which God has created. Therefore, the tiger is given a triangular muscle with a certain amount of loss of force, but there is a gain by spreading the muscle over a great surface, a gain in the packing and shape of the leg—there is more gained than lost by the apparent sacrifice of force.

An interesting fact may here be stated, the extreme beauty of which every anatomist present will appreciate. We can demonstrate, and I ask you to take it for granted, that the resultant force of the fibres of quadrilateral and triangular muscles lies in the bisector of the vertical angle. When I take the triangular muscle in the leg of the tiger, and draw the bisector of that angle on a tiger's dead body, I find that the bisector of the angle passes rigorously through the top of the fibula, the peroneal or small bone of the tiger's leg, through the very spot in which the biceps muscle in my leg is inserted; so that, although the tiger's muscle is triangular, it really behaves like an imaginary muscle working along an imaginary line, passing from the same point in the tiger from which it passes in my pelvis to the very same point, the top of the fibula, to which it is attached in my leg also. Here Nature is not to be accused of departing from the principle of least work. In this case, the strict carrying out of that principle would injure her in other ways, as in the packing of the muscles; therefore she has deliberately abandoned it, making a small sacrifice in order to obtain a greater advantage. Nature always acts upon the French proverb, "*Reculer pour mieux sauter*." I have said before that she is at perfect liberty to use, as far as I am concerned, either the penniform or the prismatic muscle; and I cannot criticise her proceedings in that respect. Still her use of the penniform muscle is very sparing, as if she did not like to use her resources except when they were absolutely necessary. We find, although there is no loss of force in a penniform muscle, it is a rare form of muscle, and only resorted to when there is a worthy object. The most remarkable example I can give you of the penniform muscle in Nature is the muscle which lifts the wing of the bird. The bird's wing is depressed by great and powerful muscles, which I shall describe at the close of the lecture: it is lifted by a small compact muscle, which is placed upon the breast of the bird, in order to keep the centre of gravity of the bird as far back as possible. It is worthy of remark, that in the case of the ostrich, which does not fly, Nature places this muscle on the neck of the bird, because it is no injury to the ostrich to have the muscle on the neck; whereas it would be destruction to any other bird to have it so. This muscle placed upon the breast works by a tendon passing through a pulley, and changes through an angle of 180 degrees in its application, so as to lift the wing of the bird. The nature of a bird's flight is this: The depressor muscles of the wing must be made enormously great, to strike the air with the utmost force; the muscles which lift the wing must be made as light and small as possible, because their only object is to bring back the wing through the air after the stroke is made; this ought to be done in the shortest possible time, because, while the wing of the bird is rising through the air, the bird is falling: therefore we find that Nature, or rather the great Author of Nature, always employs the penniform muscle to lift a bird's wing; and for this reason, since the fibres converge at an angle towards each other, by compounding their forces the velocity along the diagonal is greater than it would be in a prismatic muscle. Thus no force is lost; and the bird is enabled to repeat the downward stroke much faster than if the prismatic form of muscle had been retained.

[To be continued.]

A CASE OF SMALL-POX USHERED IN WITH ROSEOLA VARIOLOSA.

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THERE are certain points of special interest in a case of small-pox formerly under my care in the Alice Hospital, Darmstadt, which render it somewhat worthy of notice at the present time. In reading the notes of the case, it will be observed that there was an almost total absence of premonitory symptoms at the commencement of the disease. The patient complained merely of slight headache and nausea, supposed to be due to the morphia given to relieve the sciatic pain. The invasion of the secondary fever was characterised by symptoms of unusual violence. Most commonly the secondary fever is noticed by an increase in the temperature. So it was in this case, but in addition there were repeated rigors of great severity. The first appearance of rash was in the right groin, where it was definitely localised. The eruption was from the first papular, but the papules were so closely aggregated together as to give a uniform aspect to the part, and this was more marked when the rash had spread to the left groin over the lower part of the abdomen. In his work on *Diseases of the Skin*, Hebra mentions some unusual

forms of rash noticed at an early stage of the disease, and "before the appearance of the true eruption." In one form—*roseola variolosa*—the duration of the efflorescence is very short, and it fades away as the characteristic papules become fully developed. In another form, he describes a rash which appears as a mere hyperæmia—or, in other instances, of an hæmorrhagic nature—at the lower part of the abdomen and upper parts of the thighs. The true small-pox eruption begins two or three days after its appearance. My case would seem more to resemble the *roseola variolosa*, differing from it, however, in the localisation of the rash, which rendered diagnosis extremely difficult, and caused no suspicion of small-pox. When the eruption had become more extended over the abdomen, it had some of the features of the second form described by Hebra.

