Morbid Anatomy.

(a) *Vessels*.—The digital arteries of the fingers showed very slight thickening, those of the thumb showed obvious thickening in the internal coat. The ulnar artery showed some thickening of the internal coat but the radial artery showed much more pronounced changes.

(b) *Nerves*.—There was no definite sign of recent degeneration in any of the nerves, nor was there an apparent deficiency of nerve fibres or increase of fibrous tissue in the larger nerve trunks or in the digital nerves.

No syphilitic history could be obtained in any of the above cases, nor were there any symptoms or signs of central nervous disease.

I should like to include in this analysis the report of a case by Dr. F. Parkes Weber¹² which he has called an "anomalous and asymmetrical case of sclerodactylia with Raynaud's phenomena." Dr. Parkes Weber is not inclined to consider the case one of erythromelalgia and therefore I do not include it in the analysis. However, it has so much in common with several of these nine cases and I am the more wishful to call attention to the case as the morbid anatomy of the vessels and nerves has been investigated.

A patient, A. B., aged 25, a waiter, had considerably wasting and contraction of the muscles of the left leg; the skin of the left foot was tense, shiny, and livid and decidedly cold to the touch; the colour sometimes was dark purple, almost black. When the foot was made warm he suffered from pain in the foot; there was pain also when the foot was cold; dependency did not produce pain. There was an ulcer of the great toe, the fourth and fifth toes were wanting; the nail on the great toe was absent and those of the two remaining toes were quite horny; there was a scar on the heel; the right foot (except for some scars, purpuric spots, and some pigmentation), was healthy. Both knee-jerks were present; there was no reaction of degeneration and the anterior and posterior tibial arteries pulsated in both limbs. There were no abnormalities of sensation.

Amputation was subsequently performed. Examination of the internal plantar and dorsal arteries showed decided thickening of the middle coat but no endarteritis obliterans or thrombosis; also some thickening of the intramuscular arterioles was noticed. Dr. F. E. Batten examined the nerves and found they were quite normal. Dr. Parkes Weber looked upon the case as one of "idiopathic obliterative arteritis." There were, however, so many symptoms common to this case and those reported in this communication that it is possible to group them together, more particularly as the microscopic evidence in all cases points to vascular change.

Of the 9 cases of erythromelalgia which have been subjected to examination, 1 case (Weir Mitchell and Spiller)⁶ showed what appeared to be a reduction of the number of nerve fibres in a portion of nerve excised with an increase of fibrous tissue; there was, however, no anaesthesia in those parts to which the nerve was distributed; there were changes in the arteries. In another case (Auerbach)¹⁰ there was degeneration of certain posterior nerve roots, but the peripheral nerves were quite healthy. (No mention is made of the morbid anatomy of the vessels in this case.) In Weir Mitchell's first case⁶ the nerves showed no change, but changes were present in the arteries; in his second case⁷ the nerves removed were quite healthy. Dehio's case⁹ showed narrowing of the lumen of the artery, with thickening of the intima, and no changes were found in the ulnar nerve. In Sachs' and Wiener's case the vascular changes were probably primary, and the increase of fibrous tissue in the nerve trunks was probably secondary.

In the cases reported in this communication vascular change was present in all (least in Case III). Such change was mostly an increase in the intima of the arteries, and occasionally thrombosis and changes in the inner coat of the veins. The nerves were investigated even to their terminations, and no degeneration was found, nor was there any suggestion of increase of fibrous tissue in the trunk of the nerves.

Dr. Parkes Weber's case, even though it is not called erythromelalgia, at any rate affords proof that many of the leading symptoms, so like those of erythromelalgia, are associated with vascular changes, the nerves being quite normal.

In no case has recent degeneration of nerve fibres been demonstrated, and in not one of the nine cases analysed was anaesthesia ever present. As a result of a consideration of these reported cases, it would appear that erythromelalgia when occurring independently of central nervous change, is associated with but one morbid picture, that of local vascular change.

I desire to express my gratitude to my colleagues for permission to make use of the clinical reports and the material of their cases, and to Mr. Sherstone Baker for sending for examination the foot amputated in Case I.

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PREVACCINATED SMALL-POX.

By J. DUNCAN HOWE, M.R.C.S., L.S.A.,

Preston.

THE article in the BRITISH MEDICAL JOURNAL for January 17th, 1903, is very interesting. When it appeared I was about to send my notes on the following cases, believing them to be unique.

The source of infection was the father of the family, who consulted me on December 15th, 1902. He had sickened the day previously (December 14th) immediately after dinner, with vomiting, shivering, and epigastric pain. The pain became general all over the body, particularly in the lumbar region. He now looked very ill; the tongue was furred, and the temperature 101.6°. He was sent home to go to bed, and was given a diaphoretic mixture to be taken every two hours. On December 16th the temperature was 100°; he was perspiring profusely, and felt much better.

On December 18th the patient, whom I had not visited on the previous day, walked into my surgery at 9.30 a.m. Fortunately there was no one else there at the time, and I saw him at once. He expressed himself as feeling quite well, and intended going to work as an extra help at the post office, but thought he had better call in and tell me. As it was rather dark I did not notice his face, but on taking his pulse I immediately saw the rash on his wrist, and then on looking elsewhere found it well marked on his face, head, body, and limbs, including the soles of the feet and the palms of the hands.

He was removed to hospital early the same day. The rash had evidently appeared late on December 16th or early on the 17th, because on the 18th it was observed that it was taking a rapid course. He had been vaccinated once in infancy. I could not trace how he became infected, but there were several cases from other parts of the town in hospital.

On December 20th the wife and three children were vaccinated by me, the two youngest being primary. Four insertions were made in all of them, and all were successful except in the eldest child and the mother, in whom three out of four took. The ages of the children are 7, 9, and 11 years respectively. It will be noticed that the vaccinations were not performed until two days after their father had been removed to hospital, or five days after the appearance of the rash. The mother would not give her consent before because her husband was known to be averse to it. My next visit to the house was on December 25th, and there was nothing unusual to note.

On December 28th, the ninth day of vaccination, and the twelfth or thirteenth day of "contact," one of the primarily vaccinated cases was very ill. It was considered to be due to the constitutional disturbances of vaccinia. A diaphoretic mixture was given, and some simple local treatment. On December 30th, on inquiry at the house, it was found that the patient was "all right." I did not go in and see the case.

On January 6th, 1903—the eighteenth day of vaccination and twenty-first of "contact"—the rash was first seen by me. The temperature was subnormal and the patient apparently quite well. The rash consisted of vesicles on the flexor surfaces of the upper limbs and fronts of the thighs. The other parts of the body showed small scabs. The other primarily vaccinated child was shown to me on January 2nd. I then saw two vesicles in the right popliteal space. There were doubtful abortive spots on the face and body. I gave it as my opinion—scabies having been precluded—that the rash was of a very doubtful nature, but might be a general vaccination rash—that is, cow-pox. I was called in on January 6th to see the eldest girl, and I then formed the opinion that all three had modified small-pox, and reported them accordingly.

The last of the children sickened on January 4th, with vomiting, headache, and pains in the lumbar region. On January 6th, at 11.30 a.m., the symptoms were the same, but there was no vomiting. The temperature was 100.4°, and at 8.30 p.m. 102.2°.

When I visited early in the day the mother was as well as usual. At 8.30 p.m. she was lying down on the sofa with shivering, headache, and general pains. Her temperature

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.

By J. E. SAUL, Ph.C., F.I.C.,
London.

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.