, 1896,¹ affords at least as strong evidence in favour of primary abdominal pregnancy as Witthauer's case. As the patient unfortunately died from hæmorrhage, a complete examination of all the pelvic viscera was made. The gestation sac was placed between the uterus and the rectum, occupying the whole of the pouch of Douglas, and there was a fetus, 2½ in. in length after immersion in spirit, its development corresponding to that of the tenth week of normal intrauterine gestation. Both tubes and ovaries, with each mesosalpinx, were normal, with the exception that the right ovary contained two small cysts, and the tubes showed no signs of recent dilatation.

The specimen was examined by a Committee of the Obstetrical Society, which reported that, in its opinion, the specimen was probably an example of primary abdominal gestation. The word "probably" was introduced by the Committee because it was held to be possible that a tubal abortion had occurred at a very early stage of gestation, and that the ovum had been completely transplanted to the bottom of the pouch of Douglas, and continued its development in that situation. Obviously such a possibility cannot be excluded in any apparent case of primary abdominal fetation. It is agreed that after a tubal abortion the tube may very rapidly recover its normal appearance. No primary abdominal pregnancy could therefore be discovered so early that it might not be alleged that the ovum might have been first attached in the tube, and afterwards completely transplanted to its new situation. But it can scarcely be argued that, if an ovum whose villi have been damaged by separation from the tube can establish an entirely new attachment to peritoneum and develop there, it is not possible, and indeed much more likely, that a fresh and undamaged ovum can attach itself, in some conditions, to peritoneum. Such cases therefore as mine and Witthauer's, if they do not afford absolute proof that the individual instance was one of primary abdominal fetation, are very strong evidence that such a condition is possible.

¹ *Obstet. Trans.*, vol. xxxviii.