The notes of the case are as follows. Carl Dietewig, aged 25, private in the 4th Hessian Infantry Regiment, was admitted into the Alice Hospital on December 11th, 1870. The patient stated that he had been ill for four weeks, during two of which he was in a lazareth near Orleans, with diarrhoea, but he had had no fever. On admission, he complained of pain in the course of the right sciatic nerve. This pain had continued for some days, and it had prevented him from walking. There was no tenderness on pressure, and no wasting of the limb. With this exception, he expressed himself, and to all appearances was, perfectly well.

Dec. 15th.—The patient could not sleep, owing to severe pain in the right sciatic region. In the evening he had a subcutaneous injection of a quarter of a grain of morphia.

Dec. 16th.—He slept well and had less pain. He complained of headache and a constant feeling of sickness.

Dec. 17th.—He was much the same as yesterday. A copious closely aggregated papular eruption appeared on the right groin. It was of a deep red hue. There was no irritation.

Dec. 18th.—The rash had spread over the lower part of the abdomen to the left groin, and as high as the umbilicus. The eruption was symmetrical. His appetite was good, and he felt well. The temperature at midday and in the evening was 104 deg. Fahr.

Dec. 19th.—Morning temperature 104 deg. Fahr.; pulse 120. Some fresh papules had appeared higher up on the abdomen, chest, forehead, and wrists. The evening temperature was 104.3 deg. Fahr.

Dec. 20th.—The morning temperature was 102.7 Fahr.; pulse 112. The patient had slept well. He had no pain. His appetite was good. The rash had spread copiously over the face, back, and arms. The papules were of a purple-red colour, and varied in size. On the abdomen where the spots were closely aggregated together, the appearance at a short distance was strikingly like that of erysipelas, though the colour was somewhat darker. On the back the papules were innumerable. On the original site of the rash—the right groin—the red blush was not so marked, and each isolated spot was not so red, nor so elevated. His face was uniformly swollen. There was some irritation about the eyes and nose. The evening temperature was 104 deg. Fahr.

Dec. 21st.—The morning temperature was 100.9 deg. Fahr.; pulse 104. On the right tonsil could be seen three or four white patches, each circumscribed, circular, and of the diameter of a small pea. On the right groin the eruption had almost disappeared. On the face it was in great part vesicular and pustular. The evening temperature was 103.1 deg. Fahr.; pulse 110.

Dec. 22nd.—The patient had slept well. With the exception of pain on swallowing, the patient said that he felt well. His face was very much swollen; eyes closed. On the arms each spot had a circumscribed red base; on this was an elevated flat disc of a pale yellow colour, and with a marked central depression. On the face many of the spots had run together. The tongue was thickly furred. He said that he was once vaccinated when a child, but no definite cicatrix was visible. The morning temperature was 99.5 deg. Fahr.; the evening temperature, 102.5 deg. Fahr.

Dec. 24th.—The morning temperature was 100.4 deg. Fahr. The patient slept well. He had no pain. This morning he had several "shivering" fits, during which his teeth chattered, and the bed was shaken violently. His legs were now covered with the eruption. The face was more swollen. Some of the spots on the face had burst. All were of a muddy yellow colour. He was said to have been breathing with difficulty, but at 6 P.M. there was no evident difficulty of respiration, and air entered his chest freely. His urine did not contain albumen. The evening temperature was 104.2 deg. Fahr.; pulse 120.

Dec. 25th.—In the morning the temperature was 104 deg. Fahr.; respiration 32. There was a great and apparent change for the worse. His breathing was anxious and laborious, and there was evidence of much obstruction. The face and hands were livid. He complained of "slime" in his throat. The patient died at 11.30 A.M.

There was no necropsy.